

NIRMA UNIVERSITY OF SCIENCE AND TECHNOLOGY
Institute of Diploma Studies
Course Structure for Diploma in Electronics & Communication Engineering

Semester-I

| Sr. No. | Course Code | Course Name | Teaching Scheme | | | | Examination Scheme | | | | | |
|---------------|-------------|----------------------|-----------------|-----|-----|--------|--------------------|-----|-----------------------|------|------|------|
| | | | Hours / Week | | | Credit | Hours | | Examination Weightage | | | |
| | | | L | T | P | | MSE | SEE | Lect | | TA | LPW |
| | | MSE | SEE | MSE | SEE | | | | | | | |
| 1. | 1HMF02 | Communication Skills | 2 | 2 | - | 4 | 1.5 | 3 | 0.25 | 0.60 | 0.15 | - |
| 2. | 1MAF03 | Mathematics-I | 4 | 1 | - | 5 | 1.5 | 3 | 0.25 | 0.60 | 0.15 | - |
| 3. | 1SCF05 | Science-I | 4 | - | 2 | 5 | 1.5 | 3 | 0.20 | 0.40 | 0.15 | 0.25 |
| 4. | 1CLH03 | Applied Mechanics | 3 | 1 | 1 | 4 | 1.5 | 3 | 0.20 | 0.40 | 0.15 | 0.25 |
| 5. | 1CEH05 | Computer Application | - | - | 4 | 2 | - | - | - | - | - | 1.00 |
| 6. | 1IAF05 | Internet Application | - | - | 2 | 1 | - | - | - | - | - | 1.00 |
| Total: | | | 13 | 4 | 9 | 21 | | | | | | |

Semester-II

| Sr. No. | Course Code | Course Name | Teaching Scheme | | | | Examination Scheme | | | | | |
|---------------|-------------|----------------------------------|-----------------|-----|-----|--------|--------------------|-----|-----------------------|------|------|------|
| | | | Hours / Week | | | Credit | Hours | | Examination Weightage | | | |
| | | | L | T | P | | MSE | SEE | Lect | | TA | LPW |
| | | MSE | SEE | MSE | SEE | | | | | | | |
| 1. | 1HMF01 | English | 2 | 2 | 2 | 5 | 1.5 | 3 | 0.20 | 0.40 | 0.15 | 0.25 |
| 2. | 1MAF04 | Mathematics-II | 4 | 1 | - | 5 | 1.5 | 3 | 0.25 | 0.60 | 0.15 | - |
| 3. | 1SCF06 | Science-II | 4 | - | 2 | 5 | 1.5 | 3 | 0.20 | 0.40 | 0.15 | 0.25 |
| 4. | 1MEH01 | Elements of Engineering Graphics | 3 | - | 4 | 5 | 2 | 4 | 0.20 | 0.40 | 0.15 | 0.25 |
| 5. | 1MEH02 | Shop Skills | - | - | 2 | 1 | - | - | - | - | - | 1.00 |
| 6. | 1CFF08 | Computer Fundamentals | 2 | 1 | 2 | 4 | 1.5 | 3 | 0.20 | 0.40 | 0.15 | 0.25 |
| Total: | | | 15 | 4 | 12 | 25 | | | | | | |

L – Lecture, T - Tutorial, P – Laboratory/Project work (LPW), TA – Term Assignments, MSE – Mid Semester Examination, SEE – Semester End Examination.

NIRMA UNIVERSITY OF SCIENCE AND TECHNOLOGY
Institute of Diploma Studies
Course Structure for Diploma in Electronics & Communication Engineering

Semester III

| Course Code | Course Title | Teaching scheme (Hrs./Week) | | | Crédit | Evaluation Scheme | | | | | | |
|-------------|--------------------------------|-----------------------------|----------|----------|-----------|-------------------|-------------------|------|---------------------|--------|------|-----|
| | | L | T | P | | C | Examination Hours | | Component Weightage | | | |
| | | | | | | | MSE | SEE | T. A. | L.P.W. | MSE | SEE |
| 1MAH11 | Mathematics - III | 3 | 1 | - | 4 | 1.5 | 3 | 0.15 | - | 0.25 | 0.60 | |
| 1ITH04 | Programming Methodology | 2 | 1 | 2 | 4 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 | |
| 1ECB01 | Electronics Devices & Circuits | 3 | - | 2 | 4 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 | |
| 1ECB06 | Electronics Networks & Lines | 3 | 1 | - | 4 | 1.5 | 3 | 0.15 | - | 0.25 | 0.60 | |
| 1CCS05 | Interpersonal Skills | 2 | 1 | - | 3 | 1.5 | 3 | 0.15 | - | 0.25 | 0.60 | |
| 1SPG0 | GDC-I* | 3 | - | - | - | - | - | - | - | - | - | |
| | Total | 16 | 4 | 4 | 19 | | | | | | | |

* Actual hours and Examination Scheme depend on course offered

Semester IV

| Course Code | Course Title | Teaching scheme (Hrs./Week) | | | Crédit | Evaluation Scheme | | | | | | |
|-------------|-------------------------------|-----------------------------|----------|-----------|-----------|-------------------|-------------------|------|---------------------|--------|------|-----|
| | | L | T | P | | C | Examination Hours | | Component Weightage | | | |
| | | | | | | | MSE | SEE | T. A. | L.P.W. | MSE | SEE |
| 1ECH08 | Consumer Electronics | 3 | - | 2 | 4 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 | |
| 1EEH12 | Basic Electrical Engineering | 3 | - | 2 | 4 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 | |
| 1ECB02 | Linear Integrated Electronics | 3 | 1 | 2 | 5 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 | |
| 1ECB04 | Digital Electronics | 3 | 1 | 2 | 5 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 | |
| 1ECA03 | Industrial Electronics | 3 | - | 2 | 4 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 | |
| 1SPG0 | GDC-II * | 3 | - | - | - | - | - | - | - | - | - | |
| | Total | 18 | 2 | 10 | 22 | | | | | | | |

* Actual hours and Examination Scheme depend on course offered

NIRMA UNIVERSITY OF SCIENCE AND TECHNOLOGY
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Semester V

| Course Code | Course Title | Teaching scheme (Hrs./Week) | | | Crédit | Evaluation Scheme | | | | | |
|-------------|---|-----------------------------|---|---|--------|-------------------|-----|---------------------|-------|--------|------|
| | | | | | | Examination Hours | | Component Weightage | | | |
| | | L | T | P | | C | MSE | SEE | T. A. | L.P.W. | MSE |
| 1ECB03 | Electronics Instruments & Measurements | 3 | - | 2 | 4 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 |
| 1ECB05 | Microprocessor Architecture & Interfacing | 3 | 1 | 2 | 5 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 |
| 1ECA01 | Communication Engineering – I | 3 | - | 2 | 4 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 |
| 1ECA04 | Fiber Optics Communication | 3 | - | 2 | 4 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 |
| 1CCS01 | Entrepreneurship Development | 3 | - | - | 3 | 1.5 | 3 | 0.15 | - | 0.25 | 0.60 |
| 1CCS03 | Marketing Management | 3 | - | - | 3 | 1.5 | 3 | 0.15 | - | 0.25 | 0.60 |
| | Total | 18 | 1 | 8 | 23 | | | | | | |

Semester VI

| Course Code | Course Title | Teaching scheme (Hrs./Week) | | | Crédit | Evaluation Scheme | | | | | |
|-------------|--------------------------------------|-----------------------------|---|----|--------|-------------------|-----|---------------------|-------|--------|-----|
| | | | | | | Examination Hours | | Component Weightage | | | |
| | | L | T | P | | C | MSE | SEE | T. A. | L.P.W. | MSE |
| 1ECT01 | Industrial Training (Phase-I) * * | - | - | - | 10 | - | - | - | 1.00 | - | - |
| 1ECA08 | Seminar* | - | - | 6 | 1 | - | - | - | 1.00 | - | - |
| 1ECA09 | Electronics Workshop* | - | - | 6 | 1 | - | - | - | 1.00 | - | - |
| | Total | - | - | 12 | 12 | | | | | | |

* 5 Weeks Full Time

** 10 Weeks Full Time

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Semester VII

| Course Code | Course Title | Teaching scheme (Hrs./Week) | | | Crédit | Evaluation Scheme | | | | | | |
|-------------|----------------------------------|-----------------------------|---|----|--------|-------------------|-------------------|------|---------------------|--------|------|-----|
| | | L | T | P | | C | Examination Hours | | Component Weightage | | | |
| | | | | | | | MSE | SEE | T. A. | L.P.W. | MSE | SEE |
| 1ECA02 | Communication Engineering – II | 3 | - | 2 | 4 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 | |
| 1ECA05 | T.V. Engineering | 3 | - | 2 | 4 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 | |
| 1ECA06 | Antenna & Microwave Engineering. | 3 | 1 | 2 | 5 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 | |
| -- | Advance Technology Course-I# | 3 | - | 2 | 4 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 | |
| -- | Advance Technology Course-II# | 3 | - | 2 | 4 | 1.5 | 3 | 0.15 | 0.25 | 0.20 | 0.40 | |
| | Total | 15 | 1 | 10 | 21 | | | | | | | |

Semester VIII

| Course Code | Course Title | Teaching scheme (Hrs./Week) | | | Crédit | Evaluation Scheme | | | | | | |
|-------------|---------------------------------------|-----------------------------|---|----|--------|-------------------|-------------------|-----|---------------------|--------|-----|-----|
| | | L | T | P | | C | Examination Hours | | Component Weightage | | | |
| | | | | | | | MSE | SEE | T. A. | L.P.W. | MSE | SEE |
| 1ECT02 | Industrial Training (Phase-II) * * | - | - | - | 10 | - | - | - | 1.00 | - | - | |
| 1ECA07 | Project Work * | - | - | 18 | 3 | - | - | - | 1.00 | - | - | |
| | Total | - | - | 18 | 13 | | | | | | | |

* 5 Weeks Full Time

** 10 Weeks Full Time

L – Lecture, T - Tutorial, P – Laboratory/Project work (LPW), TA – Term Assignments, MSE – Mid Semester Examination, SEE – Semester End Examination.

SYLLABUS - 10⁺
FIRST YEAR OF DIPLOMA PROGRAMME

1HMF01 ENGLISH

L T P C
2 2 2 5

1. Short Stories

Introduction. Reading (aloud/silent, individually/group). Giving the plot/gist of the story (summarizing skills) – oral and written. Framing and Answering questions – oral and written.

Vocabulary exercises: Identifying new words, word attack skills- finding meanings, word and idea generation skills, using the words in sentences.

2. Grammar

Determiners, Auxiliary verbs, Tenses, Subject – verb agreement

3. Letter – writing

Personal letters – letters to friends and relatives

Social Letters – Application for leave, letter of apology, thanks giving and letters of invitation

4. Prose Units

Introduction. Reading (individually/group, aloud/silent). Answering / framing questions (orally and in writing). Summarizing the passage, highlighting the main points.

Vocabulary exercises: Identifying new words, finding meanings, word and idea generation skills, using the words in sentences.

5. Paragraph writing

Describing a machine, incident, situation, a person, a phenomenon (scientific), a process (technical) or an event

6. Grammar

The passive, Infinitives, Prepositions, Clauses and connectors, Modifiers

Tutorials: It will consist of minimum of ten tutorial assignments based on above topics.

1MAF03 MATHEMATICS – I

L T P C
4 1 - 5

1. Trigonometry

Measurement of angles – Degree and radian, Area of sector and arc length, Trigonometric functions – Addition formulae and allied angles, Factor formulae – Formulae for multiple and sub multiple angles, Inverse trigonometric functions, Properties of a triangle – Solution of a triangle

2. Co-ordinate Geometry

Point

Distance formula for R^2 , Centroid of a triangle, Division of a line segment

Straight Line

Equation of a straight line in R^2 , Slope of a straight line, Intercepts on axes, Equation of a straight line passing through two points (x_1, y_1) and (x_2, y_2) , Equation of a straight line having slope m and passing through the point (x_1, y_1) , Equation of a straight line having an intercept on y-axis and slope m , Parallel and perpendicular straight lines, relation between their slopes, Angle between two straight lines, perpendicular distance from a fixed point of a line

Circle

Equation of a circle having its centre at (h,k) and radius r , General equation of a circle
General equation and rough sketch of parabola, hyperbola, ellipse

ALGEBRA

3. Reorientation of indices and logarithm

4. **Surds**

Definition & concept, Simple examples on surds, Square root of surds, Examples on square root of surds

5. **Determinants**

Definition of determinants, Order of determinants, expansion of determinants of order 2 and 3, solution of equations by determinants (Cramer's Rule)

6. **Arithmetic and geometric progression**

Sequence and series, Arithmetic progression – definition, formulae for n^{th} term of an A.P., sum of n terms of an A.P., Definition of arithmetic mean, Examples, Geometric progression – definition, formulae for n^{th} term of a G.P., sum of n terms of a G.P., Definition of geometric mean, Examples

7. **Binomial Theorem**

Definition of ${}^n P_r$ and ${}^n C_r$, Statement of Binomial theorem, General term and middle term for positive integral index, Application of Binomial theorem for approximate values

8. **Introduction to a Matrix**

Definition of a matrix, Different types of matrices, Addition and subtraction of matrices, Multiplication of matrix by a scalar, Multiplication of two matrices, Transpose of a matrix, Adjoint of a matrix, Inverse matrix of order 3, Solution of two linear simultaneous equations in R^2 , Solution of three linear simultaneous equations in R^3

Tutorials: It will consist of minimum of ten tutorial assignments based on above topics.

1SCF05 SCIENCE – I

L T P C
4 - 2 5

1. **Units and Dimensions**

Introduction, Fundamentals and derived units, Dimensions of physical quantities

2. **Gravitation**

Gravitation, Newton's law of gravitation, Definition and derivation of unit of 'G', Acceleration due to gravity, Satellite, Escape Velocity, Critical Velocity, Communication Satellite.

3. **Gas laws and specific heat of gases**

Boyle's, Charle's and Gay-Lussac's laws, Absolute zero temperature and Kelvin scale, General gas equation $PV=nRT$, Specific heat of gases. C_p & C_v and relation between C_p & C_v , Thermal conductivity, coefficient of thermal conductivity and temperature gradients.

4. **Surface tension and viscosity**

Surface tension and its molecular theory, Determination of surface tension using capillary tube and its application, Viscosity and Newton's law for viscous force. Coefficient of Viscosity, Poiseuille's and Stoke's methods to determine viscosity. Application of viscosity.

5. **Sound waves, acoustic of buildings and ultrasonic**

Sound wave – wavelength – frequency - speed relation - transverse and longitudinal waves, Echo and reverberation of sound. Sabine's formula, Acoustical planning of auditorium, Ultrasonics – Piezo – electric method. Application of ultrasonics.

6. **Modern Physics**

LASER – Principle and its production, Application of LASER, Nature of X-rays, their production, Properties and application of X-rays, Photoelectric effect

7. **Atomic Structure**

Modern Atom – Composition of Atom, Distribution of electrons in shells – Energy levels and sub-energy levels, Atomic orbitals, Aufbau principle, Electronic configuration of atoms, Electronic configuration of inert gas elements, Electronic theory of valency - Types of valency, Formation of electrovalent and covalent compounds

8. Fundamental of basic chemistry

Chemical formula and molecular weight – Equivalent weight, Mole concept, Concentration of solutions, Types of chemical equation – Calculation on basis of chemical equation

9.

Ionisation

Atoms & ions, Ionisation – Factors affecting the ionisation, Degree of ionization, Ionic equilibrium in water – Concept of pH and its importance in engineering field, Electrolysis and their applications

10. Basic concepts of organic compounds

Introduction to organic compounds – Difference between inorganic and organic compounds, Characteristic of organic compounds, Classification of organic compounds, Utility of various organic compounds in human life

Practical / Term - work - Practical / term-work will consist of minimum ten experiments / exercises based on above topics.

1CLH03 APPLIED MECHANICS

L T P C
3 1 1 4

1. Fundamentals

Fundamental units, Derived units, System of units, Scalar and vector quantities, Introduction to applied mechanics.

2. Forces And Resolution of Forces

Concept of particle and rigid body: Force, its characteristics and effects, system of forces., principle of transmissibility. Resolution of force: into two mutually perpendicular component, into two non – perpendicular components

3. Composition of Coplanar Forces

Composition of forces by using: Parallelogram law of forces, Triangle law of forces, Polygon law of forces, Method of Resolution.

Moment of force, Couple and its characteristics, Varignon's theorem and its applications, Solution of simple problems on above topics

4.

Equilibrium

Equilibrium of system of forces and equilibrant, Conditions of equilibrium, Type of supports and reactions at support. Space, free body and force diagrams and their use, Lami's theorem and its applications, Equilibrant for simple system of coplanar forces.

Beams: Type of beams, point load and uniformly distributed loads, Simple, Roller and Hinge support, and reactions at supports.

Solution of simple problems based on above topics.

5. Friction

Limiting friction, angle of repose, coefficient of friction, laws of static friction, Simple problem based on horizontal plane and inclined plane.

6. Centre of Gravity

Centroid of linear and plane element, C.G. of solid, Solution of simple problems based on regular and

composite shapes made up of regular shapes.

7. Simple Lifting Machine

Definitions: Effort, load, Mechanical advantage, velocity ratio, input, output, efficiency, ideal machine, reversibility and condition for reversibility of machine, law of machine.

Solution of simple problems based on simple lifting machine like:

Pulley block system (single sheave, two sheave and three sheave block system), Simple axle and wheel, Differential axle and wheel, Simple screw jack, Single purchase crab, Double purchase crab, Weston's Differential Pulley block.

8. Rectilinear Motion

Basic concepts and definitions: Motion, Rectilinear motion, displacement, distance, velocity, speed, acceleration, uniform velocity, average velocity, instantaneous velocity, uniform acceleration.

Equations of rectilinear motion with uniform acceleration, distance traveled by a particle in n^{th} second, velocity time diagrams, equation of motion under gravity, distance traveled by freely falling body during n^{th} second after it is dropped, velocity of a freely falling body when it just touches the ground.

Solution of simple problems based on above topics.

9. Motion of Rotation (Angular Motion)

Definitions: Angular displacement, angular velocity, angular acceleration, uniform angular velocity and angular acceleration. Equations of circular motion with constant angular acceleration, relation between rectilinear motion and circular motion, angular distance moved by a body in n^{th} second. Centripetal and Centrifugal force. Solution of simple problems based on above topics.

10. Kinetics

Definitions: Mass, momentum, impulse, impulsive force, impact, Newton's laws of motion, law of conservation of momentum. Recoil of gun, motion of lift. Solution of simple problems based on above topics.

11. Work, Power and Energy

Definitions: Work, graphical method of representation of work, Power, Mechanical energy (Potential and Kinetic energy), Work-Energy principle, law of conservation of energy. Solution of simple problems based on above topics.

Tutorials: At least 70 problems covering above syllabus have to be solved.

1CEH05 COMPUTER APPLICATION

L T P C
- - 4 2

1. Brief Overview of Win-95:

Desktop, Task Bar, Start Menu, Icons, Screen Saver, Window Appearance, Explorer, Paint Brush, Calculator

2. Overview of Microsoft Word:

Introduction, Creating documents, Editing documents, Tools - Spell Check

3. Formatting In MS-Word:

Fonts, Different Views of Documents, Ruler, Margins, Alignments, Different types of Tabs. Bullets and Numbering, Newspaper Columns, Page Break, Adding Graphics, Adding Borders to the Page

4. **Working with Tables In MS-Word:**
Creating tables, Modifying tables, Enhancing Tables, Converting text to table and vice-versa
5. **Mail Merge and Printing Features in MS-Word:**
Mail Merge-Definition, Data source, Form Letter
Headers and Footers, Page Number, Print Preview and Printing a document
6. **Overview of Microsoft Excel:**
Introduction, Worksheets, Workbook, Cell, What is Label, Value and formula? Formula Bar and Formulas, Working with Ranges, Working with Worksheets, Types of Cell Addresses, Page Break Preview
7. **Advnace Formatting in Excel:**
Different types of Formats like Accounting, Currency, Fraction etc.,
Creating Custom Formats, Auto Formats, Working with Styles
8. **Functions in Excel:**
What are Functions? Difference between functions and formulas, Different types of functions like sum, average, min, max etc., Paste Function AutoSum, Auto Calculate
9. **Charts and Macros in Excel:**
Definition of Chart, Different types of charts, Charting Terminology, Chart Wizard, Customizing Chart, Previewing and Printing Charts Definition of Macro, Macros - Creating and Recording, Editing, Running and Deleting
10. **Overview of Microsoft PowerPoint:**
Introduction, Different ways of creating presentations, Templates, Different views of Presentations,
11. **Formatting Presentations in Microsoft PowerPoint:**
Design Templates, Autolayouts, Slide Master, Color Schemes, Backgrounds, Animations, Slide Miniature, Slide Transitions, Meeting Minder, Annotating Slides, Kiosk presentation
12. **Graphics in Microsoft PowerPoint:**
Creating a Graph, Modifying a Graph, Organization Chart, Drawing Tools

Practical / Term - work - Practical / term-work will consist of minimum ten experiments / exercises based on above topics.

11AF05 INTERNET APPLICATION

L T P C
- - 2 1

1. **What is Internet and How it works**
Introduction of networks, Types of connections: LAN, MAN, WAN, dial-up, leased, History of Internet, Usage of Internet, Server and Client (Browser)
2. **Connection to the internet**
Introduction to ISP and URL, Web Browsers - Use of Browsers, Type of browsers, Using a Browser
3. **Surfing the web**
Web pages, Website, Home Page, Hyper links, Different sites-educational, portal, entertainment, News, Jobs, Banking, Maps, Yellow pages, Forums, Discussion groups and interest groups, joining and leaving groups, Accessing courseware on the Web
4. **Electronic Mail**
Overview of email, Creating mail account / Group account, Access email, Sending email, File attachment / Transfer, Mail box management, Maintaining address book
5. **Searching on web**
Search engine, Types of search engine, Searching information & Search Techniques
6. **Downloading & Uploading**
What is downloading / Uploading? Downloading files, Uploading files

1HMF02 COMMUNICATION SKILLS

L T P C
2 2 - 4

1. Introduction to Communication Skills

What is Communication?, Importance of communication, Barriers in communication – communication gap & communication break down, Types of communication – verbal & non-verbal

2. Oral Communication – Listening Skills

Listening

Types of listening – acoustic, linguistic, attitudinal, Barriers in listening, Understanding and comprehending the message – decoding messages

3. Oral Communication – Speaking Skills

Conversational situations – face to face & telephonic

Introducing yourself and others, Thanking a person, Describing a person, place, thing, situation & event, Giving instructions, Making inquiries – at a bank, post- office, air- port etc., Asking questions, Making requests Pronunciation, Voice – speed, tone and volume

4. Vocabulary building

Reference skills – dictionary, thesaurus

Building word- power Spelling, meaning and usage of words, Antonyms, synonyms, homophones & homonyms, Prefixes and suffixes

Words with silent letters, Words commonly misspelt, Words commonly confused, Idiomatic usage – phrasal verbs, cultural expressions

5. Reading Skills

Scanning – focused reading to collect specific information, Skimming – reading a text to get the general idea, Reading & Comprehending articles and reports on technical subjects, Interpretative reading

6. Written Communication – Writing Skills

Composition writing-free composition & guided composition, Resumes- job applications, Business letters Complaint letters, Request letters, Placing orders, Asking for and giving information

7. Non-Verbal Communication Skills

Postures, Gestures, Facial Expressions, Eye-contact, Space-distancing, Aesthetics of communication, Clothing.

Tutorials: It will consist of minimum of ten tutorial assignments based on above topics.

Teaching Methodology

- (1) Drill Exercises
- (2) Audio – Video laboratory
- (3) Role- Playing – dramatization of situation
- (4) Various individual and group exercises – self learning/pair learning/group learning
- (5) Word puzzles and games

1MAF04 MATHEMATICS – II

L T P C
4 1 - 5

1. Functions

Definition of function, Different types of functions, examples

2. Limit

Definition of limit, Meaning of $\lim_{x \rightarrow 0} f(x)$, Working rules of limit (without proof), Evaluation of limit of simple algebraic functions and trigonometric limits

3. Differentiation

Definition, Derivative by first principles, Formulae of derivatives of standard functions and inverse trigonometric functions – Formulae of derivatives of sum, product and quotient of functions, Chain rule (Only statement), Derivative of parametric and implicit functions – Simple problems based on it, Second order differentiation: Evaluation of second order derivatives of simple functions Application of derivatives – Velocity, Acceleration, Maxima and Minima their examples

4. **Integration**

Definition of Indefinite Integrals – Formulae of integrals of some standard functions, Working rules of indefinite integrals (without proof), Evaluation of simple indefinite integrals, Integration by substitution, Definite integrals – Fundamental principle of definite integrals (only statement), Working rules of definite integrals (without proof), Evaluation of simple definite integrals using the fundamental principle, Application of integration – Area, Volume (Only straight line, circle, Parabola, hyperbola and ellipse are to be considered)

5. **Vector Algebra**

Vector and scalar quantities – Definition of the terms, Types of vectors – Geometrical Representation of vectors, Addition and subtraction of vectors – Unit vectors i , j & k , Use of unit vectors, Position vectors in terms of i , j & k – Magnitude and direction of vectors and its examples, Product of vector and a scalar – Dot & cross product of two vectors, Applications – Work done by force and moment of force and their examples

Tutorials: It will consist of minimum of ten tutorial assignments based on above topics.

1SCF06 SCIENCE – II

L T P C
4 - 2 5

1. **Water**

Introduction – Hard and Soft water, Degree of Hardness of water – Disadvantages of hard water, Methods of softening hard water, Requirements of drinking water, Purification of water for domestic purposes

2. **Corrosion**

Introduction – Magnitude of corrosion problem, Types of corrosion – Immersed corrosion, Electrode potential – Mechanism of electrochemical corrosion, Factors affecting the rate of corrosion, Protection of metals from corrosion – Methods of applying metal coating

3. **Non-metallic materials**

Paints, varnishes and enamels, Insulators, Lubricants, Refractories, Adhesives, Glasses and ceramics

4. **Static Electricity**

Electric charge, Coulomb's inverse square law, unit charge, electric field, field intensity, electric lines of forces, Electric flux, flux density, Gauss theorem, electric potential, potential due to a charged sphere, Capacity – unit, capacitance, principle of condenser, condenser in series and parallel.

5. **Current Electricity & Electromagnetism**

Ohm's law, resistance, specific resistance, resistances in series and parallel. Theory of shunt, Wheatstone's network, Wheatstone's bridge, potentiometer, effect of temperature on resistance, platinum resistance thermometer, effect of temperature variations on resistivity of conductors and insulators.

Heating effect of electric current, Joule's Law, electric power and electric energy, calculation of electric bills, Seeback effect, measurement of high temperatures by bimetallic thermocouple.

6. **Electromagnetism**

Magnetic effect of electric current, magnetic induction, Laplace's law, Biot-Savart's Law. Construction and working of Ammeter, Voltmeter & Moving coil galvanometer.

Electromagnetic induction, Faraday's Law, Lenz's law, emf generated in a coil due to rotation in uniform magnetic field, AC and DC generator principle and working.

7. **Elementary Electronics**

Introduction to elementary electronics, Energy bands in conductor, semiconductor & insulator, Temperature effect on semiconductor

n-type & p-type semiconductor, properties of p-n junction diode and its V-I characteristics, Applications of diode, Zener diode, difference between conventional p-n junction diode & zener diode. Applications of zener diode.

Practical / Term - work - Practical / term-work will consist of minimum ten experiments / exercises based on above topics.

1MEH01 ELEMENTS OF ENGINEERING GRAPHICS

L T P C
3 - 4 5

1. Introduction To Engineering Drawing:

Use of engineering drawing as a language of engineers, size and layout of drawing sheets, boards, scales, different types of lines, lettering, rules and regulations of drawing general principles of projection, sections and other conventions of drawing, general principles of dimensioning, methods of dimensioning, symbolic representation as per B.I.S. SP 46 Use of drawing instruments.

2. Loci of Points:

Loci of point moving with given constrain such as keeping its distance equal from (fixed circle and fixed line), (fixed point and fixed line), fixed two circles and line, fixed three circles, Loci of point on mechanism such as slider crank mechanism, Four bar chain mechanism, crank and connecting rod mechanism with C.R. constrained to pass through guide, trunion.

3. Engineering Curves:

Conics Curves:

(i) Ellipse – different methods to construct ellipse such as directrix, Arcs of circles, Concentric circles, oblong and parallelogram Method (ii) Parabola – different methods to construct parabola such as directrix, rectangle, parallelogram and tangent method (iii) Hyperbola – Rectangular and oblong hyperbola, different methods to construct hyperbola such as directrix and asymptotes.

Eccentricity of conic Sections, normal and tangent to the curves, CYCLOIDAL CURVES: Cycloid, Epicycloid and Hypocycloid, Normal and Tangent to Cycloidal curves, INVOLUTE – Involute of regular polygon & circle. Normal and tangent to the involute, SPIRAL – Archimedean spiral, Logarithmic spiral, Helix: Helix on cylinder only.

4. Introduction to Screw thread:

Introduction of various portion of a screw thread such as pitch, root diameter, nominal diameter, effective diameter, lead, slope, flank, angle, root, crest, external, and internal threads, single start and multi start threads, right hand and left hand threads; Conventional representation of external and internal threads.

5. Introduction to Orthographic Projection:

Introduction of projection, Reference planes (H.P. VP and PP) of projection; projectors, reference line, different views of orthographic projection such as F.V., T.V., S.V. First and third angle projection system, symbols for systems of projection;

6. Sectional Orthographic Projection:

Sectional views - Full, half, partial, broken, revolved, removed and offset sectional views, sectioning conventions, section lines, cutting plane line, dimensioning of views as per B.I.S.

7. Isometric Projection:

Isometric projection, Isometric axes, Isometric lines and planes, Non-isometric lines and planes, Isometric scale, Isometric projection by box method, Co-ordinate method and offset method. Iso Metric Projection of sphere and arcs. Dimensioning; Isometric view.

Practical / Term - work - Practical / term-work will consist of minimum six experiments / exercises based on above topics.

1MEH02 SHOP SKILLS

L T P C
- - 2 1

1. Appraisal of common workshop processes such as Carpentry, fitting, smithy, plumbing.
 - Identification of hand tools used in various shops, specifications and materials of hand tools.
 - Correct method of handling and using tools.
 - Correct method of use and selection of measuring instruments.

Practical / Term - work - Practical / term-work will consist of minimum four experiments / exercises based on above topics.

1CFF06 COMPUTER FUNDAMENTALS

L T P C
2 1 2 4

1. **General Applications of Computer:**
Introduction of Computer, Hardware, Software, Operating System, Computer Networking, Computers use in industry, Office Automation.
2. **Problem Solving and Flowchart:**
Problem Solving, Flow Charting, Branching, Looping,
3. **Basics of BASIC:**
Importance of BASIC, Programme analysis, Listing & Editing of BASIC Programme, Running the Programme, System Commands, Common BASIC Statements.
4. **Constants of Variable:**
The character set, Constants, Variables, Naming the Variables, getting data into the memory and the RESTORE statement.
5. **Expression in BASIC:**
Arithmetic expressions, Hierarchy of operations, Rules of Arithmetic, Evaluation of Expression - LET statement, Refinement in programming, Logical expressions and Library Functions.
6. **Printer Controls:**
Comma Control, Semicolon Control, TAB Function and PRINT USING control.
7. **Jumping, Branching and Looping:**
Jumping - GO TO statement, Branching - IF. THEN statement, Multiple branching - ON... GO TO statement and looping - FOR..... NEXT statement.
8. **Subscripted Variables:**
Single - Subscripted variables, Double subscripted variables and searching and sorting.
9. **Functions and Subroutines:**
User - Defined functions, Subroutines, Multiple - Parameter functions, Multiple - line functions and named subroutines with arguments.

Practical / Term - work - Practical / term-work will consist of minimum twelve exercises / programmes based on above topics.

1MAH11 Mathematics-III

L T P C
3 1 - 4

1. **Partial Differentiation:**

Functions of two or more variables, First and higher order partial derivatives, Euler's theorem for homogenous functions, Total derivatives and chain rule, Differentiation of implicit functions.

2. **Matrices:**

Revision of matrices, Elementary transformations, Rank of matrix, Consistency of a system of homogenous and non-homogenous equations.

3. **Complex Numbers:**

Introductions to complex numbers, Polar form of complex numbers, De Moivre's Theorem (Statement Only), Roots of a complex number, Exponential form of a complex number, Circular and Hyperbolic functions and relation between them.

4. **Differential Equations Of The First Order And First Degree:**

Reorientation, Formation of different equation, Solution of the first order and First-degree equations of the type (1) Variable separable (2) Homogenous (3) Exact (4) Linear.

5. **Vector Calculus:**

Reorientation, Dot and cross product of vectors, Differentiation of vectors, Gradient, Directional derivative, Divergence and curl of a vector.

6. **Laplace Transforms:**

Definition, Laplace transforms of elementary functions, Inverse Laplace transforms, Transforms of derivatives and integrals, Convolution theorem (statement only), First shifting theorem, Applications of Laplace transforms in solving linear differential equation with constant coefficients.

7. **Fourier Series:**

Introduction, Euler's Formula, Conditions for a Fourier Expansion, Functions having points of Discontinuity, Change of Interval, Odd and Even Functions- Expansions of Odd or Even periodic Functions

Tutorials: It will consist of minimum ten tutorial assignments based on above topics.

Text Book:-

1. Higher Engineering Mathematics Vol. I and Vol. II

by Dr. K. R. Kachot Published by Mahajan Publishing House, Ahmedabad

1ITH04 Programming Methodology

L T P C
2 1 2 4

1. **Introduction to computer:**

Computer characteristics, Modes of operation, Types of programming language, Introduction to C, Some simple C programs, Describe programme characteristics

2. **C fundamentals:**

The C character set, Identifiers and keywords, Data types, Constants, Variables and arrays, Declarations, Expressions, Statements, Symbolic constants

3. **Operators and expressions:**

Arithmetic operators, Unary operators, Relational and logical operators, Assignment operators, The conditional operators, Library functions

4. **Data input and output:**

Preliminaries, Input – output functions, Interactive programming, Sample examples and programming

5. **Control statements:**

Preliminaries, Branching : if – else statement, Looping : while statement, do-while statement, for statement, Nested loop control structure, the switch statement, the break statement, the continue statement, the comma operator, the go to, label statement

6. Functions:

A brief overview, Defining a function, Accessing a function, Function prototypes
Passing arguments to a function, Recursion

7. Programme structure:

Storage classes, Automatic variables, External (Global) variables, Static variables, Multiple programs,
More about library functions

8. Arrays:

Defining an array, Processing an array, Passing an array to the functions, Multidimensional array,
Arrays and strings

9. Pointers:

Fundamentals, Pointer declarations, Passing pointers to function, Pointers and One dimensional arrays,
Dynamic memory allocation, Operations on pointers, Pointers and Multidimensional arrays, Arrays of
pointer, Passing functions to other function

10. Structures and Unions:

Defining a structure, Processing a structure, User defined data types (type def), Structures and pointers,
Passing structures to functions, Self-referential structure

11. Data files:

Opening and closing of a data file, Creating a data file, Processing a data file, Unformatted data files

12. Some additional features of C:

Enumeration, Command line parameters, More about library functions, Macros, The C preprocessor
Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Tutorial: - It will consist of minimum ten tutorial assignments based on above topics.

Text Book:-

1. Programming in C by E. Balaguruswamy - Tata McGraw Hill Publication

1ECB01 Electronics Devices & Circuits

L T P C

3 - 2 4

1. Basic Materials:

Insulators, Conductors and Semiconductors, Their properties and applications. Atomic structure of
Insulators, Conductors and semiconductors. Energy levels. Electron, Proton, Nucleus. Band theory
of different types of material. Concept of free electron, electron volt, potential electric charge, current.
Capacitance. Columbus's law. Concept of Inductance, solenoids and Relay

2. Diode & its applications:

Diode construction, characteristics, equivalent circuit, load line concept. Rectifiers – construction,
working, advantages, disadvantages, characteristics, comparison on basis of ripple factor, efficiency &
PIV. Filters. Basics of power supply

3. Special diodes:

Zener diode, Tunnel diode, Varactor diode, Schottky diode, construction, characteristic, working and
applications.

4. Basics of Bipolar devices and its Applications:

Construction, types, configuration. Characteristics of CE & CB configuration. α, β & their relation.
CC configuration. Application as an amplifier & as a switch. Methods of transistor biasing. Bipolar
transistor amplifier.

5. Power Amplifier:

Difference between voltage amplifier & power amplifier. Class A, B & AB amplifier. (No mathematical analysis). Push pull amplifier. (No mathematical analysis)

6. Basics of Unipolar Devices and its Applications:

Construction, Working and Characteristics of UJT, PUT, FET and MOSFET (depletion and enhancement type). Comparison with bipolar devices. Application of each devices with their essential V-I characteristics.

7. Basics of Opto electronics Devices and temperature sensors:

LED, photodiode, phototransistor, opto coupler, photo- Voltaic cell, LDR, Alphanumeric display. Thermistor, Sensistor. Application of each device.

8. Thyristor Device Family:

Construction, Working and Characteristics of SCR, TRIAC, DIAC, IGBT. Application of each device.

9. Basics of Analog Electronics:

Ideas of integrated circuit – comparison with analog and digital circuit. Operational Amplifier- their parameters and characteristics. Op-Amp as comparator, inverting, non-inverting amplifier. Schmitt trigger characteristics of Op-Amp. Op-Amp as waveform generator (sinusoidal, square and triangular). Different popular Op-Amp ICs and their special features. Op-Amp for analog calculation and few industrial applications. General Idea of an IC fabrication.

10. Fundamental of Digital Electronics & Timer Circuits:

Simple Logic gates, Flip-flops & Counters. NE – 555 and 556 timer ICs- their internal block and pin diagram, function of each pin. Application of these ICs as timer, monostable, astable, bistable and Schmitt trigger circuit. Application of Timer IC's as a VCO

Practical / Term - work - It will consist of minimum ten experiments / exercises based on above topics

Text Book:

1. Electronics devices & circuits by Sanjeev Gupta.

1ECB06 Electronics Networks And Lines

L T P C
3 1 - 4

1. Network Theorems :

Kirchoff s Voltage and Current Law. Mesh and Nodal analysis. Principle of Duality. Driving point Impedance, Transfer impedance and Image impedance. Super position theorem. Reciprocity Theorem. Norton s Theorem. Compensation Theorem. Maximum Power Transfer Theorem. Thevenin's Theorem. Network Transformation : T to Π and Π to T.

2. Resonance and Coupled Circuit :

Definition of Quality factor. Series resonance. Parallel resonance. Bandwidth and Selectivity of series and Mutual inductance, networks with natural inductance. Co-efficient of coupling. Iron core transformer. Single Tuned air-core transformer. Doubled air-core transformer.

3. Attenuator:

Characteristic impedance of T and Π Network. Attenuation in Nepers and Decibels and relation between Nepers and Decibels. Symmetrical T and Π Attenuator Lattice Attenuator.

4. Filters:

Constant K-Low pass filter. Constant K-High Pass filters. M-derived Low pass filter. M-derived High pass filter. Termination with m-derived half section. Composite filter.

5. Transmission Line:

Theory : Transmission line general equation. Infinite line. Wave length, Velocity of propagation. Condition of Distortion less line. Loading of Telephone cable. Standing wave ratio and reflection coefficient. Stub matching, Smith chart.

6. Equalizer :

Amplitude equalizer (Series and Shunt). Phase equalizer.

Tutorials: It will consist of minimum ten tutorial assignments based on above topics.

Text Book:-

1. Network Analysis - G. K. Mithal

1CCS05 Interpersonal Skills

L T P C
2 1 - 3

1. **Introduction to Human Resource Management:**

Need and scope of human resource management in industrial environment

Impact of human factors on productivity and industrial harmony

2. **Human Need, Relations and Values:**

x and y theory, Importance of human resources, Maslow's hierarchy, its importance in managing human resources, Need of human relations and human values in the industry, Desirable human values and their importance including ethics and morale value

3. **Behavioural Dynamics:**

Interpersonal Behaviour, Introduction, Need for interpersonal competence, Determinants of interpersonal, behaviour, Leadership, Situational approach to leadership, Power influence and compliance, Influence of leadership, Techniques to deal people effectively

Group Dynamics, Concept of group dynamics, Dynamics of group formation, Types of group, Role of group in organization, Desirable characteristics of group member

4. **Attitude:**

Concept & importance of positive attitude and openness of mind, Do's and don'ts for developing positive attitude, Importance of mental health.

5. **Supervisor's role in HRD:**

Importance of HRD, Need, importance & types of Training, Need and importance of Motivation, Supervisor's role as Trainer & Motivator, Need, importance and use of Counseling and Mentoring.

6. **Decision Making:**

Importance of decision making in context of productivity, quality, cost consciousness, human relations and goal achievement. Factors affecting, Types and process, Make the decisions for given case / situation.

7. **Management of Change:**

Need of change, Barrier to change, Strategies to manage change(Effective implementation and management of change), Trade unions and their objectives, Constructive role of trade unions in goal setting, achievement and change management, Causes and resolution techniques of conflicts.

8. **Stress Management:**

Concept of stress management, Attributes of stress, Stress measuring techniques, Techniques to relieve the stress

9. **Communication:**

Communication : Concept and definitions, Objectives, Types: downward, upward, lateral, grapevine

Proposals and Reports : Introduction, Features / Characteristics, Structure, Forms / Types

Business letters : Introduction , Form: Block & Indented, Characteristics, Structure, Types of Business letters

Group Discussion and Meetings : Communication skills to be developed

Tutorials: It will consist of minimum ten tutorial assignments based on above topics.

Text Book:-

1. Managing people at work, Ahuja, Jain & Chhabra, Dhanpat Rai and Sons. Allahabad 1997
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1ECH08 Consumer Electronics

L T P C

3 - 2 4

1. Sound Operated acoustic devices:

Sound pressure microphone: - Carbon, crystal of Capacitance type microphone. Construction, Working principle & application of each above stated microphones. Dynamic moving coil & ribbon type microphone their types, Construction, Working and applications. Determination of its sensitivity and frequency responses.

2. Sound generating acoustic devices:

Radiator, Baffle and horn type of loud speakers, Construction Working and applications of each type of Loudspeaker. Need of Cabinet or baffle for Speakers Different type of Enclosures, Requirement of speakers for stereo Systems Cross over net work types their function and selection of Speakers for such type of net work. High fidelity, Eco amplifier filter, graphic equalizers circuits their need & applications.

3. Public address System:

Need of public address System.. Different Systems available. Representation & understanding of Public address System with block diagram. Selection of Audio mixed amplifier System and type of Speakers. Comparison of out doors public addressing System & indoor public addressing System. Requirement of Audio power for each type of System. Environmental effects such as temp, poor acoustic etc. No of Connection of Speakers as per amplifier unit's effective arrangement of Speakers (Indoor & Outdoor).

4. Magnetic tape recorders:

Different types of Ferro magnetic tape their Construction speed limit identification of Correct side of tape. Normal length of tape. Compact Hard disc Construction & material. Principle of working of tape recorder CD recorder & player optical recorder with block diagram. Need of biasing A.C. and D.C. biasing. Simple diagram of the tape transport mechanism. Various Components Such as Capstan, take up spool, Supply reel, fast-forward & reverse. Winding of the tape. Tape counter etc. Construction idea of Erase head & record. Special features such as auto start auto stop. Explanation of recording & play back mode with neat block diagram. Selection of motor, belt for the tape deck mechanism. Normal adjustment and faults with the deck mechanism. Normal faults occurring in Tape electrical circuits & their rectification.

5. Optical Tape recorders:

Fundamental of stereo recording, optical recording & play back. Its comparison with mono recording. Elements of analog & digital disc recording, Manufacturing process, Disc player drive System. Their care and maintenance. Elementary idea of digital recording & playback & compact disc recording & playing unit.

6. Cable T.V.:

Equipments at cable operator's premises such as receiver, amplifier special cable & connectors Reception of signal from various satellites, Cable network & distributions paid channel and their locking, Cable modems.

7. Projection T.V.:

Need of projection T.V. Different methods of projections. Video projectors - types - their working with block diagram - applications.

8. Cordless phone and Cell phones:

Principle of cordless phone. Block diagram of a cordless phone - Base unit and portable unit. Function of each block Normal common faults & their rectification cordless phone of different Manufactures with Special features. Principle of cell phone - Block diagram and working of each block, limitation of Cell phone & their rectification.

9. **Electronic Exchanges:**

Manual Telephone exchange working. Relays, indicators, transformers and telephone circuits, different telephone systems, transmission bridge, subscribers' line termination, cross bar switching, principle of signaling on junction lines and truck lines. Automatic Telephone systems. Testing, hunting and switching circuits, holding, speaking and release circuits, traffic & trunking, strowgear exchange system, digital encoding system, digital electronic exchange, principle, outgoing and incoming calls in digital exchange, electronic exchange in India, dialing. EPABX, Principle and operation and features.

10. **House hold appliance:**

Block diagram working and special feature of the following appliance.

1. Micro wave ovens
2. Automatic and semi automatic washing machine.
3. Programmable timer.
4. Portable emergency lights.
5. Remote controls.
6. Audio Video Electronic game (at least two).
7. Mosquito repellent.
8. Water purifier.
9. Musical light.
10. Dish Washer.

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Text Book:-

1. Audio Tape recording by R. C. Vijay, BPB Publication.
2. Audio & Video system by Ajay Sharma, Dhanpat Rai and Sons, New Delhi

1EEH12 Basic Electrical Engineering

L T P C

3 - 2 4

1. **Electrical Resistance:**

Concept of potential difference, E.M.F., Ohm's law, Resistance, factors deciding Resistance, Series – Parallel combination of resistors, Solution of circuits applying Ohm's law, types of resistors, fixed resistors, variable resistor, resistance colour coding.

2. **Electromagnetic induction:**

Faraday's laws, Dynamically induced emf, Statically induced emf – (a) Self induced emf and (b) Mutually induced emf, Definition and equations of self & mutual inductance and coefficient of coupling, hysteresis loop and hysteresis loss and Simple examples of hysteresis loss calculation.

3. **Capacitance:**

Definitions - capacitance, permittivity (ϵ_0 , ϵ_r). Capacitors in series and parallel, Capacitor types.

4. **Magnetic circuit:**

Define: M.M.F, magnetic force, Permeability, hysteresis, reluctance, and leakage factor. The relationship between B, μ , H, ϕ . Solution of simple series magnetic circuits. Comparison between a magnetic and an electrical circuit. Brief idea of Magnet and Magnetic field. Electromagnets- simple treatment of electromagnetic circuits as per its various parameter such as B, μ_0 , μ_r , mmf, reluctance, input of air gap.

5. **Fundamentals of Alternating Current:**

Define: cycle, frequency, periodic time, amplitude, frequency with reference to alternating emf and current. Different forms of alternating emf and current equations. Definitions & final expressions only of R.M.S. value, average value, form factor and peak factor. Vector representation of an alternating emf and current. Mathematical representation of an alternating emf and current by (a) Symbolic notation, operator "j", (b) Trigonometric form (c) Polar form. Addition, subtraction, multiplication and division of emf and current vectors with reference to (a) and (c).

6. A. C. Circuits:

A.C. through pure resistors, inductors and capacitors. A.C. through R-L series and R-C series circuit. Definition of impedance, phase angle, lagging/leading quantity, Admittance, Susceptance, Conductance. Power in A.C. circuits, definition of power factor. Definition and relation between KW, KVA, KVAR P.F. Simple R-L-C series circuits – only final expressions of impedance, current and Power Factors. Simple parallel a.c. circuits. - Only final expressions of total currents, power factor of the circuits comprising of RL and RC in parallel by: a. Vector/phasor method, b. Admittance method. . Introduction of series and parallel resonance.

7. Poly phase Circuits:

Poly phase ideas & concept. Advantage of 3ϕ over 1ϕ , circuit & Calculations of power, P.F., phase & line, voltage and current. Principle, construction, types and application of the following machines: (a) D.C. motor & D.C. generator and (b) A.C. M/c. Type: - (1) A.C. motor (1ϕ , 3ϕ), (2) A.C. generator, (3) Transformer (1ϕ , 3ϕ).

Practical / Term work- It will consist of minimum ten experiments / exercises based on above Topics.

Text Book:-

1. Electrical Technology By B. L. Theraja – Vol. – I & II

1ECB02 Linear Integrated Electronics

L T P C
3 1 2 5

1. Introduction to OP AMP, Ideal OP AMP. Non- inverting & inverting Amplifiers. Non ideal behaviour, parameters of OPAMP. OP AMP errors, bias & offset current and voltage, drift. Error calculation, offset nulling.
2. Sum & Difference Amplifiers. Integrator & Differentiator. Instrumentation Amplifiers. Bridge amplifiers. Voltage to current converters. Current to voltage converters, ac amplifier.
3. Precision Half wave Rectifiers. Precision full wave Rectifiers. Clipping circuits. Clamping circuits. Log, Antilog Amplifiers. Dead space circuits. Schmitt trigger, Astable & Monostable multivibrator. Wein bridge & phase shift oscillator. Introduction to filters.
4. Introduction to 555 timer. 555 – Astable & Monostable modes. Applications of 555. Timer / Counter circuits.
5. 723 based regulators. 723-Basic low voltage regulator & protection. 723-Basic High voltage regulators. 78XX series fixed voltage regulators. Introduction to switching regulators.
6. Operating Principles of PLL. Lock range, capture range. PLL as FM Demodulator, AM detector tracking filter, VCO. LM 565 PLL.
7. LM 380 type power Amplifier & applications. 311 Comparator and applications.

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Tutorial: - It will consist of minimum ten tutorial assignments based on above topics.

Text Book:-

1. Op-amp & linear integrated circuits by Ramakant Gaykwad

1ECB04 Digital Electronics

L T P C
3 1 2 5

1. Number Systems and Codes:

Number Systems Decimal, Binary, Octal, Hexadecimal. Conversion from one number system to another number system. Arithmetic Operations: Binary Addition Subtraction, Multiplication and Division, 1's and 2's Compliment methods of Subtraction. Codes BCD, GRAY, ASCII, EBCDIC, and EXCESS-3 codes.

2. Logic Gates and Logic Families (No Analysis):

Fundamental Gates: AND, OR, NOT. Positive and Negative Logic Systems. Combination Gates: NAND, NOR, EX-OR, EX-NOR. Introduction To RTL, DTL Logic families. Basic TTL Gate, Fan-out, Speed of Operation and power Dissipation (No Mathematical Analysis). Brief Introduction to IIL and ECL logic families. MOS and CMOS NAND/NOR logic.

3. Boolean Algebra and Karnaugh MAP:

Basic theorem and properties of Boolean algebra. De-Morgan's theorem and universal building blocks NAND and NOR. Canonical and Standard forms. The map method, two and three variable map, four variable maps.

4. Combination logic Circuits:

Half adder, full adder, IC-7482 and 7483. Half subtractor, full subtractor, use of full adder as full subtractor. Code converters: Binary to gray and vice versa, binary to excess-3 and vice versa. Decoder/Encoders: BCD to Decimal Decoder, IC-7441, BCD to seven segment decoder, IC-7446/47. Comparators, IC-7485. Multiplexer / Demultiplexer, IC-74150, 74154. Parity Generator and checker, IC-74180.

5. Flip – Flops:

SR-Flip flop, synchronous and Asynchronous. D-flip flop and T flip flop, IC-7474. JK flip flop, JK master slave flip flop IC-7473 and IC-7476. Edge triggered JK-flip flop, IC-7470.

6. Counters:

Ripple counters, synchronous counters, up-down counters, ring counter, decade counter, binary counter, study IC-7490, 7493,7492,74192 and 74191.

7. Registers:

Parallel and Serial shift registers. Shift left and Shift right operation. Study of IC-7494, 7495 and 7496.

8. Memories:

Memory classification: Magnetic and Semiconductor, sequentially accessed, random accessed, read only and content addressable memory. RAM - Static & dynamic. ROM - ROM, PROM, EPROM, EEPROM. Brief Introduction to CCD and Magnetic bubble memories.

9. Analog to Digital and Digital to Analog Converter:

Analog to Digital conversion: Specifications; range of input voltage, Conversion time, Accuracy, Format of digital out put, Input impedance. Flash A/D converter. Counter type A/D converter. Successive Approximation A/D converter. Comparison of various A/D converters. Digital to analog conversion. Specification; Resolution, Linearity, Settling time, Temperature, Sensitivity, accuracy, Offset voltage, Monotonicity. Binary Ladder DAC. OP-AMP summing amplifier.

Practical / Term work- It will consist of minimum ten experiments / exercises based on above Topics.

Tutorial: - It will consist of minimum ten tutorial assignments based on above topics.

Text Book:-

1. Modern Digital Electronics: R.P. Jain; TMH

1. Power Electronic Components:

Introduction to thyristor family, construction, symbol and two transistors model of SCR, DIAC, TRIAC, UJT. Mode of operation of SCR, latching & holding currents. SCR turn-on methods: different triggering circuits, UJT as a relaxation oscillator, PUT. Series and parallel connections of SCR. SCR as a controlled rectifier, half wave rectifiers, and full wave half controlled and full controlled rectifiers with R & RL load. SCR turn - off methods, load & line commutation, forced commutation, series, resonance, voltage auxiliary and complementary, external pulse commutation circuits (class A, B, C ,D, E). SCR protections and heat sink: Need of protection, different protection ckts, snubber ckts, and heat sink design.

2. Polyphase rectifiers and speed control of motor:

Advantages of polyphase rectifiers, output voltage with different 3-phase half wave & full wave rectifiers with diode and SCR. Characterization of DC motors : Speed control of DC motor by armature and field control, electronic control of DC motor by controlled rectifiers, speed control of AC motor by TRIAC i.e. fan regulators and starting of AC motors using TRIAC

3. Timers and automatic controllers:

Principles of RC timing circuit. RC timer using transistor or IC, Sequential timer in welding process SCR delay timer light operated photo relay.

4. RF heating and ultrasonic:

Principles of induction heating, Theory of induction heating, advantages and applications. Dielectric heating principles, theory of dielectric heating, advantages and applications of dielectric heating. Generation of ultrasonic waves, applications of ultrasonic waves, ultrasonic flow detection, ultrasonic welding and soldering.

5. Industrial automatic control:

Proximity switch, pH meter (Hydrogen ion concentration). Photoelectric potentiometer, flow meter. Mass spectrometer, Electron Microscope. Wave soldering machine (Industrial Visit).

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Text Book:-

1. Industrial Electronics & control: S.K. Bhattacharya

1ECB03 Electronics Instruments and Measurements

L T P C
3 - 2 4

1. Introduction

Necessities of Measurements, Definitions, Accuracy, Precision, Types of errors, Limiting errors.

2. Bridges and their applications:

Wheat stone bridge, Kelvin's Double arm bridge, Capacitance and Inductance comparison, Maxwell's Bridge, Hay's bridge, Schering bridge, Wien bridge

3. Basic Parameter Measurements:

Moving coil moving iron type Electro static DC. Ammeter, DC Voltmeter, Suspension Galvanometer PMMC, Dynamic behavior of PMMC damping mechanism. Electronic Multimeter, Consideration in choosing analog Voltmeter, Hot wire, Electronic instrument, wattmeter, Energy meter, insulation testing megger Digital Voltmeter: -Features of DVM, Advantages of DVM, Ramp Type DVM, Integrating DVM

Q-Meter: -Basic Q-meter ckt. Applications of Q-meter, The series connection of Q-meter, The parallel connection of Q-meter.

4. Transducers:

Classification of transducers, Selection of transducers, Strain gauge, Unbounded strain gauge, Displacement transducers, Capacity transducers, Inductive transducers, Linear Variable Differential Transformer (LVDT), Piezoelectric transducer, Velocity transducer, Temperature Measurements, Resistance Thermometer, Thermocouples, Thermistor.

5. Semi-Conductor Measurement:

Transistor tester, Digital IC tester

6. Oscilloscope:

C.R.O. Block Diagram, Cathode Ray tubes, Electrostatic Deflection System, Sensitivity., Screens for CRT., Graticules, CRT Circuits, Vertical Deflection System, Delay line, Multiple trace, Horizontal Deflection System, Oscilloscope probe, Oscilloscope Techniques, Determining frequency, Phase angle and time delay measurement, Determining modulation characteristics.

7. Signal Generators:

Sine wave generation by 1.Hartley oscillator, 2. Collpits oscillator, 3. Wien bridge oscillator, Sweep frequency generator, Pulse and square wave generator, Function generator, Audio frequency signal generation.

8. Frequency Counters:

Simple frequency counter, Display counter, Cascading counters, Multiplexing of display in frequency counter, Time base, Input signal processing, Period Measurement, Measurement of errors, Gating errors, Time base errors, Triggering level errors, Extending frequency range of counter

9. Spectrum Analyzer:

Introduction, schematic diagram, signal Analysis with Spectrum Analyzer, block diagram & explanation of heterodyne Spectrum Analyzer, measurements: AM ,FM, application of Spectrum Analyzer.

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Text Book:-

1. Modern electronic Instrumentation & Measurement Technique by Helprick & Cooper

1ECB05 Microprocessor Architecture & Interfacing

L T P C

3 1 2 5

1. Microprocessor Architecture and Microcomputer System:

Microprocessor Architecture and its operations: Microprocessor initiated operations and 8085 BUS organization, Internal data operations and 8085 registers. Memory: Memory organization, Memory map, Memory read and write. Microcomputer System. 8085 Microprocessor: Block diagram, Address and data bus, control and status signals, power - supply and clock frequency, Interrupts and externally initiated operations, serial I/O ports, BUS timings, Flags. Instruction cycles & timings.

2. 8085 Instruction set:

Addressing Modes, Data transfer instructions, Arithmetic Instructions, Logic operations, Branch operations, Stack I/O. and Machine control instructions, Simple Programs using 8085 Instructions.

3. Programming Techniques:

Looping, Counting and Indexing, Counter and Timing delays, Stack and Subroutines, Code conversion, BCD Arithmetic and 16 bit Data Operations.

4. Interfacing Memory & I/O Devices with supporting devices:

Introduction to devices - Latch, Buffer, Decoder, Encoder etc. Address Space Partitioning, RAM - Memory Interfacing, Date transfer Schemes, Programmed Data transfer, Direct Memory Access data transfer, and Serial Data transfer.

5. Interfacing Devices:

Types of interfacing devices, Address decoding for I/O, Input / Output ports, Programmable Peripheral interface (IC 8255A), Programmable Interrupt Controller (IC 8259A), Programmable interval timer (8253), Universal synchronous asynchronous receiver transfer - block diagram, interfacing and programming (IC 8251), Keyboard display Controller (IC 8279), DMA controller 8237/57.

6. Interfacing examples with programming:

Interfacing of Display devices & switches, Interfacing of ADCs, DACs., Interfacing of keyboards, Interfacing of stepper motor.

7. Microprocessor applications:

A temperature monitoring system, Automatic Applications, Close loop Process Control, Speed control of DC motor.

8. Microprocessor system development aids:

Software tools - Assembler, editor, work, linker debugger etc.

Hardware tools - EPROM programmer, EPROM erasers emulators, ROM simulators etc.

9. Interfacing Standards & Methods:

Interfacing methods: Duplex, Half Duplex & Simplex method of operation, General purpose parallel interface (Centronix parallel interface), Asynchronous serial interface, Synchronous Serial interface, RS232-c/ v-24 standard serial interface, IEEE Standard 488, Instrumentation Interface (GPIB)

10. Essentials of Micro controller:

Introduction, comparison between microprocessor & micro controller, architecture: micro controller hardware, input/output ports, counters & timers, external memory, serial input/output interrupts.

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Tutorial: - It will consist of minimum ten tutorial assignments based on above topics.

Text Book:-

1. Microprocessor Architecture Programming & Applications with 8085 by - R. S. Gaonkar.

1ECA01 Communication Engineering – I

L T P C
3 - 2 4

1. Introduction to Communication System:

Block Diagram of general Communication System, Definition of Modulation, Need for modulation, Types of modulation, Band width requirements

2. Amplitude Modulation:

Derivation of expression for AM waves, Frequency Spectrums of the AM Waves, Modulation Index, Derivation of modulation index, Power relation of the AM wave, Examples based on the above relation, Generation of AM, Low level and high level modulation, Collector modulated class – C amplifier, Complete diagram of AM broad casting transmitter.

3. Frequency and phase modulation:

Description of systems, Mathematical representation of FM, Modulation index for FM, Problems based on FM, Frequency spectrum of the FM wave, Phase modulation, Comparison between FM and AM, Comparison of wideband and narrowband of FM, Pre-emphasis & de-emphasis network, Generation of FM using: (1) Basic reluctance modulation (2) Varactor diode modulation (3) Transistor reactance modulation (4) Stabilized reactance modulation, Indirect method generation of FMS (Armstrong method), A complete diagram of FM broad casting Transmitter

4. Single side band Techniques:

Evaluation and Description of SSB. Advantages & Disadvantages of SSB. Suppression of carrier using Balanced modulation using FET. Suppression of unwanted sidebands by: (a) Filter system (b) The Phase shift method. SSB transmitter, using pilot carrier system. Vestigial sideband transmitter. Independent sideband transmitter.

5. Radio Receivers:

Receiver types TRF and super heterodyne receiver. AM receiver RF section, mixer, IF amplifier and AGC. Communication receiver Extension of the super heterodyne receiver. FM receiver Amplitude limiting Basic, FM Demodulation, Ratio Detector & Foster Seeley Discriminator, stereo FM Multiplex reactance. Single sideband Receiver Demodulation of SSB Receiver type. ETR.

6. Radio Servicing:

AC – Signal Analysis method Transistor Radio Stage by signal substitution method.

D. C. Analysis: (a) Voltage Analysis (b) Resistive Analysis (c) Current Analysis. Alignment Procedure for Transistor. Transistor – Radio Trouble Shooting.

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Text Book:-

1. Electronic Communication System by George Kennedy
-

1ECA04 Fiber Optics Communication

L T P C
3 - 2 4

1. Principle of fiber optics communication:

Introduction to fiber optics. Elements Of Applied Optics. Different type of Lenses. Optical lenses. Focal Length. Advantages of optical fiber optics communication. Elements of fiber optics communication. Types of optical fibers. Fiber strength. Principle of light propagation within the fibers. Evanescent field, Goos - Haenchen shift Effects of index problem on propagation. Modes of propagation. No. of Mode propagation. Single mode propagation. Fibers drawing process. Fibers coating. Fibers packaging. Fibers splicing & joining of fibers. Fibers characteristics term and cutoff wavelength. Optical and electrical Bandwidth.

2. Losses in FIBERS:

Scattering losses. Absorption losses. Leaky modes. Mode coupling losses. Bending losses. Intrinsic losses Combined losses of fibers. The effects of dispersion on pulse transmission. Inter mode Dispersion. Material Dispersion. Waveguide dispersion.

3. Fibers Optical Source Devices:

Introduction to fibers optical source. Light emitting diodes. Semiconductor LASER diodes. Noise of the LASER diodes. Stripe geometry of LASER. Double hetero junction LASER and LED. Excitation and Oscillation problems. Ruby and four level solid LASERS.

4. Optical Detector and Connectors:

Pin diodes. Avalanche photodiode. Photo conductors. Efficiency of detectors. Sensitivity, Gain, freq. Response. Coupling of fibers to detectors. Optical connectors.

5. Optical Modulation and Modulators:

Modulation methods and modulators. Direct intensity modulation method. Analog method of LASER modulation. Pulse method of LASER modulation. Digital method of LASER modulation. External modulators. Switches. Transmitters. Modulation rates. Automatic level controls. Spectrum stabilization.

6. Optical Receiver and Detectors:

Receivers. Photo detectors. Photo detectors Quantum efficiency and responsivity Diodes circuit models. Optical receiver models.

7. Optical Communication System:

Transmitter design. Receiver design. Device used and their characteristics. Line guided optical system. Comparison with others.

8. Repeaters:

Optical repeaters. PCM generation. Equalizer. Repeater spacing. Power consumption.

9. Integrated Optics:

Material and fabrication techniques used in the integrated optics. Application of integrated optics. Photoreceptor optics.

10. Applications:

Telephone. Video distribution. Telemetry. Military application. Passive and Active sensing. Computer Networking.

11. Optical Fiber Measurement:

N. A. Measurement. Attenuation Measurement. Dispersion Measurement. Field Measurement.

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Text Book:-

1. Optical Fiber Communication By John .M. Senior (PHI)
-

1CCS01 Entrepreneurship Development

L T P C
3 - - 3

1. Entrepreneur, Entrepreneurship and Enterprise vital link for economic development.

Understanding the concept of Entrepreneur, Entrepreneurship and importance of small enterprises for the economic development of the country. Who can be an Entrepreneur? Why Entrepreneurship? What are the qualities and traits of successful Entrepreneur? Self-assessment.

2. Entrepreneurship as a career choice

Why should we encourage Entrepreneurship? Importance of being Entrepreneurial. Benefits to individual, organisation and society.

3. Resource mobilization form ‘Support System’

Whom to contact for what?, Assistance and incentives available from Central/state Government, [IC/DIC], Small industry Development Bank [SIDBI], State Finance Corporations [SFCs] and various other agencies.

4. Achievement Motivation Training. (AMT)

Developing Entrepreneurial Personality. Achievement motivation Training [AMT] and Developing Entrepreneurial Competencies. Specialized inputs of twelve hours based on Behavioral science exclusively designed for developing Entrepreneurial attitude among the students.

5. Business Opportunity Identification and Selection [BOI]

How to identify and select a Business Opportunity? What are the processes and techniques? How to use brain storming technique? Methods of Environment scanning and data collection. Understanding BOI process. Products profile preparation and product selection.

6. Market Survey tools and techniques

What are Market Survey? How to carry out Market survey? What are tools and techniques? How to prepare questionnaire? How to undertake field survey? How to write market survey report? Assignment of preparing market survey report.

7. Preliminary Project Report [PPR]

What is PPR? Why PPR? How to prepare PPR? Assignment for preparing PPR.

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Text Book:-

1. A handbook for New Entrepreneurs By EDI, Ahmedabad

1CCS03 Marketing Management

L T P C
3 - - 3

1. The Concept And Scope Of Marketing Management

Define Market, Meaning of marketing and marketing management, Know various demand-sale, Marketing Task, Centralized and Decentralized market, Concept of product, selling, marketing and social marketing, Consumerism, Role of marketing in business organization, Marketing in developing countries

2. Consumer Behaviour

Buyer market concept, nature and characteristics, Seller market (Concept, nature and characteristic), Importance of different types of market, Types of consumers, Factors influencing buyer behaviour and the buying process in organizational market, Consumer decision and buyer decision process, Moral of industrial buyer behaviour.

3. Marketing Planning

Market demand (Concept only), Concept, bases and benefits of market segmentation, Process and criteria for target market selection, Process of analyzing market opportunities, Marketing information system, Marketing mix & marketing strategy (Elements only), Marketing research (concepts only)

4. Product planning and Advertising Management

Physical & service product (concept only), Product meaning & classification, Product item, product mix, product line and optimum product mix, Product diversification (1) Product planning (2) Stages of new (3) product development (process) (4) Factors affecting product failure (5) Product life cycle (6) Branding (7) Advertising (8) Message importance, type design and personation (9) Media importance, types and selection criteria (10) Promotion need (11) Packing

5. Sales Management

Sales management definition and functions, Types of selling, Sales structure, Managing sales personal, Motivation of sales force, Importance of compensation

6. Distribution management

Concept & types of distribution channel, Roles of intermediates in channel of distribution, Functions and flow of distribution channel, Factors governing the choice of specific channel

7. Pricing Strategies

Importance, objectives & determinates of pricing, Pricing methods, Method of pricing based on cost, Demand and competition, Pricing for industrial goods and services

8. International Marketing

Meaning of international Marketing, Need for export marketing in developing and developed countries, Major factor in the international marketing environment, Need for export promotion

9. Customer Satisfaction and Transaction Analysis

Importance of customer satisfaction, Reasons for customer dissatisfaction, Method to deal with customer dissatisfaction, Concept and meaning of after sales service, Seller behavior, Concept and meaning of transactional analysis, Advantages of transactional analysis, Examples using transactional analysis

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Text Book:-

1. Principles of Marketing by Philip Kotler

1ECA02 Communication Engineering – II

L T P C
3 - 2 4

1. Communication System

Introduction to Communication System, Analog & digital messages, SNR, Channel Bandwidth and the rate of communication, Modulation, Randomness, Redundancy and coding.

2. Noise

External noise, Internal noise, Noise calculation, SNR, Noise Figure

3. Sampling Theorem & Pulse Modulation

Sampling theorem, Principle and circuits of PAM, PWM, and PPM. Pulse Code Modulation, Quantization, Companding Process, Bandwidth. Delta Modulation and Adaptive delta modulation.

4. Principles of Digital Modulation Techniques and data transmission

Introduction, Types of Pulse Modulation, Frequency shift keying (FSK), Phase shift keying (PSK), Quadrature amplitude modulation (QAM) and Digital Carrier system – PSK, BPSK and QPSK. Digital Communication System, Line coding, Scrambling, Regenerative repeater, M-ary communication

5. Satellite Communication

Introduction, Satellite Orbits, General Principles Synchronous & non synchronous Systems, Properties of radio system. Ground station and satellite equipment. Classification of earth station. Description of earth station. Tracking and servo system. Satellite space craft system, Geostationary satellite, Application of Geostationary satellite, Satellite in low and medium earth orbit, Satellite telephone system using GEO, LEO and MEO Satellite; Global positioning system and its application Intelsat system, Domestic satellite system. Digital Satellite Television and Interactive System [a] Digital data processing and transmission [b] Direct to home digital satellite Broad cast system[c] Interactive Cable TV distribution Network

6. Multiplexing and Multiple access technologies

Introduction, FDM and FDMA, TDM and TDMA, Merits and Demerits of the two systems

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Text Book:-

1. Modern Analog & Digital Communication System by B. P. Lathi

1ECA05 Television Engineering

L T P C
3 - 2 4

1. Review of Modulation and Demodulation Process:

Need of modulation: A. M. modulation, Limitation of A.M. modulation, Typical A.M. modulations circuits and its applications with block diagram. A.M. detectors, Conditions for obtaining faithful detection of original signal. F.M. modulation - Advantages of F.M. over A.M. F.M. discriminators. Typical F.M. discriminators and their applications.

2. Video Signal Generation:

Composite video signal for B & W as well as for colour T.V. Bandwidth requirement Vestige side band requirement overall band width used in practice. Generation of Composite Video Signal by Camera tubes and other accessories. Different Camera tube - Plumbicon, Vidicon, Silicon diode arrays, charge coupled device - Construction & Working of all the camera tubes stated, Special care for the tubes to be taken. Special care for handling of tubes.

3. Colour Signal for Colour T.V.:

Idea of tube taken, tint and Saturation at a Colour beam. Obtaining different colour from various main colour of beam i.e. Red, Green and Blue. Understanding of chroma triangle. Generation of luminance Signal Y : Obtaining Y- signal from different proportion of Base Colour R,G,B Choice of generation (R-Y) and (B-Y) colour signal obtaining Y- signal from (R-Y) and (B-Y) signal. Colour matrix - Chroma signal - Burst Signal : generation of (R-Y) and (B-Y) signals from signal received from camera. By using proper adder and matrix circuit to get signal from modulated (R-Y) and (B-Y) signal and Y- (luminance signal). Generation & accumulation of Burst signal in a composite signal to be transmitted. Compatibility of the transmission system.

4. Brief knowledge of different transmission:

Different transmission system such as PAL, NTSC, and SECAM - Their special features as the country when they are used or adopted.

5. T.V. Receiver:

Antenna specially used for T.V. Receiver, Need of Booster and balun. Block diagram of B & W T.V. receiver and understanding the function of each block. Identification & familiarization of IC's used for various section or blocks at the above diagram such as 1. 3068 VIF 2. 3065 SIF 3. 810 Sound out put or Complete sound system using CA1190 4. CA 920 sync separator and Horizontal deflection IC 5. TBA 1044 Vertical deflection Oscillator IC 6. Video out stage 7. EHT generation 8. Power supply circuit 9. Yoke with deflection coils - coil identification. 10. Ring magnet and their adjustment construction features. Picture tube for B & W T.V. its output and control characteristic familiarization of its different electrodes with approximate level of voltage to be applied. Accelerating anode & its connection with tube. Importance of acqadag coating. Earthing of the tube. Gamma correction of the tube. Identification of its pin with pin diagram. Special care to be taken for its hand ling. Discuss on commons faults & their rectification.

6. Block diagram of colour Television:

Understanding the function of each block comparison of colour T.V. with B & W T.V. Identification & familiarization of generally used ICs for various section of the T.V. such as 1. Tuner - VIF IC TDA 4420 2. Chroma section IC TDA 3561 3. Video out put stage 4. Sync Separator of Horizontal Oscillator TDA 1940F 5. Vertical oscillator stage or Sound sub system IC 1701 or CA 1190 6. E.H.T. Circuit & horizontal out put 7. Purity magnets, shadow marks, Deflection yoke adjustment and care.

7. Picture Tubes:

Constructional ideas with special features of picture tube such as tri gun, delta gun Trinitron etc. Need of degaussing of the tubes. Methods of degausses of the tube. Pin diagram approximate voltage level to each pin to be maintained Gamma Corrections. Care of maintenance of the tube.

8. Study of Common faults:

1. Poor Picture 2. Picture is smaller than normal 3. Appearance of single horizontal line or vertical line or simply a Centre dot. 4. Horizontal lines with vertical rolling. 5. Picture trembling 6. Folding of Picture in horizontal direction. 7. Tearing of picture. 8. Inverted picture. 9. Negative picture. 10. Only one colour 11. Colour seen is to be different than normal. 12. Picture smeared with different. Trace of colour. 13. Black & White Picture on colour monitors in spite of colour transmission. 13. Picture key stoned. 14. Picture sineared or compressed. 15. Pictures smear with black dot. 16. Plain Raster.

9. Various control & their adjustment:

Horizontal control. Vertical control. Sound control with Bass, Treble & Surround control. Colour control with bright contrast or picture in picture (PIP). Remote control & function given by remote control. Automatic ON-OFF time. Automatic & manual tuning adjustment.

10. VCR, VCD and DVD

Problems of recording video signal. Tape material & its construction. Overcoming the problems of recording. VCR - Block diagram and working of each block. Different type of VCR. Construction diagram of VCR with drum & other mechanism. Normal faults in VCR. Various controls used in VCR. Servo control used in VCR, elementary idea of digital video recording & playback videodisc recording. Working Principle of VCD. Troubleshooting in VCD. Working Principle of DVD. Trouble shooting techniques for DVD.

11. CCTV - Closed Circuit T.V.:

Uses of CCTV - application field. Understanding of a CCTV system with block diagram. Requirements of CCTV systems and their selection criteria. Control and adjustment in CCTV system.

12. Modern TV's & their special features:

Explanation of the working of following modern T.V. with some special features & Block diagram. Digital T.V. High definition T.V. Flat tube T.V. T.V. with LCD screen. Tele text and view data.

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Text Book:-

1. Modern Television Practice by R .R. Gulati

1ECA06 Antenna & Micro Wave Engineering

L T P C
3 1 2 5

1. Introduction to Microwaves:

Frequency spectrum, classification of microwave band, advantages and limitation of microwave communication

2. Theory of transmission lines:

Concept, basic line equation, determination of attenuation constants (Alpha) and phase constant (Beta), dimensions on transmission lines and conditions for distortion less line, $\lambda/4$ and $\lambda/2$ line, standing waves, VSWR, impedance matching using stub line, smith chart, solutions of transmission line, problem using smith charts, types of transmission line.

3. Waveguides:

Introduction to wave guides, concept of phase and group velocity, TE and TM waves (No mathematical treatment)

4. Microwave Tubes:

Limitations of conventional tubes at UHF and microwave. Operating principle, performance, characteristics and applications of microwave tubes like two cavity klystron, Reflex Klystron Magnetron, TWT Traveling wave Tube (No Mathematical Analysis)

5. Micro wave Semiconductor devices:

Varactor diode, Varactor multipliers, SRD Multipliers, principle of parametric amplifier. PIN diode, equivalent circuit of PIN diode under various bias conditions, PIN diode applications; switches. Working principle, performance. Characteristics & applications of microwave diodes like Tunnel diode, GUNN diode, and IMPATT and TRAPATT diode.

6. Microwave Components:

Principle of working and performance of various microwave components like E-plane Tee, H-plane Tee, directional coupler, isolators and circulators, wave meters, matched load, Matched Terminations, cavity, Magic Tee, Bends, Twists.

7. Microwave Measurements:

Power Measurements. Frequency and wavelength measurement. SWR Measurement. Attenuation Measurement. Cavity Measurement

8. Antenna Fundamentals:

Definitions: Antenna, Radiation Resistance, Radiation pattern, Antenna Temperature, Bandwidth, Beam width, Polarization. Beam Area, Radiation Intensity, Beam Efficiency, Directivity, Gain, Antenna Efficiency, Different Apertures, Aperture Efficiency, Top loading, Effective Height, Friis Transmission Formula. Accelerated Charges, Opened-out Twin-line, Oscillating Dipole, Centre - Fed Dipole

9. Antenna Arrays:

Field and Phase Patterns, Two Isotropic Point sources, Pattern Multiplication. Broadside Array. End Fire Array, Binomial Array.

10. Antenna Structure, Characteristics and Applications:

Short-dipole, its pattern and radiation resistance Half-wave Dipole, Quarter-Wave Dipole. Loop Antenna, its pattern and radiation resistance. Helical Antenna, its geometry and modes. Slot Antenna, Horn Antenna. Folded Dipole, Yagi-Uda Antenna. Resonant wire Antenna, V – Antenna. Rhombic Antenna, Log - Periodic Antenna. Parabolic Reflector Antenna, Lens Antenna. Ground - Plane Antenna, Micro strip Antenna. Turn Stile Antenna, Super turnstile Antenna

11. Radio Wave Propagation:

Modes of Propagation: Ground - Wave, Ionospheric Wave, Space Wave. Tropospheric Scatter, Duct, Multi-hop. Definitions: virtual Height, Skip Distance, Maximum Usable Frequency Lowest Usable Frequency Optimum Working Frequency.

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Tutorial: - It will consist of minimum ten tutorial assignments based on above topics.

Text Book:-

1. Microwave Engineering by Sanjeev Gupta (Khanna Publication)
 2. Antenna & Wave Propagation by K. D. Prasad
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1ECD01 Advance Communication Technology

L T P C
3 - 2 4

1. The Telephone System:

Introduction., Public switched telephone system, The local loop, Signal and noise in telephone system, Frequency division multiplexing, Digital transmission, Telephone Network signaling, Digital local loop, Types of Signaling (SS7).

2. Digital Modulation and Modems:

Introduction, Types of Pulse Modulation, Frequency shift keying (FSK), Phase shift keying (PSK), Quadrature amplitude modulation (QAM), Telephone Modems, Modem to computer connections, Cable modem and Hubs. Digital Data Compression (MP3), Audio Compression and Video Compression.

3. Satellite Communication:

Introduction, Satellite Orbits, Geostationary satellite, Application of Geostationary satellite, Satellite in low and medium earth orbit, Satellite telephone system using GEO, LEO and MEO Satellite; Global positioning system and its application Digital Satellite Television and Interactive System [a] Digital data processing and transmission [b] Direct to home digital satellite Broad cast system [c] Interactive Cable TV distribution Network.

4. Multiplexing and Multiple access technology:

Introduction, FDM and FDMA, TDM and TDMA, Code division multiple access (CDMA). Advantage of DMA over other technologies.

5. **Introduction to Cellular and wireless communication:**
Introduction, Mobile communication Evolution and Fundamentals 1. Frequency allocation for mobile Services: [a] Frequency Reuse, [b] Channel assignment Strategies, [c] Channel planning for Wireless System, [d] Adjacent channel interference and system capacity. Mobile telephone Concepts, Basics of GSM technology, GSM, Its security and Privacy, Cellular telephone specification and Operations: [a] Cell site Equipment, [b] Digital cellular systems, [c] Roaming and digitally advanced MPS., Frequency allocation for mobile services, WLL technology, Introduction to point to point and point to multi point, communication: [a] Local multipoint distribution system [LMDS], [b] MMDS.
6. **Introduction to Third generation 2G Wireless Networks:**
3G-W CDMA (UMTS), Basics of 3G CDMA 2000, TD-SCDMA, Wireless Local Area Networks (WLAN's) Blue tooth and Personal Area network (PAN's), General Packet Radio Service (GPRS).
7. **Personal Communication System:**
Introduction, Difference between Cellular and PCS system, Comparisons of PCS scheme, Data communication with PCS
Wireless application protocol
Introduction, Why WAP? Wireless Sessions Protocol
Applications
8. **Integrated Service Digital Network (ISDN):**
History of ISDN, ISDN's Advantage, Need of ISDN
Regular Telephone Versus Digital Servie, Digital fiber line (DSL) Types of Digital Subscriber line

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Text Book:-

1.

1ECD02 Power Electronics

L T P C
3 - 2 4

1. **Modern Power Devices:**
Principle, construction and working of following Power Devices : Power Bipolar Transistors, Power MOSFETs, IGT or IGBT, SIT
2. **Regulated Power Supply:**
Simple series voltage regulators with over current and output over voltage protection shunt regulator-using transistor, 3-terminal regulator. Switch mode power supply (SMPS) pre regulator (Power supply in series, power supply in parallel). Basic working principle and advantages of stabilizers. Switch mode Power Supply: Introduction to SMPS, Different between SMPS and Linear supply advantages of SMPS, SMPS Circuits using SCR & ISS. AC regulator: AC lord controllers, SCR back to back connections, AC loud control circuits using TRIAC and DIAC, 3-0 AC regulator circuits.
3. **Choppers:**
Introduction of chopper. Different types of choppers like class A, B, C, D. Jone's chopper. Morgan's chopper. Chopper based dc motor control. Microprocessor based speed control of DC motors.
4. **Inverters:**
Introduction, Principle of PWM inverters, bridge inverters, 3-0 bridge inverter 180 & 120 Conduction. Series inverters. Parallel inverter. Design of series & parallel inverters with triggering circuits.

5. AC Drives:

Induction motor characterization Torque speed relation of induction. Different controls of AC motors like stator voltage rotor resistance, slip recovery, frequency control.

6. Cycloconverters:

Introduction, Operating principle of Cycloconverters. Types of Cycloconverters. Single phase to single Cycloconverters. Three phase to single Cycloconverters. Three phases to three phase Cycloconverters.

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Text Book:-

1. Power Electronics by Bhim Rao.

1ECD03 Process Instrumentation & Control

L T P C
3 - 2 4

1. Performance Characteristics:

Accuracy, precision, various errors etc.

2. Pressure Measurement:

Definition & Various Units of Pressure. Various Methods of Pressure Measurement. Manometers. Electric types:- bellows, diaphragm. Electrical types:- LVDT, Using resistance, Strain gauge, capacitance type pressure gauge. Vacuum Measurement: Mechanical type:- Mcleod gauge. Electrical type:- Thermal (Pirani gauge)

3. Flow Measurement:

Head Type Measurement: (a) Basic concept (Principle) (b) Various measuring elements (orifice, Venturi, pilot tube, flow nozzle). Area type flow meters: (a) Principle (b) Rota meter. Variable area piston type. Types of flow meters. Flow meter of Mass flow meter. Electromagnet of flow meter. Ultrasonic of flow meter. Hot wire ennumometer

4. Liquid Level Measurement:

Mechanical type (Flow Type). Hydrostatic types (Air purge systems). Electrical Methods of level Measurement. Ultrasonic Methods

5. Temperature Measurement:

Various temp units (Scales). Measurement by mercury / liquid, gases filled – in systems (thermometer). Expansion type (Solid expansion (bimetallic thermometer, fluid expansion). Electrical types (Thermocouples (J, K, R,S,T,E) RTD, Thermistors). Radiation type: - Optical & Total radiation type, pyrometer

6. Converters & Controllers:

I/P & P/I. Flapper Nozzle assembly. Various controller modes. Describe. Continuous (P, I, D, PI, PD, PID). Pneumatic controllers. Electronic controllers. Examples based on modes of controllers.

7. Control Valves:

Function, types, characteristics, selection criteria for valve size

8. Various control schemes:

Cascade, Feedback, Feed forward, Ratio control, Split range, Simple control scheme for level, flow, temp gauge & pressure.

9. Programmable logic controller (PLC):

Architecture & Programming, Simple ladder diggers, Applications

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Text Book:

1ECD04 Bio Medical Electronics

L T P C
3 - 2 4

- 1. Introduction to Bio Medical Instrumentation:**
Definition of Bio Medical Instrumentation. Man – Instrumentation. Components of the Man - Instrument system. Problems encountered in measuring a living system.
- 2. Sources of Bio-electric potentials:**
Resting & Action potentials. Propagation of action potentials. Study of bio-electric potentials like (1) Electro cardiogram (2) Electro encephalogram (3) Electro myogram. Signal characteristics of ECG, EEG, EMG.
- 3. Bio - Electrodes:**
Microelectrodes, Needle electrodes, Disc electrode.
- 4. Respiratory Measurements:**
Physiology of Respiratory System, Test & Instruments for mechanics of breathing.
- 5. Bio - Medical Measurement:**
Blood Pressure, Blood flow, Temperature, Blood pH, Respiratory measurement.
- 6. Bio - Medical Reorders System:**
Electrocardiograph, Electromyograph, Electroencephalograph (Block - diagram study)
- 7. Introduction to Medical Imaging:**
X –Rays, Ultrasonic, Computers in bio-medical field.
- 8. Therapeutic Equipments & Techniques:**
Pacemaker, De-fibrillates, Lasers in bio-medical field, Patient safety, Bio - Telemetry.

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Text Book:

1. Hand book of Biomedical by R. S. Khandpur
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1CED06 Computer Networks

L T P C
3 - 2 4

- 1. Introduction to Computer network for data Communication:**
Introduction to Computer networks & their use. Network Topologies-Bus, Star, Ring, Tree, Mesh, Hybrid, Circuit Switching, Packet Switching, Overview of Routing Algorithms, Networking protocols-OSI Model and their various Layer's Functionality
LAN, MAN, WAN- Ethernet, FDDI, SMDS, Frame Relay, ATM- Introduction, Layers & their Functionality, TCP/IP model.
- 2. Components of LAN:**
Transmission Media.- Guided Media, Unguided Media(Twisted Pair, Co-axial, Fiber Optic, Overview on Microwave Communications, Satellite Communication & Wire less LAN),Connectors & Ports-Serial Port, Parallel Port, USB Port,NIC,IP Addressing
- 3. Interconnection Devices:**
Repeater, Bridges, Router, Gateway, Switches, Modem- Cable, DSL
- 4. Network Applications:**
Network Security-Data Encryption- Decryption, Digital Signature, Firewalls, Viruses, Data Encryption Standard-DES, DNS - Domain Name System, Internet & their Applications and Services-Basics of Internet, Dial Up Connection, Leased Line Connection, Electronic Mail, News Group, File Transfer

Practical / Term work- It will consist of minimum ten experiments / exercises based on above topics.

Text Book:

