आईएफटीएम विश्वविद्यालय, मुरादाबाद, उत्तर प्रदेश

IFTM University, Moradabad, Uttar Pradesh

NAAC ACCREDITED

IFTM UNIVERSITY
N.H.-24, Lodhipur Rajput, Delhi Road, Moradabad, Uttar Pradesh-244001
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Study & Evaluation Scheme of
Diploma (Electronics & Communication Engineering)
[Session 2020-21]

Programme:	***Diploma (Electronics & Communication Engineering)***
Course Level:	***Diploma***
Duration:	***Three Years (six semesters) Full Time***
Medium of Instruction:	***English/Hindi***
Minimum Required Attendance:	***75%***
Maximum Credits:	***162***

Programme Outcomes (POs):

Students completing this programme will be able to:

- Apply the basic knowledge of the basic sciences and fundamentals of Electronics and Telecommunication Engineering.
- Use basic concepts in various domains of Electronics and Telecommunication Program such as Applied Electronics, Analog and Digital communication, Digital and Embedded Systems, Industrial Instrumentation and Automation.
- Identify, analyze and solve Electronics and Telecommunication Engineering problems to the substantiate conclusions.
- Design and implement electronic circuits and to analyze, interpret and experimentally validate the results.
- Work effectively on various technical projects to satisfy the industrial needs.
- Use modern engineering tools, software's and equipments to analyze the impact of engineering solutions in societal and environmental contexts.
- Apply ethical principles and knowledge for the benefits of society and industries.
- Individual and Teamwork: Work effectively as an individual and member or a leader in multidisciplinary teams.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
IFTM UNIVERSITY, MORADABAD

Diploma (Electronics & Communication Engineering)

STUDY & EVALUATION SCHEME (Effective from Session 2020-21)
YEAR I, SEMESTER-I

S.N.	Course Code	Course Name	Periods			EVALUATION SCHEME				Course Total	Credits
						Internal Exam			External Exam		
			L	T	P	Mid Sem Exam	AS +AT	Total			
THEORY											
1.	DPH -101	Elementary Physics-I	3	1	0	20	10	30	70	100	4
2.	DMA -101	Elementary Mathematics -I	3	1	0	20	10	30	70	100	4
3.	DCH -101	Elementary Chemistry-I	3	1	0	20	10	30	70	100	4
4.	DME -101	Elementary Engineering Mechanics	3	1	0	20	10	30	70	100	4
5.	DME -102 / DEE - 101	Workshop Technology / Basic Electrical & Electronics Engineering	3	1	0	20	10	30	70	100	4
6.	FEC -101/ DCS -101	Fundamentals of English Communication / Computer Fundamentals and Programming in C	3	1	0	20	10	30	70	100	4
PRACTICALS / PROJECT											
7.	DCS -151/ DME -151	Computer Programming Lab/ Engineering Drawing Lab	0	0	2	20	10	30	70	100	1
8.	DPH -151	Physics-I Lab	0	0	2	20	10	30	70	100	1
9.	DCH -151	Chemistry-I Lab	0	0	2	20	10	30	70	100	1
10.	DME -152 / DEE - 151	Workshop Lab / Basic Electrical and Electronics Engineering Lab	0	0	2	20	10	30	70	100	1
11.	DGP -101	General Proficiency	-	-	-	-	-	100	-	100	1
		TOTAL	**18**	**06**	**08**	**-**	**-**	**-**	**-**	**1100**	**29**

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STUDY & EVALUATION SCHEME (Effective from Session 2020-21)
YEAR I, SEMESTER-II

S.No.	Course Code	Course Name	Periods			EVALUATION SCHEME				Course Total	Credits
						Internal Exam			External Exam		
			L	T	P	Mid Sem Exam	AS +AT	Total			
THEORY											
1.	DPH -201	Elementary Physics-II	3	1	0	20	10	30	70	100	4
2.	DMA -201	Elementary Mathematics -II	3	1	0	20	10	30	70	100	4
3.	DCH -201	Elementary Chemistry-II	3	1	0	20	10	30	70	100	4
4.	DME -201	Elementary Mechanical Engineering	3	1	0	20	10	30	70	100	4
5.	DEE -201 / DME - 202	Basic Electrical & Electronics Engineering / Workshop Technology	3	1	0	20	10	30	70	100	4
6.	FEC-201/ DCS-201	Fundamentals of English Communication / Computer Fundamentals and Programming in C	3	1	0	20	10	30	70	100	4
PRACTICALS / PROJECT											
7.	DPH -251	Physics-II Lab	0	0	2	20	10	30	70	100	1
8.	DME -252/ DEE - 251	Workshop Lab / Basic Electrical and Electronics Engineering Lab	0	0	2	20	10	30	70	100	1
9.	DCS-251/ DME -251	Computer Programming Lab/ Engineering Drawing Lab	0	0	2	20	10	30	70	100	1
10.	DCH - 251	Chemistry – II Lab	0	0	2	20	10	30	70	100	1
11.	DGP -201	General Proficiency	-	-	-	-	-	100	-	100	1
		TOTAL	**18**	**06**	**08**	**-**	**-**	**-**	**-**	**1100**	**29**

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STUDY & EVALUATION SCHEME (Effective from Session 2020-21)
YEAR II, SEMESTER-III

S.N.	Course Code	Course Name	Periods			EVALUATION SCHEME				Course Total	Credits
						Internal Exam			End Sem Exam		
			L	T	P	Mid Sem Exam	AS +AT	Total			
THEORY											
1.	DEC -301	Fundamentals of Electronic Instrumentation & Measurement	3	1	0	20	10	30	70	100	4
2.	DEC -302	Electronic Devices and Circuits-I	3	1	0	20	10	30	70	100	4
3.	DEC -303	Basic Network System	3	1	0	20	10	30	70	100	4
4.	DEC -304	Fundamentals of Communication Engineering	3	1	0	20	10	30	70	100	4
5.	DEC -305	Principles of Digital Electronics	3	1	0	20	10	30	70	100	4
PRACTICALS / PROJECT											
6.	DEC -351	Electronics Instrumentation & Measurement Lab	0	0	2	20	10	30	70	100	1
7.	DEC -352	Network System Lab	0	0	2	20	10	30	70	100	1
8.	DEC -353	Communication Lab-I	0	0	2	20	10	30	70	100	1
9.	DEC -354	Digital Lab	0	0	2	20	10	30	70	100	1
10.	DGP -301	General Proficiency	-	-	-	-	-	100	-	100	1
		TOTAL	**15**	**05**	**8**	**-**	**-**	**-**	**-**	**1000**	**25**

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Diploma (Electronics & Communication Engineering)

STUDY & EVALUATION SCHEME (Effective from Session 2020-21)
YEAR II, SEMESTER-IV

S.N.	Course Code	Course Name	Periods			EVALUATION SCHEME				Course Total	Credits
						Internal Exam			End Sem Exam		
			L	T	P	Mid Sem Exam	AS +AT	Total			
THEORY											
1.	DEC -401	Introduction to Microprocessor	3	1	0	20	10	30	70	100	4
2.	DEC -402	Introduction to Power Electronics	3	1	0	20	10	30	70	100	4
3.	DEC -403	Fundamentals of Transducers and Sensors	3	1	0	20	10	30	70	100	4
4.	DEC -404	Fundamentals of Signals and Systems	3	1	0	20	10	30	70	100	4
5.	DEC -405	Electronic Devices and Circuits-II	3	1	0	20	10	30	70	100	4
PRACTICALS / PROJECT											
6.	DEC -451	Microprocessor Lab	0	0	2	20	10	30	70	100	1
7.	DEC -452	Power Electronics Lab	0	0	2	20	10	30	70	100	1
8.	DEC -453	Electronic Devices Lab	0	0	2	20	10	30	70	100	1
9.	DEC -454	Electronics Workshop & PCB Lab	0	0	2	20	10	30	70	100	1
10.	DGP -401	General Proficiency	-	-	-	-	-	100	-	100	1
		TOTAL	**15**	**05**	**8**	**-**	**-**	**-**	**-**	**1000**	**25**

Note: Students has to go for *Industrial Training of 4 – 6 Weeks after IV Semester. The training will be evaluated in V Semester.*

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STUDY & EVALUATION SCHEME (Effective from Session 2020-21)
YEAR III, SEMESTER-V

S.N.	Course Code	Course Name	Periods			EVALUATION SCHEME				Course Total	Credits
						Internal Exam			End Sem Exam		
			L	T	P	Mid Sem Exam	AS +AT	Total			
THEORY											
1.	DEC -501	Industrial Management & Entrepreneurship Development	3	1	0	20	10	30	70	100	4
2.	DEC -502	Modern Communication System	3	1	0	20	10	30	70	100	4
3.	DEC -503	Biomedical Electronics	3	1	0	20	10	30	70	100	4
4.	DEC -504	Microwave & Radar Engineering	3	1	0	20	10	30	70	100	4
5.	DEC -505	Telemetry & Data Acquisition Systems	3	1	0	20	10	30	70	100	4
PRACTICALS / PROJECT											
6.	DEC -551	Minor Project	0	0	2	-	30	30	70	100	1
7.	DEC -552	Communication Lab-II	0	0	2	20	10	30	70	100	1
8.	DEC -553	Microwave Lab	0	0	2	20	10	30	70	100	1
9.	DEC -554	Industrial Training (Evaluation & Viva)	0	0	2	50	50	100	-	100	1
10.	DGP -501	General Proficiency	-	-	-	-	-	100	-	100	1
		TOTAL	**15**	**05**	**8**	**-**	**-**	**-**	**-**	**1000**	**25**

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STUDY & EVALUATION SCHEME (Effective from Session 2020-21)
YEAR III, SEMESTER-VI

S.N.	Course Code	Course Name	Periods			EVALUATION SCHEME				Course Total	Credits
						Internal Exam			End Sem Exam		
			L	T	P	Mid Sem Exam	AS +AT	Total			
THEORY											
1.	DEC -601	Introduction to Data Communication Network	3	1	0	20	10	30	70	100	4
2.	DEC -602	Fundamentals of Control System	3	1	0	20	10	30	70	100	4
3.	DEC -603	Introduction to Optical Fiber Communication	3	1	0	20	10	30	70	100	4
4.	DEC -604	Modern Consumer Electronics Appliances	3	1	0	20	10	30	70	100	4
5.	DEC -605	Electronics Equipment Testing	3	1	0	20	10	30	70	100	4
PRACTICALS / PROJECT											
6.	DEC-651	Major Project	0	0	4	-	50	50	150	200	6
7.	DEC-652	Control System Lab	0	0	2	20	10	30	70	100	1
8.	DEC-653	Optical Fiber Communication Lab	0	0	2	20	10	30	70	100	1
9.	DGP-601	General Proficiency	-	-	-	-	-	100	-	100	1
		TOTAL	**15**	**05**	**8**	**-**	**-**	**-**	**-**	**1000**	**29**

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - I Year (I Semester)
DPH 101: ELEMENTARY PHYSICS-I

Objective: This aim of this course is to impart knowledge in basic concepts of physics like unit, dimension, work, energy and power etc and their applications.

UNIT I **(08 Sessions)**

Unit and Dimensions

Physical quantities, Fundamental and derived units, Systems of unit (CGS, MKS and SI units), Dimensions and dimensional formulae of physical quantities (area, volume, velocity, acceleration, momentum, force, impulse, work, power, energy, surface tension, coefficient of viscosity and strain) , Dimensional equations and their uses with examples, Limitations of dimensional analysis.

UNIT II **(10 Sessions)**

Force and Motion

Scalar and vector quantities - examples, addition and multiplication of vectors, scalar product and vector product of vectors, Force, resolution and composition of forces – resultant, friction, law of friction and type of friction, Newton's Laws of motion – concept of momentum, determination of force equation from Newton's second law of motion, Newton's third law of motion Conservation of momentum, impulse and impulsive forces, simple numerical problems, Circular motion (Definition), Relation between linear and angular velocity and linear acceleration and angular acceleration , Centripetal force (derivation) and centrifugal force Banking of roads, Definition of torque ,Planetary Motion, Newton's law of gravitation, Kepler's law of planetary motion, Escape velocity (derivation)

UNIT III **(08 Sessions)**

Work, Power and Energy

Work: definition and its units, Work done against friction in moving an object on horizontal and inclined plane (incorporating frictional forces),

Power: definitions and its units, calculation of power in simple cases,

Energy: Definitions and its units: Types: Kinetic energy and Potential energy, with examples and their derivation.

UNIT IV **(08 Sessions)**

Temperature and its measurement

Difference between heat and temperature on the basis of K.E. of Molecules, Principles of measurement of temperature and different scales of temperature, Transfer of Heat, Modes of transfer of heat (conduction, convection and radiation with examples), Coefficient of thermal conductivity, Properties of heat radiation. Prevost's theory of heat exchange, Laws of black body radiations: Stefan's law, Kirchhoff's law, Wien's law.

UNIT V **(10 Sessions)**

Properties of Matter

Elasticity, stress and strain, Different types of modulus of elasticity, Surface tension- its units, measurement of surface tension by capillary tube method, applications of surface tension, effect of temperature and impurity on surface tension, Fluid motion, stream line and turbulent flow, Viscosity and coefficient of viscosity.

Course Outcomes:

Students completing this course will be able to:

- Identify different systems of units and convert units from one system to another as well as conversant with practical units.
- Understand equations of motion and their applications.
- Differentiate between work, energy and power
- Explain Mode of heat transfer and black body radiation.
- Define stress, strain, elasticity, surface tension and their applications.

Suggested Readings:

1. Concept of Physics, Prof. H.C. Verma, Part-1 (BhartiBhawan)
2. Concept of Physics, Prof. H.C. Verma, Part-2 (BhartiBhawan)
3. A Text Book of Applied Physics: Eagle Prkashan, Jullandhar

Website Sources:

- https://thefactfactor.com
- https://i1.dainikbhaskar.com
- https://hplgit.github.io
- https://worldwidescience.org
- https://courses.lumenlearning.com
- https://www.machinedesign.com
- http://teacher.pas.rochester.edu

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering Programme
Diploma (EC) - I Year (I Semester)
DMA 101: ELEMENTARY MATHEMATICS-I

Objective: - To understand basics and applications of algebra, determinants, vectors, trigonometry and complex numbers. The focus of these topics in field to impart their knowledge in particular area of engineering branches and Comprehensive knowledge of basic mathematics.

UNIT I **(08 Sessions)**

Series : AP and GP; Sum of n terms, Partial fractions, Exponential and Logarithmic series, Binomial theorem for positive, Negative and fractional index (without proof) Application of Binomial theorem, Permutation & combination.

UNIT II **(10 Sessions)**

Determinants: Elementary properties of determinants of order 2 and 3, Consistency and solution of system of algebraic equation by Cramer's rule, Matrices, Type of matrix, Properties (addition, subtraction, multiplication, adjoint, inverse) of matrix.

UNIT III **(06 Sessions)**

Vector algebra: Dot and Cross product, Scalar and vector triple product, Application to work done, Moment of a force.

UNIT IV **(08 Sessions)**

Trigonometry: Relation between sides and angles of a triangle, Statement of various formulae showing relationship between sides and angles of a triangle, trigonometrically equations, Inverse trigonometric function.

UNIT V **(08 Sessions)**

Complex numbers, Representation, Modulus and amplitude De-moiver'stheorem and its application in solving algebraic equations, Mod, Function and its properties.

Course Outcomes:

The student is able to

- Remember terminologies and formulae in algebra, determinants, vectors, trigonometry and complex numbers.
- Understand and interpret the concepts of algebra, determinants, vectors, trigonometry and complex numbers.
- Compare and analyse the methods in algebra, determinants, vectors, trigonometry and complex numbers.
- Predict and evaluate the problems in algebra, determinants, vectors, trigonometry and complex numbers.

Suggested Readings:

1. R.D. Sharma: Mathematics (I& II-XI), Dhanpat Rai Publication, Delhi.
2. B.S. Grewal :Engg. Mathematics by khanna Publishers, New Delhi.
3. H.R. Luthra : Applied Mathematics by Bharat Bharti Prakashan & Co. Meerut
4. Kailash Sinha : Applied Mathematics by Bharat Publication, Meerut
5. NCERT (XI & XII)

Website Sources:

- www.pdfdrive.com
- www.dmi.gov.in
- www.yourarticlelibrary.com
- onlinecourses.nptel.ac.in
- en.wikipedia.org

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - I Year (I Semester)
DCH 101: ELEMENTARY CHEMISTRY-I

Objectives: To emphasize the relevance of fundamentals and applications of chemistry for diploma holders and student will learn appropriate combinations of old and new emerging concepts. Also to bring potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

UNIT I **(08 Sessions)**

Structure Of Atom: Basic concepts of atomic structure, Matter wave concept, Schrodinger wave equation (excluding derivation) Quantum number, Heisenberg's Uncertainty Principle, Shapes of orbitals.

Chemical Bonding: Basic concepts, Hydrogen bonding, Valence bond theory, Hybridization, VSEPR theory, Molecular orbital theory as applied to diatomic homo nuclear molecules of first and second period elements, Co-ordination bond.

UNIT II **(08 Sessions)**

Periodic Classification Of Elements: Classification of elements (s, p, d and f block elements), Modern Periodic law, Periodic properties: Ionization energy electro negativity, Electron affinity,

UNIT III **(08 Sessions)**

Electro Chemistry: Arrhenius Theory of electrolytic dissociation, Transport number, Electrolytic conductance, Ostwald dilution law. Concept of Acid and bases: Bronsted, Arrhenius and Lewis theory. pH. Buffer solutions, Indicators, Solubility product, Common ion effect with their applications, Redox reactions, Electrode potential (Nernst Equation), Electro-chemical cells (Galvanic and Electrolytic). EMF of a cell and free energy change. Standard electrode potential, Electro chemical series and its applications., Laclanche's or dry cell, Acid storage cell (Lead accumulator) and Alkali stroge cell (Edison accumulator), Solar cell (Photovoltaic cell), Numerical problems based on topics.

UNIT IV **(08 Sessions)**

Chemical Kinetics: Introduction, rate of reaction, rate constant order and molecularity of reaction. Activation energy, Zero order First order and Second order (when initial concentration of both the reacrants are same) reactions.

Catalysis: Definition, Characteristics of catalytic reactions, Catalytic promoters and poison, Autocatalysis and Negative catalysis, Theory of catalysis, Application.

UNIT V **(08 Sessions)**

Solid State and Colloids

Solid State: Types of solids (Amorphous and Crystalline), Classification (Molecular, Ionic, Covalent, Metallic), Band theory of solids (Conductors, Semiconductors and Insulators), types of Crystals, FCC, BCC, Crystal imperfection

Colloids: Colloids and its types, Different system of colloids, Dispersed phase and dispersion medium. Methods of preparation of colloidal solutions, Dialysis and electro-dialysis. Properties of colloidal solution with special reference to adsorption, Brownian Movement, Tyndal effect, Electrophoresis and coagulation. Gold number, Application of colloids.

Course Outcome:

- Students will able to understand and relate electrochemistry and corrosion.
- They will analyze the basic knowledge of various types of colloids, their properties and Industrial Applications
- Can apply the science for understanding the solid state and its various application in making semiconductors.

Suggested Readings:

1. Liquid Crystals and Plastic Crystals, vol.-I, edited by G.W. Gray and P.A. Winsor, Ellis Harwood Series in Physical Chemistry, New York.
2. Corrosion Engineering by M.G. Fontana McGraw Hill Publications.
3. Engineering Chemistry by J C Kuriacose and J. Rajaram, Tata McGraw-Hill Co, New Delhi (2004).

4. Chemistry of Engineering Materials by C.P. Murthy, C.V. Agarwal and A. Naidu BS Publication Hyd.

Website Sources:

- http://www.commonchemistry.org/
- https://uri.idm.oclc.org/login?url=https://www.engineeringvillage.com/search/quick.url?CID=quickSearch&database=1
- https://www.technicalsymposium.com/

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - I Year (I Semester)
DME 101: ELEMENTARY ENGINEERING MECHANICS

Objective:
The primary objectives of elementary engineering mechanics course are to help the student develop this ability to visualize. This is so vital to problem formulation purpose of the study of elementary engineering mechanics. To develop the capacity to predict the effects of force and motion while carrying out the creative design functions of engineering.

UNIT I **(08 sessions)**
Introduction: Mechanics and its utility. Concept of scalar and vector quantities. Effect of a force. Tension & compression. Rigid body. Principle of physical independence of force. Principle of transmissibility of a force.

UNIT II **(08 sessions)**
System of Forces: Concept of co-planer and non-co-planer forces including parallel forces. Concurrent and non-concurrent forces. Resultant force. Equilibrium of forces. Law of parallelogram of forces. Law of triangle of forces and its converse. Law of polygon of forces. Solution of simple engineering problems by analytical and graphical methods such as simple wall crane, jib crane and other structures. Determination of resultant of any number of forces in one plane acting upon a particle, conditions of equilibrium of co-planer concurrent force system.

UNIT III **(08 sessions)**
Moment & couple: Concept of Varignon's theorem. Generalized theorem of moments. Application to simple problems on levers-Bell crank lever, compound lever, steel yard, beams and wheels, lever safety valve, wireless mast, moment of a couple; Properties of a couple ; Simple applied problems such as pulley and shaft.

UNIT IV **(08 sessions)**
General Condition of Equilibrium: General condition of equilibrium of a rigid body under the action of co-planer forces, statement of force law of equilibrium, moment law of equilibrium, application of above on body.
Friction: Types of friction: statically, limiting and dynamical friction, statement of laws of sliding friction, Coefficient of friction, angle of friction; problems on equilibrium of a body resting on a rough inclined plane, simple problems on friction. Conditions of sliding and toppling.

UNIT V **(08 sessions)**
Stresses and strains: Concept of stress and strain. Concept of various types of stresses and strains. Definitions of tension, compression shear, bending, torsion.Concept of volumetric and lateral strains, Poisson's ratio. Changes in dimensions and volume of a bar under direct load (axial and along all the three axes).Ultimate stress, working stress. Elasticity, Hook's law, load deformation diagram for mild steel and cast iron. Definition of modulus of elasticity, yield point, modulus of rigidity and bulk Modulus. Stresses and strains for homogeneous materials and composite sections.

Course Outcomes:
Students completing this course will be able to:

- Makes the students able to recognize different force systems, moments and couples.
- The ability to draw Free Body Diagram and label the reactions to it.
- Makes the students' abilities to apply equilibrium equations in statics.
- The ability to understand Newton's law in motion, and recognize different kinds of particle motions.
- The ability to find the moment and the couple.
- Acquire knowledge about stress and strain and how to find in different parts in different conditions.

Suggested Reading:

1. Engineering Mechanics by Irving H. Shames, Prentice-Hall
2. Mechanics of Solids by Abdul Mubeen, Pearson Education Asia.
3. Mechanics of Materials by E.P.Popov, Prentice Hall of India Private Limited.
4. Engineering Mechanics by R.K Bansal
5. Applied Mechanics by J.K.Kapoor, Bharat BhartiPrakashan.

Website Sources:

- www.onlinecourses.nptel.ac.in
- www.pdfdrive.com/engineering-mechanics-books.html
- https://en.wikibooks.org/wiki/Engineering_Mechanics
- http://library.iitj.ac.in/sp/subjects/guide.php?subject=ERL

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - I Year (I/II Semester)
DME 102 / DME 202: WORKSHOP TECHNOLOGY

Objective: The subject aims at imparting knowledge and skill components in the field of basic workshop technology. It deals with different hand and machine tools required for manufacturing simple metal components and articles. The primary objectives of this subject are to understand how different objects can be made from the given raw material by using different mechanical machines and tools.

UNIT I **(08 sessions)**

GENERAL INTRODUCTION: Scope of subject "Workshop Technology" in engineering. Different shop activities and broad division of the shops on the basis of nature of work done such as (i) Wooden Fabrication (Carpentry) (ii) Metal Fabrication (shaping and Forming, Smithy, Sheet metal and Joining-welding, Riveting, Fitting and Plumbing.

UNIT II **(08 sessions)**

CARPENTRY: Timber, seasoning of timber, types of seasoning. Common Carpentry Tools-Their classification, size, specification (name of the parts and use only)., Fundamental wood working operations, Marking & Measuring, Holding & Supporting, Cutting & Sawing, Drilling & Boring, Turning, Jointing;

UNIT III **(08 sessions)**

METAL FABRICATION: Metal Shaping-Smithy: Operations involved (concept only. Tools and equipment used (Names, size, specification for identification only). Defects likely to occur during and after operations their Identification and Remedy. Defects due to wrong operation, wrong tool and wrong heating. Safety of Personnel, Equipment & Tools to be observed. Sheet metal working: Tools and Operations involved (Names and concept only); Sheet metal joints - Lap, seam, Locked seam, hemp, wire edge, cup or circular, Flange, angular and cap. Common defects -Their identification and remedy. Defects due to wrong operation or wrong tool. Safety of Personnel, Equipment & Tools to be observed.

Metal Joining During Fabrication: Permanent Joining-Welding methods-Forge welding, gas welding (high and low pressure-oxyacetylene welding, types of flames. Electric Arc welding- D.C. & A.C., Connected tools, operation, materials and safety measures. Soldering & Brazing:

Familiarity with the use of Various Tools Used in Mechanical Engineering Workshop: Marking & Measuring, Holding Tools. Cutting Tools.

Hack saw (Fixed and Adjustable frame), chisels. Finishing tools-Files. Drills and Allied Tools. Miscellaneous Tools.

UNIT IV **(08 sessions)**

MACHINE SHOP: Introduction to machine tools viz lathe, drilling machine, shaper and planer simple line and block diagram of components and their functions. Brief concept of NC and CNC machines.

UNIT V **(08 sessions)**

Foundry: Basic idea of types of sands, patterns, moulds, furnaces and simple green sand moulding process.

Course Outcomes:

Students completing this course will be able to:

- Practice workshop safety rules effectively.
- Acquire knowledge and use simple hand tools.
- Acquire knowledge and use of carpentry work.
- Acquire knowledge and use of the metal fabrication work.
- Acquire knowledge about different machines: Lathe, Drilling, Shaper and Planer etc.
- Makes the students' ability to understand about the basics of the foundry.

Suggested Reading:

1. Manufacturing Process by- B.S Raghuvanshi (Dhanpat Rai & Co.)
2. Elementary Workshop Technology by- S.K HazraChaudhary (Media Promoters)
3. Workshop Practice by- S.K Garg (University Science Press)
4. Elementary Workshop Technology by J.K. Kapoor, Bharat Bharti Prakashan.

Website Sources:

- www.onlinecourses.nptel.ac.in
- https://www.pdfdrive.com/introduction-to-basic-manufacturing-processes-and-workshop-technology-e33408290.html
- https://books.google.co.in/books/about/Workshop_Technology.html?id=m6lDDAAAQBAJ&redir_esc=y

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - I Year (I/II Semester)

DEE 101/ DEE 201: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Objective: The objective of this course is to provide an understanding of basic terms related to the electrical and electronics engineering. It provides knowledge of basic elements used in electrical and electronics circuits, to develop the capability of analyzing and design simple electrical networks, an understanding of basic principle of various network theorems, an introductory knowledge of single phase and three phase AC supply, an introductory knowledge of semiconductor materials and devices manufactured by them like a PN junction diode and Bipolar Junction Transistor.

UNIT I **(08 Sessions)**

Basic Terminology & Their Concepts : Current, EMF, Potential difference, Resistance, Resistivity, & their units, Variation of resistance with temperature, Series & parallel connection of resistors, conductors and insulators, Electrical power & energy, Concept of inductance & mutual inductance, mutually induced emf and its role in electric circuits. Energy stored in an inductor, Concept of capacitor, parallel plate capacitor & its capacitance, energy stored in a capacitor, Dielectric and its influence on the capacitance of a capacitor. Charging & discharging of capacitor. Simple numerical problems

UNIT II **(08 Sessions)**

D.C. Circuits: Kirchoff's laws-KCL & KVL, simple numerical problems.

Network Theorems- Thevenin's theorem, Norton's theorem, Superposition & Maximum power transfer Theorem, Simple numerical problems based on them

UNIT III **(08 Sessions)**

A.C. Circuits: Instantaneous value, RMS value, Peak value, Average value. Form factor & peak factor of a sine wave. Concept of phase, phase difference & phasor representation of ac voltage & current, R-L, R-C, R-L-C circuits, Active & Reactive power, power factor Simple numerical problems.

Poly-phase Systems: Advantages of a 3 phase system over single phase system, Star & Delta connections & their conversion, Relationship between phase & line values of currents and voltages, Power in 3 phase system

UNIT IV **(08 Sessions)**

Magnetic Circuits: Magnetic circuit concepts- magnetic field intensity, magneto motive force, magnetic flux density**,** Permeability, Reluctance, Determination of Ampere turns, Kirchhoff's Law for magnetic circuit, Analogy between magnetic and electric circuits, Composite magnetic circuits, B-H characteristics, Hysteresis loss

UNIT V **(08 Sessions)**

Semiconductors: Classification of solids- conductors, Insulators & semiconductors, Intrinsic & Extrinsic semiconductors, P-N junction- biasing, VI characteristics of a diode.

Bipolar Junction Transistors: Biasing, working of NPN & PNP transistor, Transistor configurations- common emitter, common base common collector configurations and their characteristics, Transistor as an Amplifier, Simple numerical problems, Transistor as a switch-use of transistor as a switch for logic gates.

Combinational logic circuits: Logic gates- AND, OR, NOT, Exclusive OR, NAND & NOR gates with their truth tables

Course Outcomes:

Students completing this course will be able to:

- The students are able to explain the various types of electrical and electronics circuits.

- Can solve a simple type of electrical network problems.
- It imparted the understanding of single phase and three phase AC supply and also the superiority of three phase supply over single phase supply.
- Students got an idea about magnetic field and how it is utilized.
- The students have got an understanding of applications of semiconductor materials and devices based on them.

Suggested Readings:

1. Electrical Engineering- Ashfaq Hussain, Dhanpat Rai & Co.
2. Electrical Engineering- J.S. Katre. Tech. Max Publications.
3. Electrical Engineering-Vol.-1. B.L. Thareja-Technical Publications.
4. I.J. Nagarath, " Basic Electrical Engineering" Tata McGraw Hill
5. Electrical and Electronics Engineering by S.K. Sahdev

Web Resources:

- www.engineering.nyu.edu
- www.elprocus.com/basics-of-network-theorems-in-electrical-engineering/
- www.electricalclassroom.com
- www.electronics-tutorials.ws/electromagnetism
- https://nptel.ac.in/courses/108/108/108108076/

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - I Year (I/II Semester)

FEC 101/ FEC 201: FUNDAMENTALS OF ENGLISH COMMUNICATION

Objectives: The objectives of Fundamentals of English Communication are:

- To develop knowledge and understanding of grammar.
- To develop abilities to make use of the grammar in own writing English.
- To increase understanding and recall of what is read and listen including facts and main idea.
- To enhance competencies in writing paragraph, gist or abstract/précis of the passage in own words/ language and in writing letters and applications of different kinds.

UNIT I: Basic Applied Grammar and Usage **(06 Sessions)**

The Sentences: Kinds of Sentences; Subject and Predicate
Phrases & Clauses, Idioms & Proverbs

UNIT II: Basic Applied Grammar Continued **(08 Sessions)**

Nouns: Kinds; Singular/Plural; Gender; Possession
Pronouns: Kinds; Usage
Adjectives: Kinds; Degrees of Comparison; Usage
Determiners: Kinds, Usage of Adjectives and Determiners

UNIT III: Basic Applied Grammar Continued **(08 Sessions)**

Articles: Kinds, Omission of Articles, Repetition of Articles, Spotting the Errors
Verbs: Kinds-Transitive and Intransitive, Finite and Non Finite Verbs
Tenses:Kinds; Usage

UNIT IV: Basic Applied Grammar Continued **(06 Sessions)**

Adverbs: Kinds; Position of Adverbs; Usage
Prepositions: Kinds; Correct Usage, Fill in the Blanks
Conjunctions:Kinds, Conversion of Compound to Complex Sentences and Vice-versa
Interjections: Definition and Types

UNIT V: Comprehension and Précis Writing **(10 Sessions)**

Reading Comprehension

Precis Writing:Techniques of Précis Writing and Exercises

Formal Letter Writing:Leave Application (for different reasons), Application for Fee Concession and Invitation (for family and friends)

Suggested Readings:

(1) Professional Communication by MaltiAgarwal, Krishna Publications.
(2) High School English Grammar & Composition by Wren & Martin, S. Chand & Company LTD., New Delhi.

Course Outcomes: After completing this course, Students will be able to:

- Develop knowledge and understanding of grammar and abilities to make use of the grammar in own writing English.
- Increase understanding and recall of what is read and listen including facts and main idea.
- Enhance competencies in writing paragraph, gist or abstract/précis of the passage in own words/ language and in writing letters and applications of different kinds.

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - I Year (I/II Semester)

DCS 101/ DCS 201: COMPUTER FUNDAMENTALS AND PROGRAMMING IN C

Objective: To study about understanding of basic concepts of computer fundamentals, operating system, primary and secondary memory in detail, peripheral devices and basic concepts of C programming language.

UNIT I **(09 Sessions)**

Introduction to Computer: Definition, Characteristics, Generation of Computers, Capabilities and Limitations, Introduction to Operating System, Concept of Bios, Booting Files, Basic Components of a Computer System- Control Unit, ALU, Input/output functions and characteristics. Memory Introduction, Classifications- Volatile Memory and Non- Volatile, Flash Memory, ROM, RAM, EPROM, PROM, EEPROM other types of memory.

UNIT II **(07 Sessions)**

Input/output and storage Units: Computer Keyboard, Pointing Devices: Mouse, Trackball, Touch Panel, and Joystick, Light Pen, Scanners, Various types of Monitors, Touch-sensitive screens, Optical Recognition System, Pen based systems, Digitizers, MICR, OCR, OMR, Bar-code Reader, digital camera. Hard Copy Devices:- Impact and Non- Impact Printers- Daisy Wheel, Dot Matrix, Line Printer, Chain Printer, Comb Printers, Non Impact Printers- DeskJet, Laser Printer, Thermal Transfer Printer, Barcode Printers, Electro static printers and plotters, High Level Language and Low-Level Language, Firmware, Compiler, Interpreter and Assembler.

UNITIII **(12 Sessions)**

Introduction and Features of "C" language: The structure of "C" program , Identifiers and Keywords, Constants, Variables, Scope of variables, Typedef, Type Conversion, Arithmetic Operators, Library Functions, Input/output Statements, getchar(), Putchar(), scanf, printf, Compound statements and block. Relational Operators, Logical Operators, Bitwise Operators, Unary Operators, if-else Statement, Operators, Switch statement, go to statement and Label, Iteration statements: For Loop, While Loop, Do While Loop, Nested Loop, Continue and Break statements.

UNITIV **(06 Sessions)**

Array and Structures: Declaration, Concept of One Dimensional and Multi Dimensional arrays, Defining Structure, Declaration of Structure Variable, Accessing Structure members, nesting of structures, Array of structures.

UNITV **(08 Sessions)**

Difference between Union and Structure: Functions: Need of "C" function, User Defined and Library Functions, Prototype of Function, Call by Value, Call by Reference, Nesting of Functions, Recursion, Array as Function Argument, Structure as Function Argument.

Course Outcomes:

Students after this course will be able to:

- Define computer, its characteristics and generation of computer.
- Explain about detailed description of the computer's memory and its types.
- Describe about the operating system and its functions.
- Explain about input and output devices.
- Explain the features of the C language, keyword, data type and statements in C.
- Make C programs with the help of array, structure and nesting of structure.
- Differentiate between structure and union.

Suggested Readings:

1. Computer Fundamentals B. Ram
2. Computer fundamentals P.K Sinha (BPB Publications)
3. Programming in Ansi C E. balagurusamy (3rd edition McGraw Hill)

Website Sources:

- https://www.tutorialspoint.com/computer_fundamentals/index.htm
- https://www.javatpoint.com/computer-fundamentals-tutorial
- https://www.w3schools.in/c-tutorial/
- https://www.geeksforgeeks.org/difference-between-input-and-output-devices/
- https://en.wikipedia.org/wiki/C_(programming_language)
- https://www.cprogramming.com/

IFTM University, Moradabad
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Diploma (EC) - I Year (I/II Semester)

DME 151 / DME 251: ENGINEERING DRAWING LAB

Objective:

1. To get the primary concept of Engineering Drawing.
2. To know about equipments in Engineering Drawing.
3. To know various signs, lines and dimensions.
4. To know about the Principles of Projection: Orthographic Projections, Isometric Projection.

1. Drawing, instruments and their uses.
1.1 Introduction to various drawing, instruments.
1.2 Correct use and care of Instruments.
1.3 Sizes of drawing sheets and their layouts.

2. **(a) Lettering Techniques**
Printing of vertical and inclined, normal single stroke capital letters.
Printing of vertical and inclined normal single stroke numbers.Stencils and their use. (**1 Sheet)**

(b) Introduction to Scales Necessity and use, R F Types of scales used in general engineering drawing. Plane, diagonal and chord scales.**(1 Sheet)**

3. Conventional Presentation :
Thread (Internal and External), Welded joint, Types of lines, Conventional representation of materials, Conventional representation of machine parts. (**2 Sheet)**

4.(a) Principles of Projection
Orthographic, Pictorial and perspective.Concept of horizontal and vertical planes.Difference between I and III angle projections.Dimensioning techniques. (**1 Sheet)**
(b) Projections of points, lines and planes. (**1 Sheet)**

5.(a) Orthographic Projections of Simple Geometrical Solids Edge and axis making given angles with the reference planes. Face making given angles with reference planes. Face and its edge making given angles with reference planes.
(b) Orthographic views of simple composite solids from their isometric views.
(c) Exercises on missing surfaces and views (**3 Sheet)**

6. Section of Solids Concept of sectioning Cases involving cutting plane parallel to one of the reference planes and perpendicular to the others. Cases involving cutting plane perpendicular to one of the reference planes and inclind to the others plane, true shape of the section(**1 Sheet)**

7. Isometric Projection. (**2 Sheet)**
Isometric scale Isometric projection of solids.

8. ORTHOGRAPHIC PROJECTION OF MACHINE PARTS: (**2 Sheet)**
Nut and Bolt, Locking device, Wall bracket

Course Outcome:
After successful completion of this course, students will able to

- Identify and use differing drawing tools/instruments.
- Use the concept of projection for Mechanical Engineering Drawings.
- Prepare engineering drawing manually with given geometrical dimensions using prevailing drawing standards using proper scale.
- Visualize and draw the shape of simple object form orthographic view to vice versa

Suggested Reading:

1. Engineering Drawing by- B. Agrawal and C.M. Agrawal (McGraw Hill Education (India) Pvt. Ltd..).
2. Engineering Drawing by K. Venkata Reddy (BS Publication).
3. Engineering DrawingbyR. K. Dhawan (S Chand)

Website Sources:

- https://www.google.co.in/books/edition/Engineering_Drawing/VRf-AwAAQBAJ?hl=en&gbpv=1&printsec=frontcover
- https://www.engbookspdf.com/Drawing/textbook-of-engineering-drawing-second
- https://www.google.co.in/books/edition/A_Textbook_of_Engineering_Drawing_In_Fir/vTd3cJ91-RwC?hl=en&gbpv=1&printsec=frontcover

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - I Year (I/II Semester)

DCS 151 / DCS 251: COMPUTER PROGRAMMING LAB

Objective: To study about understanding of basic concept of Windows Operating System, understanding of the fundamentals of programming such as data types, keywords, variables, array, structure, conditional and iterative execution, methods, etc.

List of Experiments:

1. Introduction to GUI using Windows Operating System, DOS Commands,
2. Introduction to Word, Introduction to MS-Excel.
3. WAP in C to print your name.
4. WAP in C for adding, subtraction, multiplication & division of two numbers.
5. WAP in C to calculate the area of a circle, rectangle and triangle.
6. WAP to Convert Celsius to Fahrenheit.
7. WAP to find out whether the given year is a leap year or not.
8. WAP in C to find whether the given number is even or odd.
9. WAP to use switch statement display Monday to Sunday.
10. WAP to print table of given number.

Course Outcomes:

Students after this course will be able to:

- Explain about GUI using windows operating system and DOS commands.
- Make simple C programs.
- Explain about statements in C language and how to use arrays and functions in C programs.
- Make C programs with the help of array, structure and nesting of structure.
- Make C programs with the help of functions.

Suggested Readings:

1. Computer Fundamentals B. Ram
2. Computer fundamentals P.K Sinha (BPB Publications)
3. Programming in Ansi C E. balagurusamy (3rd edition McGraw Hill)

Website Sources:

- https://www.programiz.com/c-programming#introduction
- https://www.javatpoint.com/c-programming-language-tutorial
- https://www.w3schools.in/c-tutorial/
- https://www.tutorialspoint.com/cprogramming/index.htmhttps://en.wikipedia.org/wiki/C_(programming_language)
- https://www.cprogramming.com/

IFTM University, Moradabad

Diploma (Electronics & Communication Engineering) Programme

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DPH 151: PHYSICS-I LAB

Objective: The main goal of this course is to share the knowledge to the students about the experiments so that students will get a better understanding of the concepts studied by them in the theory course and correlate with experimental observations.

List of Experiments:

1. To find the surface tension of a liquid by Jaeger's method.
2. To find volume of solid cylinder and hollow cylinder using a Vernier caliper.
3. To determine the atmospheric pressure at a place using Fortin's Barometer.
4. To determine the thickness of glass strip and radius of curvature of a concave surface using aspeedometer.
5. To determine the time period of simple pendulum and plot a graph between l & t
6. To determine the acceleration due to gravity with the help of a Bar Pendulum.
7. To determine the coefficient of viscosity of water with the help of Poissuille method.
8. Verify parallelogram Law of forces.
9. To determine the modulus of rigidity (η) of the material of wire with the help of torsional pendulum using the inertia table
10. To find the thickness of wire using a screw gauge.

Course Outcomes:

Students completing this course will be able to:

- Use the different measuring devices and meters to record the data with precision
- Measurement of surface tension, volume and atmospheric pressure.
- Determine coefficient of viscosity and modulus of rigidity
- Measurement of thickness of wire.

Suggested Readings:

1. Concept of Physics, Prof. H.C. Verma, Part-1 (BhartiBhawan)
2. Concept of Physics, Prof. H.C. Verma, Part-2 (BhartiBhawan)
3. A Text Book of Applied Physics: EgaleParkashan, Jullandhar

Website sources:

- http://dspace.wbpublibnet.gov.in
- https://www.scribd.com
- http://www.brainkart.com
- https://dkpandey.weebly.com
- https://images.topperlearning.com

IFTM University, Moradabad
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DCH 151: CHEMISTRY-I LAB

Objectives: Practical implementation of fundamental concepts of qualitative and quantitative analysis. Student will gain the knowledge on existing future upcoming devices, materials and methodology used in chemistry practical. They will rely on elementary treatment and qualitative analysis. These practical will provide an overview of quantitative analysis.

List of Experiments:

1. To analyse inorganic mixture for two acid and basic radicals from following radicals
A. Basic Radicals: NH_4^+, Pb^{++}, Cu^{++}, Bi^{++}+, Cd^{++}, As^{+++}, Sb^{+++}, Sn^{++}, Al^{+++}, Fe^{+++}, Cr^{+++}, Mn^{++}, Zn^{++}, Co^{++}, Ni^{++}, Ba^{++}, Sr^{++}, Ca^{++}, Mg^{++}
B. Acid Radicals: CO_3^{--}, S^{--}, SO_3^{--}, CH_3COO^-, NO_2^-, NO_3^- , Cl^-, Br^- , I^- , SO_4^{--}
2. To determine the percentage of available Chlorine in the supplied sample of bleaching powder.
3. To determine the total hardness of water sample in terms of $CaCO_3$ by EDTA titration method using Eriochroma black-T indicator.
4. To determine the strength of given HCl solution by titration against NaOH solution using Phenolphthalium as indicator.
5. To determine the Chloride content in supplied water sample by using Mohr's methods.
6. Determination of temporary hardness of water sample by O- Hener's method.

Course Outcome:

- Students are able to analyse different anions and cations .
- Ability to know the quantitative analysis .
- Ability to know the strength of an acid by using alkali.

Suggested Readings:

1. Applied Chemistry by R. S. Katiyar& J.P. Chaudhary Publication B.B.P. & Co. Meerut
2. March's Advanced Organic Chemistry: Reactions, Mechanisms and Structure Smith, Michael B./March, Jerry, John Willey & sons, 6th Edition, 2007.
3. Elements of Physical Chemistry, Glasstonne, Samuel B. ELBS, 2005.
4. Organic Chemistry, Finar, I.L.: Addision – Wesley Longman, Limited, 2004.
5. Principles of Physical Chemistry, by Puri B.R., Sharma L.R., S. Nagin& Company, Delhi

Website Sources:

- https://www.gopracticals.com/basic-engineering/
- https://edu.rsc.org/resources/practical
- https://play.google.com/store/apps/details?id=com.softwareindiavinod.chemistrypracticals&hl=en&gl=US

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering Programme
Diploma (EC) - I Year (I/II Semester)

DME 152 / DME 252: WORKSHOP LAB

Objective:

1. To understand how different objects can be made from the given raw material by using different mechanical tools.
2. To introduce students to the basic concepts of manufacturing via shaping, forming, machining
3. To develop a knowledge of appropriate parameters to be operationsused for various machining.
4. To develop a knowledge of workshop practice and basic use of machine tools and workshop equipment.

1. Carpentry Shop:

EX-1 Introduction & demonstration of tools used in carpentry shop
EX-2 Planning and sawing practice
EX-3 Making of lap joint
EX-4 Making of mortise and tenon joint
Ex-5 Making of briddle joint
EX-6 Making of dovetail joint
Ex-7 Making of any one utility article such as wooden picture frame, hanger, peg, name plate, etc.

2. Sheet Metal Working and Soldering Shop:

EX-1 Introduction & demonstration of tools used in Sheet metal working shop.
EX-2 Cutting, shearing and bending of sheet.
EX-3 To prepare a soap case by the metal sheet.
EX-4 To make a funnel with thin sheet and to solder the seam of the same.
EX-5 To make a cylinder and to solder the same.
EX-6 Preparation of different type of joints such as Lap joint-single seam, double seam. Hemp and wired joints.
EX-7 Study and sketch of various types of stakes/anvil.
EX-8 To braze small tube/conduit joints.

3. Fitting Shop :

EX-1 Introduction & demonstration of tools used in Fitting Shop.
EX-2 Hack sawing and chipping of M.S. flat.
EX-3 Filing and squaring of chipped M.S. job.
EX-4 Filing on square or rectangular M.S. piece.
EX-5 Making bolt & nut by tap and die set.
Ex-6 To drill a hole in M.S. Plate and taping the same to create threads as per need.
EX-7 Utility article-to prepare a screw driver or paper weight, double open mouth spanner for 18" hexagonal head of a bolt.

4. Plumbing Shop:

EX-1 Cutting and threading practice for using socket, elbow and tee etc. and to fit it on wooden practice board.
EX-2 Study of-bib cock, cistern or stop cock, wheel valve and gate valve etc.

5. Smithy Shop :

EX-1 Study & Sketch of Tools used in smithy shop.
EX-1 To prepare square or rectangular piece by the M.S.rod.
EX-2 To braze M.S. Flats/Tipped tools on M.S. shank.
EX-3 To make a screw driver with metallic handle.
EX-4 To make a square or hexagonal head bolt.
EX-5 To make a ring with hook for wooden doors.
EX-6 Utility article-to prepare a ceiling fan hook.

6. Welding Shop :

EX-1 Welding practice-gas and electric.
EX-2 Welding for lap joint after preparing the edge.
EX-3 Welding of Butt joint after preparation of the edge.

EX-4 'T' joint welding after preparation of edge.
EX-5 Spot welding, by spot welding machine.
EX-6 Welding of plastic pieces by hot strip method.
EX-7 Welding practice by CO2 gas welding

7. Machine Shop
EX-1 Study & sketch of lathe machine.
Ex-2 Plain and step turning & knurling practice.
Ex-3 Study and sketch of planning/Shaping machine and to plane a Rectangle of cast iron.
8. Fastening Shop
EX-1 Practice of bolted joints
EX-2 To prepare a rivetted joint
EX-3 To make a pipe joint
EX-4 To make a threaded joint
EX-5 Practice of sleeve joint
Course Outcome:
After successful completion of this course, students will able to

- Acquire skills in basic engineering practice.
- Identify the hand tools and instruments, gain measuring skills and Obtain practical skills in the trades.
- Read and use a manufacturing drawing as a definition for the manufacturing of a part.
- Select proper tools and cutting data for a given material and manufacturing process.

Suggested Reading:

1. A Textbook of Workshop Technology: Manufacturing Processes by R.S Khurmi and J.K Gupta (S Chand).
2. Introduction to Basic Manufacturing Processes and Workshop TechnologybyRajender Singh

Website Sources:

- https://www.abebooks.com/servlet/BookDetailsPL?bi=30061491479&cm_sp=rec-_-pd_hw_i_1-_-bdp&reftag=pd_hw_i_1
- https://www.google.co.in/books/edition/Introduction_to_Basic_Manufacturing_Proc/ky7r-BclY8cC?hl=en&gbpv=1&pg=PP1&printsec=frontcover

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - I Year (I/II Semester)

DEE-151/ DEE-251: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

Objective: The objective of this lab is to provide an understanding of basic electrical and electronic components used in various types of circuits, to know how the basic principles of electrical and electronic engineering like Ohm's Law, KCL, KVL work. To know about how the electricity consumed in a circuit is measured by the energy meter. To know how the resistance of a filament varies according to temperature, to know the working of electronic devices like a PN junction diode and NPN/PNP transistors and logic gates.

List of Experiments:

1. To study and identify the various components.
2. To verify Ohm's Law.
3. To verify Kirchhoff's Current Law (KCL).
4. To verify Kirchhoff's Voltage Law (KVL).
5. To observe the variation of resistance of a lamp with temperature by plotting V-I curve for 60 W and 100 W filaments lamp.
6. To study Star to Delta and Delta to Star conversion.
7. To verify the truth table of OR, AND, NOT, NAND, NOR and EXOR logic gates.
8. To study and plot V-I characteristics of a PN junction diode.
9. To study the biasing and working of NPN/PNP transistor.
10. To study a single phase Induction type energy meter.

Course Outcomes:
Students completing this course will be able to:

- The students are able to know the identification and application of the various types of components used in electrical and electronics circuits.
- Can understand how Ohm's Law works and its limitations.
- It imparted the understanding of KCL, KVL and their applications.
- Students got an idea about the variation of resistance with temperature and working principle of an energy meter & its use.
- The students have got an understanding of working and application of semiconductor devices.

Suggested Readings:

1. Handbook of laboratory experiments in electronics engineering by A.M. Zungeru
2. Basic electrical and electronics lab by Bharat Bhushan Jain
3. Laboratory Manual for Introductory Electronics Experiments by L.K. Maheshwari.

Website Sources:

- www.concept-of-physics.com/electromagnetism/verification-of-ohmas-law-using-voltmeter-and-ammeter.php
- www.jetir.org
- www.digitalelectronicsforstudents.files.wordpress.com
- www.mist.ac.in
- www.educompijre.files.wordpress.com

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Diploma (EC) - I Year (II Semester)

DPH 201: ELEMENTARY PHYSICS-II

Objective: The objective of this course is to provide an understanding of optics, electrostatistics and semiconductors etc.

UNIT-I **(08 Sessions)**

Waves and Vibrations: Introduction, Types of wave motion with examples, Relation between velocity of wave, frequency and wave length of a wave ($v = \eta\lambda$) , Simple harmonic motion: definition, expression for displacement, Velocity, acceleration, time period, frequency in S.H.M., Vibration of spring mass system, Free, forced and resonant vibrations with examples.

UNIT-II **(08 Sessions)**

Optics :Concept of mirrors, lenses, reflection & refraction of light, refractive index, lens formula (no derivation), real and virtual image, magnification, Power of lens, Simple and compound microscope, magnifying power and its calculation (in each case) , Total internal reflection

UNIT-III **(10 Sessions)**

Electrostatics: Coulomb's law, Gauss's Law, Electric field intensity and electric potential, Electric field of point charge, charged sphere, Capacitance, types of capacitors, capacitance of parallel plate capacitor, series and parallel combination of capacitors, Dielectric and dielectric constant.

UNIT-IV **(10 Sessions)**

Current Electricity :Ohm's law, Resistance of a conductor, specific resistance, Series and Parallel, Combination of resistors, effect of temperature on resistance, Kirchhoff's laws, Wheatstone bridge principle and its applications, Heating effect of current and concept of electric power.

UNIT-V **(08 Sessions)**

Semi Conductor Physics:Energy bands, Intrinsic and Extrinsic semi conductor, p-n junction diode and its characteristics, Diode as rectifier-half wave and full wave rectifier.

Course Outcomes:

Students completing this course will be able to:

- Differentiate between wave and vibrations
- Understand mirror, lens, reflection and refraction
- Understand Simple microscope and compound microscope
- Coulomb's law, Gauss Law and their applications
- Apply Ohms law to solve problems.
- Understand semiconductors and diodes.

Suggested Readings:

1. Concept of Physics Prof. H.C. Verma, Part-1 (BhartiBhawan)
2. Concept of Physics, Prof. H.C. Verma, Part-2 (BhartiBhawan)
3. A Text Book of Applied Physics: Eagle Parkashan, Jullandhar

Website sources:

- https://courses.lumenlearning.com
- https://en.wikipedia.org
- https://cnx.org
- http://www.sakshieducation.com
- https://www.toppr.com
- https://opentextbc.ca
- https://www.askiitians.com/
- https://www.askiitians.com

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - I Year (II Semester)

DMA 201: ELEMENTARY MATHEMATICS-II

Objective: - The course is aimed to develop the basic Mathematical skills of diploma engineering students that are imperative for effective understanding of engineering subjects. To understand basics and applications of differential & integral Calculus and coordinate geometry.

UNIT I **(08 Sessions)**

DIFFERENTIAL CALCULUS-I: Functions, Limits, Continuity, Functions and their graphs, Range and domain, Elementary methods of finding limits (right and left), Elementary test for continuity and differentiability. Methods of finding derivative, Function of a function, Logarithmic differentiation, Differentiation of implicit functions.

UNIT II **(08 Sessions)**

Higher order derivatives, Leibnitz's theorem. Special functions (Exponential, Logarithmic, Hyperbolic, Inverse and circular function), Definition, Graphs, Range and Domain and Derivations of each of these functions.

UNIT III **(08 Sessions)**

Application - Finding Tangents, Normal, Points of maxima and minima, Increasing and Decreasing functions, Sketching of some simple curves (without assumptions, question, not to be asked in the examination), Rate, Measure, Velocity, Acceleration, Errors and approximations.

UNIT IV **(08 Sessions)**

INTEGRAL CALCULUS-I: Methods of indefinite integration:- Integration by substitution, by partial fraction and by parts, Integration of special functions Meaning and properties of definite integrals, Evaluation of definite integrals.

UNIT V **(08 Sessions)**

CO-ORDINATE GEOMETRY: Standard form of curves and their simple properties-Parabola Ellipse, Hyperbola, Tangent and normals, Straight lines, Planes and Spheres in space-distance between two points in space, Direction cosines and direction ratios, Finding equation of a straight line and Shortest distance between two lines under different conditions equation of a plane, Relation between lines and Planes, Sphere.

Course Outcomes:

The student is able to

- Remember terminologies and formulae differential, integral calculus and coordinate Geometry.
- Understand and interpret the concepts of differential, integral Calculus and Coordinate Geometry.
- Compare and analyse the methods in differential, integral Calculus and Coordinate Geometry.
- Predict and evaluate the problems in differential, integral Calculus and Coordinate Geometry.

Suggested Readings:

1. R.D. Sharma: Mathematics (I& II-XI) [DhanpatRai Publication, Delhi.]
2. B.S. Grewal :Engg. Mathematics by [khanna Publishers, New Delhi.]
3. H.R. Luthra : Applied Mathematics:[Bharat BhartiPrakashan& Co. Meerut]
4. KailashSinha : Applied Mathematics: [Nav Bharat Publication, Meerut]
5. NCERT (XI & XII)

Website Sources:

- www.pdfdrive.com
- www.dmi.gov.in
- www.yourarticlelibrary.com
- onlinecourses.nptel.ac.in
- en.wikipedia.org

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - I Year (II Semester)

DCH 201: ELEMENTARY CHEMISTRY-II

Objectives: To emphasize the relevance of fundamentals and applications of chemistry for diploma holders and student will learn appropriate combinations of old and new emerging concepts. Also to bring potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

UNIT I **(08 Sessions)**

Lubricants: Definition, classification, Necessity and various kinds of lubricants. Function and mechanism of action of lubricants with examples. Properties of lubricants, Importance of additive compounds in lubricants, Synthetic lubricants and cutting fluids.

UNIT II **(08 Sessions)**

Fuels and Environmental Pollution: Definition of fuel, its classification and their composition, Knocking, Anti-knocking agents, Octane number and Cetane number. Cracking and its type, Gaseous Fuel - Water gas, Bio gas, LPG, CNG and solar energy.

Concept and various types of environmental pollution, air pollution and water pollution. General measures to control environmental pollution. Depletion of Ozone layer, Green house effect, Acid rain, Smog formation.

UNIT III **(08 Sessions)**

Water Treatment and Corrosion: Concept of hard and soft water, Hardness of water, Softening method (Only Ion exchange resin process). Disadvantages of hard water in different industries, Boiler feed water.

Corrosion- Concept of metallic corrosion, factors affecting the corrosion rate, Prevention of corrosion by various methods.

UNIT IV **(08 Sessions)**

Glass and Ceramics: Concept of glass and its constituents, Classification and uses of different glass, Elementary idea of manufacturing process of glass.

UNIT V **(08 Sessions)**

Organic Chemistry:

Isomerism- Types of isomerism

1. Structural isomerism
2. Stereoisomerism (a) Geometrical (b) Optical

A. Electrophiles and nucleophiles

B. Reaction Intermediates

i. Free radical

ii. Carbocation

iii. Carbanion

Polymers:

1. Basic terms used in polymer chemistry and Polymerisation.
2. Characteristics of Polymers and their classification

Course Outcome:

- Students will also be able to understand the chemistry of fuels and lubricants.
- Students will analyze the basic knowledge of various types of organic reactions and their applications
- Students will understand the preparation and properties of glass and ceramics.

Suggested Readings:

1. Liquid Crystals and Plastic Crystals, vol.-I, edited by G.W. Gray and P.A. Winsor, Ellis Harwood Engineering Chemistry by J C Kuriacose and J. Rajaram, Tata McGraw-Hill Co, New Delhi (2004)
2. Chemistry of Engineering Materials by C.P. Murthy, C.V. Agarwal and A. Naidu BS Publication Hyd.

Website Sources:

- http://www.commonchemistry.org/
- https://uri.idm.oclc.org/login?url=https://www.engineeringvillage.com/search/quick.url?CID=quickSearch&database=1
- https://www.technicalsymposium.com/

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - I Year (II Semester)

DME 201: ELEMENTARY MECHANICAL ENGINEERING

Objective:
To provide a comprehensive knowledge of basic mechanical systems, basic concepts from mechanical engineering sciences. Modern engineering tools (machine-tools) and related subjects to design mechanical engineering components.

UNIT I **(08 sessions)**

Thermal Engineering: A. SOURCES OF ENERGY; Basic ideas, conventional and nonconventional forms-Thermal, Hydel, Tidal, wind, Solar, Biomass and Nuclear and their uses. B. FUELS & COMBUSTION; Introduction to common fuels - solid, liquid and gases and their composition. Combustion of fuels- their higher and lower calorific values. Combustion equations for carbon, sulphur, hydrogen and their simple compounds. Calculation of minimum amount of air required for complete combustion. Combustion analysis on mass basis and on volume basis. Concept of excess air in a boiler furnace combustion. Heat carried away by flue gases. Analysis of flue gases by Orsat apparatus. Simple numerical problems Idea of specific properties of liquid fuels such as detonation, knock resistance (cetane and octane numbers), viscosity, solidification point, flash point and flame point.

UNIT II **(08 sessions)**

MACHINE COMPONENTS: Brief Idea of loading on machine components. (i) Pins, Cotter and Knuckle Joints. (ii) Keys, Key ways and spline on the shaft. (iii)Shafts, Collars, Cranks, Eccentrics.(vi) Couplings and Clutches. (v) Bearings-Plane, Bushed, Split-step, ball, Roller bearing, Journal bearing, Foot step bearing, thrust bearing, collar bearing and Special type bearings and their applications. Selection of ball bearing and roller bearing for given application using design data book.

UNIT III **(08 sessions)**

(i) Gears : Different types of gears, gear trains and their use for transmission of motion. Determination of velocity ratio for spur gear trains; spur gear, single and double helical gears, Bevel gears, Mitre wheel, worms, Rack and Pinion. Simple and compound and epicyclic gear trains and their use. Definition of pitch and pitch circle & module. (ii) Springs: Compression, Tension, Helical springs, Torsion springs, Leaf and Laminated springs. Their use and material. Selection of spring by design data book, simple numerical problem.

UNIT IV **(08 sessions)**

MECHANISMS: Definition of link, Frame and mechanism. Difference between machine and mechanism, kinematic pairs, lower and higher pairs. Velocity diagram for four bar mechanism, slider crank mechanism, quick return mechanism. Introduction to Cam and its use.

UNIT V **(08 sessions)**

LUBRICATION: Different lubrication system for lubricating the components of machines. Principle of working of wet sump and dry sump system of lubrication. (Explained with simple line diagram). Selection of lubricant based on different application (Requirement with the help of manufacturer catalogue).

Course Outcomes:
Students completing this course will be able to:

- Acquire knowledge about thermal engineering with different energy sources .
- Understand about different mechanical components with their applications.
- Acquire knowledge about different mechanisms used in mechanical machines.
- Acquire knowledge about lubrication systems.

Suggested Reading:

1. Elements of Mechanical Engineering by J.K.Kapoor (Bharat BhartiPrakashan).
2. Elements of Mechanical Engineering by R.P.Garg, BBP Pub. Pvt. Ltd, Meerut.

Website Sources:

- www.onlinecourses.nptel.ac.in
- https://khannapublishers.in/index.php?route=product/category&path

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - I Year (II Semester)

DCH 251: CHEMISTRY-II LAB

(20 Sessions)

Objectives: Practical implementation of fundamental concepts of qualitative and quantitative analysis. Student will gain the knowledge on existing future upcoming devices, materials and methodology used in chemistry practical. They will rely on elementary treatment and qualitative analysis. These practicals will provide an overview of quantitative analysis.

List of Experiments

1. Determination of pH of Common Substances.
2. Measurement of soil suspension pH (1:5 or 1:2).
3. Preparation of Soap.
4. Determination of the Strength of Ferrous Sulphate using Standard Ferrous Ammonium sulphate and Potassium Dichromate as Intermediate Solution.
5. Looking at Acid's Effects on Metals.
6. Paper Chromatography of dyes.
7. Determination of the Strength of Copper Sulphate Solution using a Standard Solution of sodium thiosulphate solution.
8. Extract synthetic coloring agents in food products and identify them by paper chromatography.
9. To determine the pH level of both city water and well water to determine which is more basic and which is more acidic.
10. Determination of temporary and permanent hardness of water sample.

Course Outcome:

- Students are able to prepare the goods like soaps for cottage industry and self employability.
- Ability to know the separation methods to separate different dyes.
- Ability to calculate the temporary and permanent hardness of different samples of water.

Suggested Readings:

1. Applied Chemistry by R. S. Katiyar & J.P. Chaudhary Publication B.B.P. & Co. Meerut
2. March’s Advanced Organic Chemistry: Reactions, Mechanisms and Structure Smith, Michael B./March, Jerry, John Willey & sons, 6th Edition, 2007.
3. Elements of Physical Chemistry, Glasstonne, Samuel B. ELBS, 2005.
4. Organic Chemistry, Finar, I.L.: Addision – Wesley Longman, Limited, 2004.
5. Principles of Physical Chemistry, by Puri B.R., Sharma L.R., S. Nagin& Company, Delhi

Website Sources:

- https://www.gopracticals.com/basic-engineering/
- https://edu.rsc.org/resources/practical
- https://play.google.com/store/apps/details?id=com.softwareindiavinod.chemistrypracticals&hl=en&gl=US

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (III Semester)
DEC 301: FUNDAMENTALS OF ELECTRONIC INSTRUMENTATION AND MEASUREMENT

Objective: The objective of the course is to introduce the fundamentals of Electronics Instruments and Measurement providing an in-depth understanding of Measurement errors, Bridge measurements, Digital Storage Oscilloscope, Function Generator and Analyzer, Display devices, Data acquisition systems and transducers.

UNIT I **(08 Sessions)**

Introduction to the Process of Measurements: Definition of measurement, Methods of measurements, Types of Instruments, Deflection and Null type instrument, Static and Dynamic characteristics, Review of the term error, Accuracy, Precision, Resolution, Sensitivity and Range.

UNIT II **(08 Sessions)**

Measuring Instruments: Analog Instruments, Classification of Analog Instruments, Principles of operation, D'Arsonval Galvanometer, Construction, Torque Equation, Permanent Magnet Moving Coil Instrument (PMMC), Construction of PMMC, Torque Equation, Ohmmeters (Series and Shunt type).

UNIT III **(10 Sessions)**

D.C and A.C Bridges: D.C bridges: wheat stone bridge, Kelvin Bridge, A.C Bridges: **G**eneral equation for bridge balance, General form of an AC bridge, Measurement of self inductance: Maxwell's inductance bridge, Hay's bridge, Anderson bridge, Measurement of capacitance: Schering bridge, Measurement of frequency: Wein's bridge.

UNIT IV **(08 Sessions)**

CRO: Introduction, CRT, Electron gun, Electrostatic focusing, Electrostatic deflection, Post deflection acceleration of electron beam, Deflection plates, Block diagram and explanation of a basic CRO, Measurement of voltage, frequency, time period & phase using CRO (lissajous pattern), CRO probes.

UNIT V **(06 Sessions)**

Digital Instruments: Introduction of Digital Instruments, Characteristics of Digital Instruments, Comparison of Analog and Digital Instruments, Working of Ramp, Dual Slope and Integrating type Digital Voltmeter, Block Diagram and Working of Digital Multimeter, Advantage of Electronic Multimeter over Conventional Multimeter.

Course Outcomes:

Students completing this course will be able to:

- Recognize the evolution and history of units and standards in Measurements.
- Identify the various parameters that are measurable in electronic instrumentation.
- Employ appropriate instruments to measure given set of parameters.
- Practice the construction of testing and measuring set up for electronic systems.

Suggested Readings:

1. A. K. Sawhney - A course in Electrical & Electronic Measurement & Instrumentation – Dhanpat Rai & Sons.
2. Helfric & Cooper - Modern Electronic Instrumentation and Measurment Techniques- PHI.
3. H. S Kalsi, "Electronic Measurement", TMH India.

Website Sources:

- http://web.mst.edu/~cottrell/me240/resources/basic_inst/Basic_Instrumentation.pdf
- https://sctevtservices.nic.in/docs/website/pdf/140297.pdf
- https://www.tutorialspoint.com/electronic_measuring_instruments/measuring_instruments.htm
- https://en.wikipedia.org/wiki/Instrumentation
- https://nptel.ac.in/courses/108/105/108105153/

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (III Semester)
DEC 302: ELECTRONIC DEVICES AND CIRCUITS - I

Objective: To introduce basic semiconductor devices, their characteristics and application. To understand analysis and design of simple diode circuit. To learn and analyze the PN junction behavior at the circuit level and its role in the operation of diodes and active device.

UNIT I **(08 Sessions)**

Semiconductors: Introduction to solids: conductor, insulator and semiconductors, Direct and Indirect semiconductor, Types of semiconductor, Band theory of solids, fermi level and carrier concentrations of n and p-type semiconductors, Drift and Diffusion current, Introduction to carrier mobility & conductivity, Continuity equation, Hall Effect.

UNIT II **(10 Sessions)**

Semiconductors Diodes: Band structure of P-n junction, depletion layer, p-n junction diode characteristics, Transition & diffusion capacitance of p-n junction diode, Zener & avalanche breakdowns, calculation of ripple factor, form factor and peak factor, Average and r.m.s value of voltage and current for half wave and full wave rectifier, Filter circuits: shunt capacitor, series inductor.

UNIT III **(08 Sessions)**

Bipolar Junction Transistor: Introduction to Transistor, construction and working of BJT (NPN and PNP) and their symbols, concept of leakage current, Input and Output characteristics of CB, CE and CC configurations, Current amplification factors: alpha, beta and gamma, relationship b/w alpha, beta and gamma.

UNIT IV **(08 Sessions)**

Field Effect Transistors: Construction and working of JFET and its characteristics, analysis of CG, CD, CS configuration and its characteristics, MOSFET: construction, working in enhancement and depletion modes.

UNIT V **(06 Sessions)**

Some Special Devices: Introduction and applications of Photodiodes, Photo detectors, solar cell, Light emitting diodes etc, Introduction to SSI, MSI, LSI and VLSI.

Course Outcomes:

Students completing this course will be able to:

- Ability to analyze PN junctions in semiconductor devices under various conditions.
- Ability to design and analyze simple rectifiers and voltage regulators using diodes.
- Ability to describe the behavior of special purpose diodes.
- Ability to design and analyze simple BJT and MOSFET circuits.

Suggested Readings:

1. V K Mehta, “Principle of Electronics” S Chand Publication.
2. Robert Boylestad & L. Nashelsky “Electronic Devices and Circuit Theory”, Pearson.
3. Sanjay Sharma, “Electronic Engineering”, Katson Publication.
4. Y.N. Bapat: “Electronics Devices & Ckts”, Discrete & Integrated.

Website Sources:

- https://nptel.ac.in/courses/117/103/117103063/
- https://www.electronics-tutorials.ws/
- https://www.electronics-tutorials.ws/transistor/tran_1.html

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (III Semester)
DEC -303: BASIC NETWORK SYSTEM

Objective: Introducing the topic and illustrating its importance for the electronics engineering field in network / circuits, Basic Network Theorems, Two port networks, signals Concept of linear network, elements of a network system, Resistance: Law of resistance, the concept of conductance and conductivity, series and parallel combination of resistances, voltage and current divider rules, concept of shorts and open circuit in a network, series and parallel combination of capacitors and series and parallel combination of inductance.

UNIT I **(10 Sessions)**

Fundamentals of a Network System: Concept of linear network, elements of a network system, Resistance: law of resistance, concept of conductance and conductivity, series and parallel combination of resistances, voltage and current divider rules, concept of shorts and open circuit in a network, series and parallel combination of capacitors and series and parallel combination of inductance.

UNIT II **(08 Sessions)**

Introduction to Basic network concepts: Classification of networks, Independent and dependent sources, Ideal voltage and current source, Conversion of sources, Kirchhoff Voltage law, Kirchhoff current law, Nodal analysis, Mesh analysis, and Concept of network duality.

UNIT III **(07 Sessions)**

Basic Network Theorems: Introduction of Super-position theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem in D.C circuits, Delta to star & star to delta conversion.

UNIT IV **(08 Sessions)**

Two port network: Concept of ports in network, introduction to T-network and π-network, symmetric and asymmetric network, balance and unbalance network, analysis of Z, Y and h-parameter of a two port network, introduction and characteristics of Low pass filter, high pass filter, band pass filter, Band reject filters.

UNIT V **(07 Sessions)**

Signals: Definition, Types of signals, Representation of test signals: step signal, impulse signal, ramp signal, gate signal and waveforms synthesis using step, ramp and gate function.

Course Outcomes:

Students completing this course will be able to:

- Understand the behavior of different circuits and their response using various circuit analysis tools and theorems
- Understand the analysis in time domain and frequency domain.
- Understand basic concepts regarding the system definition mathematically and associated network function.
- Understand the concept of Network synthesis.

Suggested Readings:

1. A Chakraborty "Network Analysis and Synthesis", Dhanpat Rai & Co.
2. D. Roy Chaudhary, "Networks and Systems"- New age publications
3. K M Soni, "Network analysis and systhesis" -Katson publication.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (III Semester)
DEC -304: FUNDAMENTALS OF COMMUNICATION ENGINEERING

Objective: Introduce the students to various modulation and demodulation techniques of analog communication. Analyze different parameters of analog communication techniques and also focuses on pulse modulation and demodulation

UNIT I **(08 Sessions)**

Communication: Introduction, Block Diagram of Communication System, Types of communication system, need of modulation and demodulation in Communication System, types of modulation: amplitude modulation, frequency modulation, phase modulation and pulse modulation.

UNIT II **(10 Sessions)**

Amplitude Modulation: Amplitude modulation: Derivation of an expression for amplitude modulation, carrier and side band, modulation index and depth of modulation, relative power distribution in carrier and side bands, elementary idea of DSB, DSB-SC, SSB, SSB-SC modulation.

UNIT III **(10 Sessions)**

Frequency modulation and Phase modulation: Frequency modulation: Derivation of an expression for frequency modulated wave spectrum, modulation index, maximum frequency deviation and deviation ratio, advantages and disadvantages of FM over AM, Phase modulation: expression of phase modulated wave.

UNIT IV **(08 Sessions)**

Pulse Code Modulation: Elementary idea of sampling theory and pulse modulation; Shannon's theorem and coding technique, Quantization (Brief idea only).Time Division and frequency division multiplexing, CDMA,WDMA, FDMA and TDMA (Brief Idea Only).PCM system, Types of PCM and its application.

UNIT V **(08 Sessions)**

Principle of AM & FM Modulators and Demodulators: Working principles and typical application of Collector Modulator, Base Modulator and Balanced Modulator, Working principles and application of varactor diode modulator, Principle of demodulation of AM wave using diode detector circuit, Basic principles of detection of FM waves.

Course Outcomes:

After successful completion of the course student will be able to

- Use of different modulation and demodulation techniques used in analog communication.
- Identify and solve basic communication problems.
- Analyze transmitter and receiver circuits.
- Compare and contrast design issues, advantages, disadvantages and limitations of analog communication systems.

Suggested Readings:

1: Kennedy & Davis-, "Electronic Communication System" – Tata McGraw Hill.

2. R P Singh and S D Sapre, "Communication System:Analog and Digital"-Oxford press.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (III Semester)
DEC 305: PRINCIPLES OF DIGITAL ELECTRONICS

Objective: The objective of this course is to familiarize with the number system, logic Gates, combinational circuits, memory, memory and the basics of digital electronics.

UNIT I **(08 sessions)**

Digital system and binary numbers: Introduction to analog and digital systems and signals, Signed binary numbers, conversions from one number system to another, complements, binary addition and subtraction (subtraction using 1's complement method and 2's complement method), BCD code, Excess-3 code, Gray code.

UNIT II **(08 sessions)**

Logic Gates: Introduction to logic gates, AND gate, OR gate, NOT gate, universal gates (NAND and NOR), EX-OR, and EX-NOR gate, boolean algebra, Canonical form representations, karnaugh map (k-map) upto 4 variables.

UNIT III **(12 sessions)**

Combinational Logic Circuits: Basic of Combinational circuits, design of combinational circuits, half adder, full adder, half subtractor, full subtractor , decimal adder, binary magnitude comparator (upto 2 bit), multiplexer(2-to-1 multiplexer, 4-to1 multiplexer), demultiplexer (1-to-2 demultiplexer, 1-to-4 demultiplexer), encoder and decoder.

UNIT IV **(06 sessions)**

Sequential Circuits: Flip-flops (RS flip flop, JK flip flop, D flips flop and T flip flop), Counters: classification of counter, binary and decade counter, Shift registers: Introduction and basic concepts including shift left and shift right.

UNIT V **(06 sessions)**

Memory: Introduction of memory, Basic memory operation, Classification of memory, RAM, ROM, Masked ROM, PROM, EPROM, EEPROM.

Course Outcomes:

Students completing this course will be able to:

- To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
- To prepare students to perform the analysis and design of various digital electronic circuits.
- Course Outcomes After studying this course the students would gain enough knowledge

Suggested Readings:

1. M. Morris Mano, Hill & Peterson, "Switching Circuit & Logic Design", Wiley
2. R.P Jain, "Modern Digital Electronics", TMH.
3. Anand Kumar, "Fundamentals of Digital Circuits" , PHI
4. Anil K. Maini, "Digital Electronics: Principles And Integrated Circuit", Wiley

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (III Semester)
DEC 351: ELECTRONICS INSTRUMENTATION & MEASUREMENT LAB

Objective: The objective of this lab is to familiarize with the functions of multimeter and to acquire the basic knowledge about different bridges.

1. Study of Electronic Multimeter.
2. Study of CRO.
3. Measurement of Low resistance with the help of Kelvin's bridge.
4. Measurement of Medium resistance with Wheatstone bridge.
5. Measurement of Capacitance with the help of Schering bridge.
6. Measurement of Inductance by using Hay's bridge.
7. Measurement of Frequency by using Wien's bridge.
8. Measurement of Inductance by using Maxwell's bridge.

Course Outcomes:

Students completing this course will be able to:

- To develop practical knowledge about theories of different bridge.
- Analyse the measurement of frequency, capacitance and inductance with the help of bridges.

Suggested Readings:

1. A.K. Sawhney, TMH, "Electronic Measurements and Instrumentation".

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (III Semester)
DEE 352: NETWORK SYSTEM LAB

Objective: To make the students capable of analyzing implementation and verification KVL and KCL of any electrical network. To make the students learn how to verify mesh and node network. To make the students learn how to Norton's, Thevenin's and Maximum Power Transfer Theorem, superposition theorem.

List of Experiments

1. Implementation and verification of KVL.
2. Implementation and verification of KCL.
3. To verify Y-Δ and Δ-Y (star to delta and delta to star) conversion.
4. To verify mesh and node network.
5. To verify Superposition Theorem.
6. To verify Norton's Theorem.
7. To verify Thevenin's Theorem.
8. To verify Maximum Power Transfer Theorem.

Course Outcomes:

Students completing this course will be able to:

- Apply the knowledge to verify Y-Δ and Δ-Y (star to delta and delta to star) conversion and simplify the network.
- Analyze the circuit using Kirchhoff's law and Network simplification theorems.
- Obtain the maximum power transfer to the load, also analyze the series resonant and parallel resonant circuit

Suggested Readings:

1. A Chakraborty "Network Analysis and Synthesis", Dhanpat Rai & Co.
2. D. Roy Chaudhary, "Networks and Systems" New age publications.
3. K M Soni, "Network analysis and systhesis" Katson publication.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (III Semester)
DEC 353: COMMUNICATION LAB-I

Objective:

- To practice the basic theories of analog communication system.
- To study of DSB SC/ SSB SC Modulation and Demodulation simulation software or hardware implementation.
- To study of Amplitude/ Frequency Modulation and Demodulation.
- To study of the Square, Triangular, Sawtooth waveform synthesis to the students, which after completion they will verify using the simulation software or hardware implementation.

List of Experiments

1. To study the element of communication system.
2. To study Amplitude Modulation and Demodulation.
3. To study DSB SC Modulation and Demodulation.
4. To study SSB SC Modulation and Demodulation.
5. To study Frequency Modulation and Demodulation.
6. To study of Square waveform synthesis.
7. To study of Triangular waveform synthesis.
8. To study of Saw tooth waveform synthesis.

Course Outcomes:

Students completing this course will be able to:

- To develop practical knowledge about theories of analog communication, identify and solve basic communication problems.
- To provide hands-on experience for the students, so that they are able to apply theoretical concepts in practice
- Demonstrate various pulse modulation techniques
- Evaluate analog modulated waveform in time /frequency domain and also find modulation index
- Develop understanding about the performance of analog communication systems

Suggested Readings:

1: Kennedy & Davis, “Electronic Communication System” – Tata McGraw Hill.
2. R P Singh and S D Sapre, “Communication System: Analog and Digital”- Oxford press.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (III Semester)
DEC-354: DIGITAL LAB

Objective: The objective of this lab is to familiarize with the functions of basic logic gates. To acquire the basic knowledge about the verification of the truth table of gates on experiment kit or breadboard.

1. Introduction to digital electronics lab, nomenclature of digital ICs, specifications.
2. Verification of truth table of AND, OR, NOT logic gates.
3. Verification of truth table of universal gates.
4. Implementation of the given Boolean function using logic gates in both SOP and POS forms.
5. Verification and implementation Half Adder and Half Subtractor.
6. To convert a Binary code to Gray code.
7. Verification and implementation of Full Adder.
8. Verification and implementation of Full Subtractor.

Course Outcomes:

Students completing this course will be able to:

- To develop practical knowledge about theories of digital IC's
- Analyse and verification of Truth Table of various IC's.
- To verify and implementation of the different combinational circuit.

Suggested Readings:

1. M. Morris Mano, Hill & Peterson, "Switching Circuit & Logic Design", Wiley
2. R.P Jain, "Modern Digital Electronics", TMH.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (IV Semester)
DEC-401: INTRODUCTION TO MICROPROCESSOR

Objective: To understand the basic architecture of 8 bit microprocessors. To understand interfacing of 16 bit microprocessor with memory and peripheral chips involving system design. To understand techniques for faster execution of instructions and improve speed of operation and performance of microprocessors. To understand RISC and CISC based microprocessors. To understand the concept of multi core processors.

UNIT I **(08 Sessions)**

Overview of Microcomputers System: Organization of micro computers: CPU, memory, input & output devices, memory, Buses – Bus architecture of microcomputer, Address bus, Data bus & Control bus, Definition of program, Applications of microprocessors

UNIT II **(08 Sessions)**

Microprocessor Architecture: General microprocessor architecture, instruction Pointer and Instruction register, Instruction format: Machine and mnemonics code, Machine and Assembly language, High level language, Use of ALU: Accumulator, Temporary register, flag flip-flop to indicate overflow, Underflow, Zero result occurance, Introduction to timing and control circuit

UNIT III **(08 Sessions)**

Introduction of 8085 Microprocessor: Evolution of microprocessor , Pin diagram of Intel 8085, Architecture-ALU, Timing & Control unit, Registers, Data & Address bus, Timing & control signals, Fetch operation, Execute Operation.

UNIT IV **(08 Sessions)**

Instruction set for Intel 8085: Word size- one byte, Two byte & Three byte instructions, Addressing modes of 8085, 8085 interrupts, and introduction to 8085 instructions set, Timing diagram of 8085, program for Addition & Subtraction of two 8-bit numbers.

UNIT V **(08 Sessions)**

Programming: Interpreter, Assembler & Compiler, program for Addition & Subtraction of two 8-bit numbers, Memory – Semiconductor memories – RAM, ROM, EPROM, and EEPROM.

Course Outcomes:

Students completing this course will be able to:

- Describe the general architecture of a microcomputer system and architecture &organization of 8085 Microprocessor and understand the difference between 8085 and advanced microprocessor.
- Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming.
- Design system using memory chips and peripheral chips for 16 bit 8086 microprocessor.
- Understand and devise techniques for faster execution of instructions, improve speed of operations and enhance performance of microprocessors.
- Distinguish between RISC and CISC processors.
- Understand multi core processor and its advantages.

Suggested Readings:

1. A. P. Mathur, “Introduction to Microprocessor” –Tata McGraw Hill, Delhi.
2. B. Ram, “Fundamentals of Microprocessors & Microcomputers”- Dhanpat Rai & Sons , Delhi.

3. Rafiquzzaman, “Microprocessor” –Prentice Hall of India, Delhi.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (IV Semester)
DEC 402: INTRODUCTION TO POWER ELECTRONICS

Objective: The objective of this course is to familiarize with the transistor, Thyristors, inverters and the basic concepts of power electronics.

Unit I **(08 sessions)**

Introduction to Power Electronic Systems: Introduction, Applications of power electronics, Advantages and Disadvantages of power electronics, Power electronics system, Types of power electronics convertors.

Unit II **(10 sessions)**

Diode circuits: Introduction to diode circuits with DC sources, Diode circuits with resistive load R, Resistive and Capacitive load R-C, resistive and inductive load R-L, Inductive and Capacitive load L-C and resistive, capacitive and inductive R-L-C load, freewheeling diode.

Unit III **(08 sessions)**

Power Semiconductor Diodes and Transistors- Introduction, construction of power diodes, Types of power diodes Characteristics of power diodes.

Power Transistors: Introduction, Types of power transistors, working and characteristics of BJT, power MOSFETs, and IGBTs.

Unit IV **(06 sessions)**

Thyristors- Constructional details and working, switching characteristics of a Thyristor, Thyristors gate characteristics, two transistor model, series & parallel operation of Thyristors, GTO, Thyristor protection-Design of snubber circuit, firing circuit for Thyristors-Main features of firing circuits, R & R-C firing circuits, introduction to Thyristor commutation techniques, Introduction to DIAC, Triac.

Unit V **(08 sessions)**

Inverters: Introduction, Operating principle of single phase voltage source inverters-single phase bridge inverters steady state analysis of single phase inverters. Three phase bridge inverters- Three phase 180° mode VSI.

Course Outcomes:

Students completing this course will be able to:

- Power electronics generally deal with the control and conversion of electric power.
- It is the application of solid state electronics.
- To acquire the basic knowledge of electronic devices- power diodes, transistors, Thyristors, Triacs, GTOs, MOSFETs and IGBTs.
- To prepare students to know the characteristics and to perform operation of these devices.

Suggested Readings:

1. Dr. P.S. Bhimbra (Khanna Publisher)
2. Dr. A. K. Gupta (Khanna Publisher)

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (IV Semester)
DEC-403: FUNDAMENTALS OF TRANSDUCERS AND SENSORS

Objective: To make students familiar with the constructions and working principle of different types of sensors and transducers. To aware students about the measuring instruments and the methods of measurement.

UNIT I **(09 Sessions)**

Sensors, Primary Sensing Elements: Mechanical Devices as Primary Detectors, Mechanical Spring Devices, Pressure Sensing Primary Devices (Bourdon Tubes, Bellows, Diaphragms), Flow Rate Sensing Primary Devices, Temperature Sensor, Optical Fiber Sensors.

UNIT II **(08 Sessions)**

Transducer Basics: Basic Idea and Principle of Operation of the Transducers, Electric Transducers, Classification of Transducers, Resistive Transducers, Potentiometers, Materials used for Potentiometers, Advantages and Disadvantages of Resistance Potentiometers, Strain Gauges, Types of Strain Gauges.

UNIT III **(09 Sessions)**

Transducers Types: Resistance Thermometers its construction and advantages, Thermistors its construction and applications, Thermocouples its construction, working, advantages and disadvantages, its construction and applications, Variable Inductance Transducers, LVDT its advantages, disadvantages and uses, RVDT, Capacitive Transducers, Hall Effect Transducers and its applications.

UNIT IV **(07 Sessions)**

Optoelectronics Transducers: Photo Voltalic Cell and its applications, Photoconductive Cell, Semiconductor Photodiode, Applications of Photo diodes, Photo transistors, Applications of Photo transistors, Photo Optic Transducers, Photo Electric Transducers its advantages and disadvantages, Piezo Electric Transducers its advantages and disadvantages.

UNIT V **(07 Sessions)**

Display Devices: LCD Display, LEDs and photo couplers, LED- Material, Construction, Working, Power & Efficiency, Characteristics, Photo Detectors - Optical detection Principles, P-N photo diode, Avalanche Photodiode, Numeric Display (only brief description)

Course Outcomes:

Students completing this course will be able to:

- Understand various types of Sensors & Transducers and their working principle
- Analyze the smart sensors for their relevant applications.
- Develop the knowledge of some of the semiconductor& IC sensors.
- Understand the characteristics of various transducers
- Apply the knowledge of signal condition to various transducers.

Suggested Readings:

1. H S Kalsi, “Electronic instrumentation”, Tata McGraw Hill.
2. C. S. Ranjan- "Instrumentation Devices & Systems"- Tata McGraw Hill.
3. Singh Jasprit -“Optoelectronics an Introduction to Materials and Devices" - McGraw-Hill
4. A. K. Sawhney - A course in Electrical & Electronic Measurement & Instrumentation – Dhanpat Rai & Sons.

Website Sources:

- https://nptel.ac.in/courses/108/108/108108147/

- https://nptel.ac.in/courses/108/105/108105064/
- https://nptel.ac.in/content/storage2/courses/112103174/pdf/mod2.pdf
- https://en.wikipedia.org/wiki/Transducer
- https://www.electronics-tutorials.ws/io/io_1.html

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (IV Semester)
DEC-404 FUNDAMENTALS OF SIGNALS AND SYSTEMS

Objective: Coverage of continuous and discrete-time signals and systems, their properties and representations and methods that is necessary for the analysis of continuous and discrete-time signals and systems. Knowledge of time domain representation and analysis concepts as they relate to difference equations, impulse response and convolution, etc. Knowledge of frequency-domain representation and analysis concepts using Fourier Analysis tools, Z-transform.

UNIT I **(10 Sessions)**

Introduction to Signal: Definition, types of signals and their representations continuous and discrete time signals, Classification of Signals: Periodic and nonperiodic, even and odd, energy and power signals, exponential and sinusoidal signals, periodicity, unit impulse, unit step, unit ramp and gate functions, time scaling and time shifting of step function, ramp function.

UNIT II **(10 Sessions)**

Introduction to Systems: Continuous time and discrete time systems, Properties of systems: Linearity, Causality, time invariance and stability.

UNIT III **(10 Sessions)**

Fourier series Representation of Signals: Fourier series representation of continuous periodic signal & its properties, Fourier series representation of discrete periodic signal & its properties.

UNIT IV **(08 Sessions)**

Fourier Transform: The continuous time Fourier transform for periodic and non-periodic signals, Properties of CTFT. Discrete time Fourier transform for periodic and non-periodic signals, Properties of DTFT, the convolution.

UNIT V **(08 Sessions)**

Laplace transform: Definition, Properties of Laplace Transform, and application of Laplace transform, concept of Poles and Zeros, Z-Transform: Definition, basic principles of z-transform, the inverse Z-transform (brief idea only), Properties of z-transform.

Course Outcomes:

Students completing this course will be able to:

- Understand about various types of signals and systems, classify them, analyze them, and perform various operations
- Characterize and analyze the properties of CT and DT signals and systems
- Analyze CT and DT systems in Time domain using convolution
- Represent CT and DT systems in the Frequency domain using Fourier Analysis tools like CTFS, CTFT, DTFS and DTFT.
- Conceptualize the effects of sampling a CT signal
- Analyze CT and DT systems using Laplace transform and Z transform.

Suggested Readings:

1. K M Soni, “Signal and System”,- katson publication.
2. S K Panday, “Signal and System”-S Chand.
3. P. Ramesh Babu, R.Ananda Natarajan, “Signals and Systems”, SCITECH Publications.

4. V. Oppenheim, A.S. Willsky and S. Hamid Nawab, ‘signals & System’, PEARSON Education, Second Edition, 2003

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (IV Semester)
DEC 405: ELCTRONIC DEVICE AND CIRCUITS –II

Objective: The objective of this course is to familiarize with the Op-Amp, Oscillators, Filters and linear IC's.

UNIT I **(10 sessions)**

Operational amplifiers: Ideal OP-AMP**,** Specifications of operational amplifier and its block diagram, open & closed loop circuits, inverting and non inverting configuration, and CMMR and slew rate.

Applications of operational amplifier: adder, sub tractor, differential amplifier, integrator, comparator, log & anti-log amplifiers.

UNIT II **(08 sessions)**

Feedback amplifiers: feedback concept, transfer gain with and without feedback, general characteristics of negative and positive feedback amplifiers.

Classifications: voltage-series, voltage-shunt, current-series and current-shunt feedback amplifier, Stability criterion.

UNIT III **(08 sessions)**

Active Filters using Op –Amp: Introduction and characteristics of Low pass filter, high pass filter, band pass filter, band reject filters, all pass filter, Butterworth filter, Introduction of Power amplifier circuits.

UNIT IV **(07 sessions)**

Oscillators: Oscillators Principles, Types of Oscillators, Frequency Stability, Phase Shift Oscillator, Wien Bridge Oscillator, Crystal Oscillator. Hartley Oscillator, Colpitts Oscillator.

UNIT V **(07 sessions)**

Linear IC's: Introduction to voltage regulator IC, three terminal voltage regulators IC. Introduction to 555 IC timer, timer as a bistable, mono stable & astable multivibrators.

Course Outcomes:

Students completing this course will be able to:

- Understand the current, voltage characteristics of semiconductor devices.
- Analyze DC circuits and relate AC models of semiconductor devices with their physical operation.
- Design and analyze of electronic circuits.
- Evaluate frequency response to understand the behavior of Electronics circuits.

Suggested Readings:

1. J. Millman & C.C. Halkias- Integrated Electronics; Tata Mc-Graw Hill.
2. Robert Boylestad & L. Nasheisky - Electronics Devices and Circuit Theory; Pearson Equation.
3. Sedra Smith- Microelectronics circuits, Oxford Press, India.
4. Op-Amps and Linear Integrated Circuits, Fourth Edition, Ramakant A. Gayakwad, Pearson Education.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (IV Semester)
DEC-451 Microprocessor Lab

Objective:

- To expose students to the operation of a typical microprocessor (8085) trainer kit.
- To provide practical hands on experience with Assembly Language Programming.
- To develop the quality of assessing and analyzing the obtained data.

List of Experiments

1. To study 8085 microprocessor.
2. To add two 8-bit binary number using 8085 microprocessor.
3. To subtract two 8-bit binary number using 8085 microprocessor.
4. To develop a program to find out the smallest of three decimal numbers.
5. To develop a program to find out the biggest of three decimal numbers.
6. Write a program to arrange an array of data in descending order by using 8085 instruction set.
7. Write a program to arrange an array of data in ascending order by using 8085 instruction set.
8. To prepare an assembly language program to multiply of two 8- bit numbers for 8085 microprocessor.

Course Outcomes:

Students completing this course will be able to:

- Identify relevant information to supplement to the Microprocessor course.
- Set up programming strategies and select proper mnemonics and run their program on the training boards.
- Practice different types of programming keeping in mind technical issues and evaluate possible causes of discrepancy in practical experimental observations in comparison.
- Develop testing and experimental procedures on Microprocessor analyze their operations under different cases.
- Prepare professional quality text and computational results, incorporating accepted data analysis and synthesis methods, simulation software, and word processing tools.

Suggested Readings:

1. A. P. Mathur, “Introduction to Microprocessor” –Tata McGraw Hill, Delhi.
2. B. Ram, “Fundamentals of Microprocessors & Microcomputers”- Dhanpat Rai & Sons, Delhi.
3. Rafiquzzaman, “Microprocessor” –Prentice Hall of India, Delhi.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (IV Semester)
DEC 452: POWER ELECTRONICS LAB

Objective: The objective of this course is to make the students to design triggering circuits of SCR. To introduce power electronics components from which the characteristics of SCR, TRIAC, IGBT and MOSFET are obtained. To perform the experiments on various converters.

List of Experiments

1. V-I Characteristics of SCR.
2. Study of Power Transistor as a Switch.
3. Study of SCR as a Switch.
4. Testing of Half Wave & Full Wave (Centre Tapped & Bridge) rectifier circuit.
5. Study of Power control by using DIAC.
6. Study of Power control by using TRIAC.
7. Study of R-C firing circuit of SCR.
8. Study of UJT firing Circuit of SCR.

Course Outcomes:

Students completing this course will be able to:

- To develop practical knowledge about theories of transistors and rectifiers.
- Analyse the power control by using DIAC and TRIAC.
- Demonstrate various firing circuits of SCR.

Suggested Readings:

1. Dr. P.S. Bhimbra (Khanna Publisher)

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (IV Semester)
DEC 453: ELECTRONIC DEVICES LAB

Objective: The objective of this course is to study various electronic components and design of various electronic circuits like power supply, audio and power amplifiers. This course is considered as a foundation course for electronics engineers. The subjects to be studied in higher semesters require thorough knowledge on electronic devices and circuits.

List of Experiments

1. To Study of lab equipments and components: CRO, Multimeter, Function Generator, Power supply- Active and Passive components & Bread Board.
2. To Study the V-I characteristics of diode.
3. To Study of Zener diode as a voltage regulator.
4. To Study and measure the V_{rms}, V_{dc}, and ripple factor of Half wave rectifier.
5. To Study and measure the V_{rms}, V_{dc}, and ripple factor of Full wave rectifier.
6. To Study a characteristics of BJT in common base (CB) configuration.
7. To Study a characteristics of BJT in common emitter (CE) configuration
8. To Study Op-Amp as an adder.

Course Outcomes:

Students completing this course will be able to:

- Learn the characteristics of basic electronic devices.
- Learn the V-I characteristics of the diode.
- Learn Zener diode as a voltage regulator.
- Learn about measures of the V_{rms}, V_{dc}, and ripple factor of Half/full wave rectifier.
- A characteristics of BJT in common base (CB)/ common emitter (CE) configuration.
- To understand the concepts of Op-Amp as an adder.

Suggested Readings:

1. Adel S Sedra, Kenneth C Smith and Arun N Chandorkar, "Microelectronic Circuits – Theory and Applications", Seventh Edition, Oxford University Press, 2017.
2. Robert L Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", Eleventh Edition, Pearson India Education Services Pvt. Ltd., 2015.
3. Donald A Neamen, "Electronic Circuits – Analysis and Design", Third Edition, McGraw Hill Education, 2006.
4. Albert Malvino and David Bates, Electronic Principles, Eighth Edition, McGraw Hill Education, 2016.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - II Year (IV Semester)
DEC 454: ELECTRONICS WORKSHOP & PCB LAB

Objective: The objective of this lab is to familiarize with the PCB fabrication and to acquire the basic knowledge about step wise PCB fabrication.

List of Experiments

1. Study of Chemicals used in PCB Lab.
2. Study of PCB curing machine and photo contact printer used for developer of negative.
3. Study of PCB shearing machine.
4. Study of photo resist dip coating and photo U.V (Double Side) machine used for developing PCB.
5. Study of etching machine (Proto Etch) used for developing PCB.
6. Study of roller tinning machine and precision drilling machine.
7. Testing of regulated power supply fabricated.

Course Outcomes:

Students completing this course will be able to:

- To develop practical knowledge about the theories related to PCB fabrication.
- Analyse the different techniques related to fabrication of the PCB.
- Study and obtained the various steps and process of fabrication.

Suggested Readings:

1. R.S. Khandpur, “Printed Circuit Boards”.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - III Year (V Semester)
DEC-501: INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT

Objective: The objective of this course to familiar with the organizational structure, Industrial Management, importance of human resources and develop their analytical skills.

UNIT I **(06 sessions)**

Introduction: Concept, Development, application and scope of Industrial Management, Production and productivity, Present day concept of Industrial Engineering.

UNIT II **(08 sessions**

Management Function: Principles of Management, Management Tools: Time and Motion study, work simplification: process charts and flow diagrams, Production Planning and control.

UNIT III **(10 sessions)**

Inventory control: Inventory, Inventory management techniques, cost, Deterministic models, Introduction to supply chain management.

UNIT IV **(08 sessions)**

Quality control: Basic concepts, Statistical quality control (SQC), control charts, sampling Plan, Introduction to total quality control TQC.

UNIT V **(06 sessions)**

Entrepreneurship Development: Concept of entrepreneurship, Need of entrepreneurship in context of prevailing employment conditions of the country, Idea of project report preparation.

Course outcomes:

Students completing this course will be able to:

- Exhibit the attitude and skill required for the application of Industrial Management.
- Understand the human factors affecting the management in the industrial environment.
- Differentiate various organizational structures in terms of their merits and demerits.
- Select, analysis and inventory control models based upon given data.
- Understand how the production planning and control is carried out in the industries.
- Understand faster values positive attitude and interpersonal relations.

Reference Books:

1. N.G.Nair, “Production and operations management”.
2. Hisrich Peters, “Entrepreneurship Development”-TMH.
3. R K Singhal and Sruti Singhal, “Entrepreneurship Development”-Katson Publication.

Website resources:

- https://nptel.ac.in/courses
- https://en.wikipedia.org
- https://www.unleashedsoftware.com
- https://www.bigcommerce.com/
- https://entrepreneurhandbook.co.uk/entrepreneurship/

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - III Year (V Semester)
DEC-502: MODERN COMMUNICATION SYSTEM

Objective:

1. Aim is to identify the functions of different components
2. Learn about theoretical bounds on the rates of digital communication system and represent a digital signal using several modulation methods
3. Draw signal space diagrams compute spectra of modulated signals and apply redundancy for reliable communication.

UNIT I **(10 Sessions)**

Elements of Digital Communication and Information Theory: Model of a digital communication system, Logarithmic measure of information. Source coding fixed in and variable length code words, Hartely-Shannon law for channel.

UNIT II **(10 Sessions)**

Sampling Theory and Pulse Modulation: Sampling theorem, Signal reconstruction in time domain, Waveform Coding Technique: Quantization, Quantization noise, Encoding and Pulse code modulation, Differential pulse code modulation, Delta modulation, Comparison of PCM and DM.

UNIT III **(08 Sessions)**

Digital Modulation Techniques: Types of digital modulation, Wave forms for amplitude, Frequency and phase shift keying, Method of generation and detection of coherent and non-coherent binary ASK, FSK, PSK and DPSK.

UNIT IV **(08 Sessions)**

Mobile Communication: Evaluation of mobile communication, A simplified reference model for mobile communication, A brief introduction for radio transmission, signals, propagation, multiplexing, modulation, spread spectrum and cellular system.

UNIT V **(08 Sessions)**

Medium Access Control: Introduction to MAC, Introduction to GSM, GPRS, GPS and enable positioning system.

Course Outcomes:

Students completing this course will be able to:

- Understand the basics of information theory, source coding techniques and calculate Entropy of source.
- Describe and determine the performance of line codes and methods to mitigate inter symbol interference.
- Learn the generation and detection of the base band system.
- Understand the generation, detection signal space diagram, spectrum, bandwidth efficiency, and probability of error analysis of different band pass modulation techniques.
- Describe and determine the performance of different error control coding schemes for the reliable transmission of digital representation of signals and information over the channel.

Suggested Readings:

1. Singh and Saprey, “Communication system: Analog and digital”-Oxford press.
2. D. Roddy, “Satellite Communication” - PHI 1998.
3. J. Schiller, “Mobile Communication”-Pearson Education IInd Ed.
4. S. Haykin, “Communication System” - John Willy & Sons IV Ed.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - III Year (V Semester)
DEC 503: BIOMEDICAL ELECTRONICS

Objective: The objective of this course is to familiarize with the physiological system of the human body and relation with the biomedical instruments for diagnosis and to aware diagnosis techniques with the help of measurement instruments.

UNIT I **(08 sessions)**

Introduction: The age of Biomedical engineering, Development of biomedical instrumentation, Man-Instrumentation System, Components, Physiological system of the body, Problem encountered in measuring a living system.

UNIT II **(08 sessions)**

Transducers and Electrodes: The transducers and transduction principles active transducers, Passive transducers, Transducer for Biomedical application. Electrodes: Electrode theory, Bio potential Electrodes - Microelectrodes, Body surface, Electrodes, Needle Electrodes, Biochemical transducers, Reference Electrodes, PH electrodes, Blood Gas Electrodes.

UNIT III **(08 sessions)**

Source of Bioelectric Potentials: Resting and action potentials, Propagation of active potential, The bioelectric potential-ECG, EEG, EMG and Envoked response.

UNIT IV **(08 sessions)**

Cardiovascular Measurement: Electrocardiography - ECG amplifiers, Electrodes and leads, ECG recorder - Three channel, Vector Cardiographs, EGC system for stress testing, Continuous ECG recording (Holter Recording), Blood pressure measurement, Blood flow measurement, Heart sound measurements.

UNIT V **(08 sessions)**

Measurement of Respiratory System: Physiology of respiratory system, Measurement of breathing mechanics - Spirometer, Respiratory Therapy equipments: Inhalators ventilators and respirators, Humidifiers, Nebulizers and Aspirators.

Diagnostic Techniques: Ultrasonic Diagnosis ECo - Cardiography, ECO, Encephalography, Opthalmic Scans, X-Ray and Radio-isotope instrumentation, CAT Scan, Emission Computerised Tomography, MRI.

Course Outcomes:

Students completing this course will be able to:

- To aware about principles and design concepts in medicine and biology for healthcare purposes.
- Also included under the scope of a biomedical engineer is the management of current medical equipment within hospitals while adhering to relevant industry standards.
- To be able for equipment recommendations, procurement, routine testing and preventive maintenance.

Suggested Reading:

1. Cromwell- Biomedical Instrumentation and Measurements-Prentice Hall (India)
2. R. S. Khandpur - Biomedical Instrumentation - Tata Mcgraw Hill.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - III Year (V Semester)
DEC 504: MICROWAVE & RADAR ENGINEERING

Objective: The objective of this course is to familiarize with the electromagnetic wave theory, microwave tubes and radar system. Understand the basic concept of Radar and applications of various types.

UNIT I **(10 sessions)**

E.M. Waves Theory: Introduction, Scalar and Vector quantity, Unit vector, Position and distance vector, Resolution of vector, Addition, Subtraction of vector, Scalar and Vector product, Line, Surface and Volume integral, Gradient of a scalar, Divergence of a vector, Curl of a vector, Gauss divergence theorem and Stoke theorem (no mathematical derivation), Maxwell Equation, Boundary Condition, Electromagnetic wave equation in free space.

UNIT II **(08 sessions)**

Waveguides: Introduction to Microwave and its application, Introduction to waveguide, Types of waveguide, Introduction to electric and magnetic wave equations, Different field components of TE and TM modes in rectangular waveguide (no mathematical derivation), introduction to circular waveguide.

UNIT III **(06 sessions)**

Microwave Component: Scattering matrix, passive microwave devices: waveguide tees, directional couplers, two hole directional coupler, isolators, circulators, s-parameter analysis of all components.

UNIT IV **(06 sessions)**

Microwave Devices: Introduction to Microwave Tubes- Two cavity Klystron, Reflex Klystron, Travelling wave tube, Introduction to Microwave Semiconductor devices - Tunnel Diode, IMPATT, Gun diode and PIN diode.

UNIT V **(10 sessions)**

Radar Systems: Introduction to Radar and its various applications, Radar range equation with derivation and its application. Block diagram and operating principle of basic pulse radar, Block diagram and operating principle of CW (Doppler), Block diagram and operating principle of MTI radar.

Course Outcomes:

Students completing this course will be able to:

- Microwave engineering pertains to the study and design of microwave circuits, components, and systems.
- Fundamental principles are applied to analysis, design and measurement techniques in this field.
- A fundamental list of antenna theory concepts, an antenna basics menu is given here.
- Topics include directivity, polarization, bandwidth, impedance, frequency bands, all things necessary for an understanding of antenna theory, antenna basics and antenna fundamentals.

Suggested Readings:

1. S. Y. Liao - Microwave Devices and Circuits - PHI III ed.
2. M. L. Sisodia - Microwave - New Age Internationals.
3. I. M. Skolink - Introduction to Radar System- McGraw Hiil.
4. Roddy & Coolen - Electronics Communication - PHI 4th ed.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - III Year (V Semester)
DEC -505: TELEMETRY & DATA ACQUISITION SYSTEMS

Objective: To introduce the basic concept of telemetry system and data acquisition. To aware students about the specification of data acquisition system. Students can also identify the types of the telemetry system.

UNIT I **(08 Sessions)**

Telemetry Systems: Introduction, Methods of data transmission, General telemetry system, Types of telemetry systems, Landline Telemetry system: DC voltage, DC current and position telemetry system land line telemetry.

UNIT II **(08 Sessions)**

Transmission channel and media: Introduction, Wire-line channels, Radio channels, Microwave channels, Power lines carrier channels, Introduction to radio link, Transmitting and receiving antenna.

UNIT III **(08 Sessions)**

Data Acquisition System: Introduction, objective of Data Acquisition System, generalized block diagram of Data Acquisition System, analog data acquisition system, digital data acquisition system.

UNIT IV **(08 Sessions)**

Multiplexed System: – Amplitude and frequency modulation techniques, Pulse amplitude modulated (PAM) system, Pulse width modulated system (PWM), Pulse code modulated system (PCM) system.

UNIT V **(08 Sessions)**

Recorders: Introduction, use of recorders, Digital recording systems, X-Y recorder: working principle, construction, operation and salient features of X-Y recorder and introduction of Magnetic tape recorder.

Course Outcomes:

Students completing this course will be able to:

- Study remote sensing applications.
- Use components of telemetering and remote control systems
- Use data acquisition and distribution system, digital modulation and demodulation techniques in telemetry system

Suggested Readings:

1. A. K. Sawhney – "A course in Electrical & Electronic Measurement & Instrumentation" – Dhanpat Rai & Sons.
2. D Patranabis, "Telemetry Principle"-TMH Ed 1 1999.
3. Mani and Rangan, "Instrumentation Devices and Systems", Tata McGraw Hill, New Delhi (1997).
4. H. S Kalsi, "Electronic Measurement", TMH India

Website Sources:

- https://nptel.ac.in/content/storage2/courses/117101105/downloads/L2.pdf
- http://www.digimat.in/nptel/courses/video/108105088/L07.html

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - III Year (V Semester)
DEC -552 COMMUNICATION LAB-II

Objective: To know the steps involved in the analysis of digital communication systems. To understand, synthesize a digital communication module with the given specifications.

List of Experiments

1. To study pulse amplitude modulation using sample and hold circuit.
2. To study pulse Width Modulation and Demodulation.
3. To study pulse position Modulation and Demodulation.
4. To study pulse code modulation and demodulation.
5. To study phase shift keying modulation and demodulation.
6. To study amplitude shift keying modulation and demodulation.
7. To study frequency shift keying modulation and demodulation.
8. To obtain the delta modulation and demodulation signals.

Course Outcomes:

Students completing this course will be able to:

- The ability of visualization and practical implementation of baseband modulation techniques
- The skill to analyze PCM, PWM, PPM modulation and demodulation.
- The ability to ASK, PSK and FSK modulation and demodulation techniques with desired specifications.
- The skill to analyze and implement analogue to digital he delta modulation and demodulation signals.

Suggested Reading:

1. Singh and Saprey,"Communication system: Analog and digital"-Oxford press.
2. D. Roddy, "Satellite Communication" - PHI 1998.
3. J. Schiller, "Mobile Communication"-Pearson Education IInd Ed.
4. S. Haykin, "Communication System" - John Willy & Sons IV Ed.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - III Year (V Semester)
DEC-553 MICROWAVE LAB

Objective: The objective of this lab is to familiarize with the Microwave bench set up and to acquire the basic knowledge about E-plane T, H-plane T isolator and circulator.

List of Experiments

1. To study microwave bench set up.
2. To study Klystron amplifier.
3. To study V-I characteristic of GUNN diode.
4. To measure coupling coefficient and directivity of directional coupler.
5. To study the E-plane T.
6. To study the H-plane T.
7. To study of Magic-T.
8. To study of isolator and circulator.

Course Outcomes:

Students completing this course will be able to:

- To develop practical knowledge about theories of microwave bench.
- Analyse the characteristic of GUNN Diode.
- Obtain the knowledge about various “T” isolator and circulator.

Suggested Readings:

1. S. Y. Liao - Microwave Devices and Circuits - PHI III ed.
2. M. L. Sisodia - Microwave - New Age Internationals.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - III Year (VI Semester)
DEC-601: INTRODUCTION TO DATA COMMUNICATION NETWORK

Objective: To develop an understanding of the various aspects of data communications and computer networking systems. Topics include: data transmission, multiplexing, switching, protocols, and architecture, inter networking and ISDN.

UNIT I **(10 Sessions)**

Introduction to Networks & Data Communications, the Internet, Protocols & Standards, Layered Tasks, OSI Model, TCP / IP, Addressing.

UNIT II **(08 Sessions)**

Data Link Layer: Types of error, Error detection: redundancy, parity check and cyclic redundancy check, Error correction: forward error correction, Data Link Control and protocol: Flow Control, Error Control, Introduction to point to point Protocol.

UNIT III **(08 Sessions)**

Multiple Access: Introduction to random access, Brief idea of CDMA, CSMA/CD, CSMA/CA, Channelization: Introduction to FDMA, TDMA and CDMA, Ethernet: Brief idea of Standard Ethernet, Fast Ethernet, Gigabit Ethernet, Wireless LANs: IEEE 802.11, Introduction to Bluetooth.

UNIT IV **(06 Sessions)**

Connecting devices: Repeaters, Hubs, Bridges, Routers, Gateways, Two layer of switches, Overview of IPV4 and IPV6 network.

UNIT V **(08 Sessions)**

Transport Layer: User datagram protocol: port number, user datagram and application of UDP, Transmission control protocol: Introduction to port number, TCP services, numbering byte, sequence number, segment and connection, Introduction of ATM, Network Security: Brief idea of Cryptography.

Course Outcomes:

Students completing this course will be able to:

- Recognize the technological trends of Computer Networking.
- Discuss the key technological components of the Network.
- Evaluate the challenges in building networks and solutions to those.

Suggested Readings:

1. B. A. Forouzan, “Data Communications and Networking”, TMH, 4th ed. 2007
2. A. S. Tanenbaum, “Computer Networks”, PHI.
3. W. Stallings, “Data and Computer Communication”, PHI.

Website Sources:

- https://nptel.ac.in/courses/106/105/106105082/
- https://www.tutorialspoint.com/data_communication_computer_network/index.htm
- https://www.oreilly.com/library/view/business-data-communications/9781118086834/09-Chapter001.html

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - III Year (VI Semester)
DEC 602: FUNDAMENTALS OF CONTROL SYSTEM

Objective: To familiarize students with techniques for basics of the Laplace Transform: Definition of Laplace Transform, Properties of Laplace Transform: Linearity, Scaling, Real Integration, Initial Value and Final Value Theorem, Basics of Inverse Laplace Transform. To familiarize students with basic techniques for stability of Linear Control Systems. To understand the fundamentals of signal flow graph, terminology used in the signal flow graph representation, gain formula, introduction to block diagram reduction using a signal flow graph.

UNIT I **(10 Sessions)**

Basics of Laplace Transform: Definition of Laplace Transform, Properties of Laplace Transform: Linearity, Scaling, Real Integration, Initial Value and Final Value Theorem, Basics of Inverse Laplace Transform.

UNIT II **(08 Sessions)**

Concept of Transfer Function, properties of a continuous system transfer function and Impulse Response.

UNIT III **(08 Sessions)**

Basic Components of a control system, Classification of Control System, Feedback and its effect, types of feedback control systems. Block diagrams. Open Loop System, Closed Loop System, Comparison of Open Loop and Closed Loop System.

UNIT IV **(08 Sessions)**

Block Diagram Representation: Elements of Block Diagram, Advantages and disadvantages of block diagram, Rules for block diagram reduction, Analysis of Multiple input multiple output systems.

UNIT V **(10 Sessions)**

Stability of Linear Control Systems: definition, Bounded-input bounded-output stability criteria, methods of determining stability: Routh Hurwitz criterion, Signal flow graph: fundamentals of signal flow graph, terminology used in signal flow graph representation, gain formula, introduction to block diagram reduction using signal flow graph.

Course Outcomes:

Students completing this course will be able to:

- Understand the use of the major goal of the **Control Systems** course is to develop a specific technical expertise in the analysis and design of Feedback Control Systems.
- Understanding the ability to recognize and analyse feedback control mechanisms and design. Feedback control systems are the key learning outcomes; Elements of Block Diagram, Advantages and disadvantages of block diagram.
- Understanding the ability to describe feedback control systems in mathematical terms of different equations, transfer functions and state-space models, if the time helped us, and definition,
- Understand the use of Bounded-input bounded-output stability criteria, methods of determining stability: Routh Hurwitz criterion, Signal flow graph: fundamentals of signal flow graph.

Suggested Readings:

1. B S Manke, “Linear control system”, khanna publications.
2. William A. Wolovich, “Automatic Control Systems”, Oxford University Press, 2010.
3. I. J. Nagrath & M. Gopal, “Control System Engineering”, New Age International Publishers

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - III Year (VI Semester)
DEC 603: INTRODUCTION TO OPTICAL FIBER COMMUNICATION

Objective: To expose the students to the basics of signal propagation through optical fibers, fiber impairments, components and devices and system design. Students learn about the advantages, disadvantages and applications of optical fiber communication. Students can aware of basic elements of optical fiber transmission link, fiber modes, configurations and structures. They also understand the different kind of losses, signal distortion and learn about various optical sources, materials and splicing to learn the fiber optic receivers and noise performance in photo detector.

UNIT I **(09 Sessions)**

Overview of Optical Fiber Communication- The general system, Advantages of optical fiber communications, Optical fiber wave guides- Introduction, Ray theory transmission, Optical fiber Modes and configuration, Mode theory for circular Waveguides, Step Index fibers, Graded Index fibers. Single mode fibers.

UNIT II **(09 Sessions)**

Signal Distortion in Optical Fibers- Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses, introduction to Dispersion and its type, Optical fiber Connectors: Joints, Couplers and Isolators.

UNIT III **(08 Sessions)**

Optical Sources- Construction, Principle and operation of LEDs, Quantum efficiency, Power, Modulation, Power bandwidth product, Laser Diode: Basic concepts, Classifications, Introduction to Semiconductor injection Laser: Modes, Threshold conditions, External quantum efficiency.

UNIT IV **(06 Sessions)**

Source to Fiber Power Launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture.

UNIT V **(08 Sessions)**

Optical Detectors: Introduction, material and types of photodiode, Operation principles of PIN and APD, Detector response time, Bandwidth, Temperature effect on Avalanche gain.

Course Outcomes:

Students completing this course will be able to:

- Recognize and classify the structures of Optical fiber and types.
- Discuss the channel impairments like losses and dispersion.
- Classify the Optical sources and detectors and to discuss their principle.
- Familiar with design considerations of fiber optic systems.

Suggested Readings

1. John M. Senior, “Optical Fiber Communications”, PEARSON, 3rd Edition, 2010.
2. Gerd Keiser, “Optical Fiber Communications”, TMH, 4th Edition, 2008.
3. Govind P. Agrawal, “Fiber Optic Communication Systems”, John Wiley, 3rd Edition, 2004.
4. Joseph C. Plais, “Fiber Optic Communication”, Pearson Education, 4th Ed, 2004

Website Sources:

- https://nptel.ac.in/courses/117/104/117104127/
- https://nptel.ac.in/courses/117/101/117101054/
- https://en.wikipedia.org/wiki/Fiber-optic_communication

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - III Year (VI Semester)
EEC-604 MODERN CONSUMER ELECTRONICS APPLIANCES

Objective: The objective of this course is to familiarize with the electronic equipment based on different principles, electronic control and various testing standards.

UNIT I **(06 sessions)**

Audio systems: Construction, Working principle and application with basic block diagram of microphone, Loud speakers, Sound recording: Digital sound recording on disc CD system.

UNIT II **(08 sessions)**

Optical Electronics Appliances: Working principle and basic block diagram of Remote control of T.V., Laser Printer, Scanner, Xerox machine..

UNIT III **(08 sessions)**

Domestic Electronics Appliances: Working principle and basic block diagram of calculator, Digital watch/clock, Cellular phones, LCD and LED TV.

UNIT IV **(10 sessions)**

Satellite and Cable TV: Basic Principle, Working and Operation of introduction to Cable TV, DTH system, DTH receiver, HD TV.

UNIT V **(08 sessions)**

Induction Stove and Microwave Oven: Basic Principle, Working and Operation of Induction Stove and Microwave Oven.

Course Outcomes:

Students completing this course will be able to:

- To acquire the basic knowledge of various electronic audio and video devices and systems.
- Further, this subject will introduce the students with working principles, block diagram, main features of consumer electronics gadgets/goods/devices like audio-systems, CD systems.
- To aware the basic knowledge of national and international standards organizations and safety.

Suggested Reading:

1. Consumer Electronics - J.S.Chitode Technical Publications Pune

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - III Year (VI Semester)
DEC 605: ELECTRONICS EQUIPMENT TESTING

Objective: To familiarize students with the fundamentals of Identification of basic electronic components, ICs, PCBs, Battery & Sensors, Basics of electricity, waveform, frequency, peak value, average value of voltage and current, Probes**.** To enhance the knowledge of Electronic Test Equipment: Awareness of tools, testing and measuring instruments: CROs, Multimeter, Power supplies, Signal Generator. To familiarize students with basic techniques for Types of Product Testing: Acceptance Testing, Type Testing, Identification of legends, symbols, colour codes, safety standards.

UNIT I **(10 Sessions)**

Fundamentals of Electricity and Electronics: Identification of basic electronic components, ICs, PCBs, Battery &Sensors, Basics of electricity, wave form, frequency value, peak value, average value of voltage and current, Probes.

UNIT II **(08 Sessions)**

Familiarisation with Electronic Test Equipment: Awareness of tools, testing and measuring instruments: CROs, Multimeter, Power supplies, Signal Generator etc.

UNIT III **(08 Sessions)**

Types of Product Testing: Acceptance Testing, Type Testing , Safety Testing, Identification of legends, symbols, colour codes, safety standards, Awareness on ISO 17025, ISO 9001, Calibration and Uncertainty of measurements, Awareness on disposal of Electronic waste.

UNIT IV **(08 Sessions)**

Testing Procedures: Testing of Basic Electronic Components: Resistor (Parameter to be measured: Resistance Value), Capacitor (Parameter to be measured: Capacitance Value, IR at rated Voltage), Inductor (Parameter to be measured: Inductance Value, DC Resistance), Diode (Parameter to be measured: Resistance in forward direction and reverse direction).

UNIT V **(10 Sessions)**

Testing of Amplifiers and Other Linear ICs: testing of Zener diode, typical Op-Amp circuits and Fault diagnosis in Op-Amp circuits.

Course Outcomes:

- By the end of the course, the student will be familiar with the techniques involved in the transfer of information in the field of Radio communication**,** Testing Procedures, Types of Product Testing.
- By the end of the course, the student will be able to detect and correct the errors that occur due to noise during transmission.

Suggested Reading:

1. A.K Sawhney and Puneet Sawhney, “A Course in Electrical and Electronics Measurement and Instrumentation”-Dhanpat Rai Publications.
2. Dr R.S. Khandpur, “Troubleshooting Electronic Equipment: Includes Repair and Maintenance”, McGraw Hill Education (India) Private Limited IInd Edition.

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- ndl.iitkgp.ac.in
- www.tutorialspoint.com

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - III Year (VI Semester)
DEC-652 CONTROL SYSTEM LAB

Objective: The objective of this lab is to familiarize with DC and AC motor functions and to acquire the basic knowledge about speed control and running mode.

List of Experiments

1. To study the effect of loading on the speed of the Motor in the open loop.
2. To study the effect of loading on the speed of the Motor in the closed loop.
3. Testing of electronic fan speed regulator.
4. To study the speed control of a DC Motor.
5. To study the speed control of a AC Motor.
6. Study of stepper motor in full step, single phase, step and free running mode.

Course Outcomes:

Students completing this course will be able to:

- To develop practical knowledge about theories of speed of motor in open and closed loop.
- Analyse the potentiometer constant and speed control of DC motor.
- Obtain the knowledge about stepper motor.

Suggested Readings:

1. Ch. Chengaiah And G. V. Marutheswar, BS Publication, “Control systems”,

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- www.vlab.co.in

IFTM University, Moradabad
Diploma (Electronics & Communication Engineering) Programme
Diploma (EC) - III Year (VI Semester)
DEC-653 OPTICAL FIBER COMMUNICATION LAB

Objective: The objective of this lab is to familiarize with OFC link, losses, numeric aperture and to acquire the basic knowledge about Time division multiplexing.

List of Experiments

1. To setting up fiber optic analog link.
2. To setting up fiber optic digital link.
3. Study and measurement of losses in optical fiber.
4. Study of bending losses in optical fiber.
5. Study and measurement of numerical aperture of optical fiber.
6. Study and perform time division multiplexing (digital).
7. Study of framing in time division multiplexing.
8. Study and measure characteristics of fiber optic LED's and photo detector.

Course Outcomes:

Students completing this course will be able to:

- To develop practical knowledge about theories of optical fiber communication.
- Analyse the fiber optic link setting, bending loss.
- Obtain the knowledge about T.D.M. Time Division Multiplexing.

Suggested Readings:

1. John M Senior, Pearson, "Optical Fiber Communications", Wiley

Website Sources:

- en.wikipedia.org
- onlinecourses.nptel.ac.in
- www.vlab.co.in
- www.researchgate.net