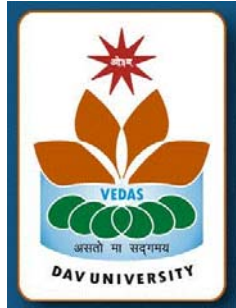# DAV UNIVERSITY JALANDHAR

Course Scheme & Syllabus

For

B. Tech in Electronics and Communication Engineering

1st TO 8th SEMESTER
Examinations 2015–2016 Session

Syllabi Applicable For Admissions in 2015

DAV UNIVERSITY, JALANDHAR

Scheme of Courses
B. Tech in Electronics and Communication Engineering
Semester-1

S. no	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	MTH151A	ENGINEERING MATHEMATICS-I	4	0	0	4	Core
2	CHE151A	CHEMISTRY	4	0	0	4	Core
3	CSE101A	COMPUTER FUNDAMENTALS AND PROGRAMMING	4	0	0	4	Core
4	EVS100	ENVIRONMENTAL STUDIES	4	0	0	4	AECC
5	MEC101A	ENGINEERING DRAWING	2	0	4	4	Core
6	ENG151A	BASIC COMMUNICATION SKILLS	3	0	0	3	AECC
7	CHE152	CHEMISTRY LAB	0	0	2	1	Core
8	CSE103	COMPUTER FUNDAMENTALS AND PROGRAMMING LAB	0	0	2	1	Core
9	ENG152	BASIC COMMUNICATION SKILLS LAB	0	0	2	1	AECC

L: Lectures   T: Tutorial   P: Practical   Cr: Credits

Scheme of Courses
B. Tech in Electronics and Communication Engineering
Semester-2

S. no	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	MTH152A	ENGINEERING MATHEMATICS-II	4	0	0	4	Core
2	PHY151A	ENGINEERING PHYSICS	4	0	0	4	Core
3	MEC103	MECHANICAL ENGINEERING FUNDAMENTALS	4	0	0	4	Core
4	ELE101	ELECTRICAL AND ELECTRONICS TECHNOLOGY	4	0	0	4	Core
5	SGS107	HUMAN VALUES AND GENERAL STUDIES	4	0	0	4	AECC
6	MEC104	MANUFACTURING PRACTICE	0	0	4	2	Core
7	PHY152	ENGINEERING PHYSICS LAB	0	0	2	1	Core
8	ELE102	ELECTRICAL AND ELECTRONICS TECHNOLOGY LAB	0	0	2	1	Core

L: Lectures   T: Tutorial   P: Practical   Cr: Credits

DAV UNIVERSITY, JALANDHAR

Scheme of Courses
B. Tech in Electronics and Communication Engineering
Semester-3

S. no	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	ECE201	DIGITAL ELECTRONICS	4	0	0	4	Core
2	ECE202	ELECTRONIC DEVICES AND CIRCUITS	4	0	0	4	Core
3	ELE201	CIRCUIT THEORY	4	0	0	4	Core
4	CSE201	OBJECT ORIENTED PROGRAMMING	4	0	0	4	Core
5	MTH252A	ENGINEERING MATHEMATICS III	4	0	0	4	Core
6	ECE204A	DIGITAL ELECTRONICS LABORATORY	0	0	3	2	Core
7	ECE205	ELECTRONIC DEVICES AND CIRCUITS LABORATORY	0	0	2	1	Core
8	CSE205	OBJECT ORIENTED PROGRAMMING LABORATORY	0	0	4	2	Core

L: Lectures   T: Tutorial   P: Practical   Cr: Credits

Scheme of Courses
B. Tech in Electronics and Communication Engineering
Semester-4

S. no	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	ECE203	ELECTRONICS MEASUREMENTS AND INSTRUMENTATION	4	0	0	4	Core
2	ECE207A	ANALOG COMMUNICATION SYSTEMS	4	0	0	4	Core
3	ECE209	SIGNALS AND SYSTEMS	4	0	0	4	Core
4	ECE210	ELECTROMAGNETIC FIELD THEORY	4	0	0	4	Core
5	ECE211	ANALOG ELECTRONICS	4	0	0	4	Core
6	ECE206	ELECTRONICS MEASUREMENTS AND INSTRUMENTATION LABORATORY	0	0	2	1	Core
7	ECE212A	ANALOG COMMUNICATION SYSTEMS LABORATORY	0	0	3	2	Core
8	ECE213	SIGNALS AND SYSTEMS LABORATORY USING MATLAB/MENTOR DSP	0	0	2	1	Core
9	ECE214A	ANALOG ELECTRONICS LABORATORY	0	0	2	1	Core

L: Lectures   T: Tutorial   P: Practical   Cr: Credits

Note: At the end of the examination of 4th Semester the students will undergo compulsory industrial training for a period of 4 weeks duration in reputed industries. Every student will submit the Training Report within two weeks from the start of teaching for 5th Semester. The marks for this will be included in the 5th Semester.

DAV UNIVERSITY, JALANDHAR

Scheme of Courses
B. Tech in Electronics and Communication Engineering
Semester-5

S. no	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	ECE301	MICROPROCESSORS AND MICROCONTROLLER	4	0	0	4	Core
2	ECE302	DIGITAL COMMUNICATION SYSTEM	4	0	0	4	Core
3	ECE304A	LINEAR INTEGRATED CIRCUITS	4	0	0	4	Core
4	ICE208	LINEAR CONTROL SYSTEMS	4	0	0	4	Core
5	ECE306A	MICROPROCESSORS AND MICROCONTROLLER LABORATORY	0	0	2	1	Core
6	ECE307	DIGITAL COMMUNICATION SYSTEM LABORATORY	0	0	3	2	Core
7	MTH256A	NUMERICAL METHODS	3	0	0	3	Core
8	ECE308	LINEAR INTEGRATED CIRCUITS LABORATORY	0	0	2	1	Core
9	ECE315	INDUSTRIAL TRAINING-I	0	0	0	2	Training, D and P

L: Lectures   T: Tutorial   P: Practical   Cr: Credits

Scheme of Courses
B. Tech in Electronics and Communication Engineering
Semester-6

S. no	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	ECE305	ANTENNA ENGINEERING	4	0	0	4	Core
2	ECE309	MICROWAVE AND RADAR ENGINEERING	4	0	0	4	Core
3	ECE310A	EMBEDDED SYSTEMS	4	0	0	4	Core
4	ECE311	DIGITAL SIGNAL PROCESSING	4	0	0	4	Core
5	ECEXXX	DEPARTMENT SPECIFIC ELECTIVE -I	4	0	0	4	DSE-1
6	ECE312	MICROWAVE AND RADAR ENGINEERING LABORATORY	0	0	3	2	Core
7	ECE313A	EMBEDDED SYSTEMS LABORATORY	0	0	2	1	Core
8	ECE314	DIGITAL SIGNAL PROCESSING LABORATORY	0	0	3	2	Core

L: Lectures   T: Tutorial   P: Practical   Cr: Credits

Note:
- *Department specific elective-I should be from the basket of "Department Specific Elective-I".*
- *At the end of the examination of 6th Semester the students will undergo compulsory industrial training for a period of 6 weeks duration in reputed industries. Every student will submit the training report within two weeks from the start of teaching of 7th Semester. The marks for this will be included in the 7th semester.*

DAV UNIVERSITY, JALANDHAR

Scheme of Courses
B. Tech in Electronics and Communication Engineering
Semester-7

S. no	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	CSE353	DATA STRUCTURES	4	0	0	4	Core
2	ECE461	DIGITAL SYSTEM DESIGN	4	0	0	4	Core
3	ECE462	DIGITAL SYSTEM DESIGN LABORATORY	0	0	3	2	Core
4	ECEXXX	DEPARTMENT SPECIFIC ELECTIVE -II	4	0	0	4	DSE-II
5		GENERIC ELECTIVE - I	4	0	0	4	Generic Elective -I
6	ECE400	INDUSTRIAL TRAINING-II	0	0	0	2	Training, D and P
7	ECE402	PROJECT	0	0	8	4	Training, D and P

L: Lectures   T: Tutorial   P: Practical   Cr: Credits
Note:
- *Department specific elective-II should be from the basket of "Department Specific Elective-II".*
- *Generic elective-I should be from the "Generic Elective Basket"*

Scheme of Courses
B. Tech in Electronics and Communication Engineering
Semester-8

S. no	Paper Code	Course Title	L	T	P	Cr	Nature of Course
1	ECE411	DATA COMMUNICATIONS	4	0	0	4	Core
2	ECEXXX	DEPARTMENT SPECIFIC ELECTIVE -III	4	0	0	4	DSE-III
3	ECEXXX	DEPARTMENT SPECIFIC ELECTIVE-IV	4	0	0	4	DSE-IV
4		GENERIC ELECTIVE -II	4	0	0	4	Generic Elective -II
5	ECE450	SEMINAR	0	0	4	2	Training, D and P
6	ENG351	TECHNICAL COMMUNICATION	3	0	0	3	AECC

L: Lectures   T: Tutorial   P: Practical   Cr: Credits

Note:
- *Department specific elective-III & IV should be from the basket of "Department Specific Elective-III & IV" respectively.*
- *Generic elective-II should be from the "Generic Elective Basket"*

Department Specific Elective-I

S.NO.	Paper Code	Course Title	L	T	P	Cr	Specialization
1	ECE331	VIRTUAL INSTRUMENTATION	4	0	0	4	Instrumentation
2	ECE332	SATELLITE COMMUNICATION	4	0	0	4	Communication System
3	ECE333	PROBABILITY AND RANDOM PROCESSES	4	0	0	4	Signal Processing
4	ECE334	DIGITAL MEMORY SYSTEMS	4	0	0	4	VLSI

Department Specific Elective-II

S.NO.	Paper Code	Course Title	L	T	P	Cr	Specialization
1	ECE431	MEMS FUNDAMENTALS	4	0	0	4	Instrumentation
2	ECE432	OPTICAL FIBER COMMUNICATION	4	0	0	4	Communication System
3	ECE433	DIGITAL IMAGE PROCESSING AND PATTERN RECOGNITION	4	0	0	4	Signal Processing
4	ECE434	CMOS CIRCUIT DESIGN	4	0	0	4	VLSI

Department Specific Elective-III

S.NO.	Paper Code	Course Title	L	T	P	Cr	Specialization
1	ECE441	ELECTRONIC SENSORS AND TRANSDUCERS	4	0	0	4	Instrumentation
2	ECE442	WIRELESS COMMUNICATION	4	0	0	4	Communication System
3	ECE443	MULTIRATE SYSTEMS AND FILTER BANKS	4	0	0	4	Signal Processing
4	ECE444	DIGITAL COMPUTER ELECTRONICS	4	0	0	4	VLSI

Department Specific Elective-IV

S.NO.	Paper Code	Course Title	L	T	P	Cr	Specialization
1	ECE471	REMOTE SENSING	4	0	0	4	Instrumentation
2	ECE472	TELECOMMUNICATION SWITCHING AND NETWORKS	4	0	0	4	Communication System
3	ECE473	WAVELET THEORY AND APPLICATIONS	4	0	0	4	Signal Processing
4	ECE474	ANALOG CMOS CIRCUIT DESIGN	4	0	0	4	VLSI

Generic Elective Basket

S. no	Paper Code	Course Title	L	T	P	Cr
1	ELE801	ELECTRO-MECHANICAL ENERGY CONVERSION	4	0	0	4
2	ELE802	TRANSDUCERS AND SIGNAL CONDITIONING	4	0	0	4
3	CHL801	INDUSTRIAL POLLUTION CONTROL	4	0	0	4
4	CHL802	FUEL CELL TECHNOLOGY	4	0	0	4
5	MEC801	INDUSTRIAL ENGINEERING TECHNIQUES	4	0	0	4
6	MEC802	ENERGY RESOURCES	4	0	0	4
7	CSE801	SOFTWARE ENGINEERING & PROJECT MANAGEMENT	4	0	0	4
8	CSE802	COMPUTER NETWORKS	4	0	0	4
9	ECE801	COMMUNICATION AND MEDIA FOUNDATIONS	4	0	0	4
10	ECE802	ELECTRONIC DISPLAYS	4	0	0	4
11	ECE803	EVERYDAY ELECTRONICS	4	0	0	4
12	CIV801	CONSTRUCTION MATERIALS AND TECHNIQUES	4	0	0	4
13	CIV802	RAILWAY AND TUNNEL ENGINEERING	4	0	0	4
14	MGT001	FUNDAMENTALS OF MANAGEMENT	4	0	0	4
15	MGT002	FUNDAMENTALS OF ADVERTISING	4	0	0	4
16	MGT003	FUNDAMENTALS OF STOCK MARKET	4	0	0	4
17	MGT004	FUNDAMENTALS OF RESEARCH METHODS	4	0	0	4

DAV UNIVERSITY, JALANDHAR

B Tech Course Structure

CBCS	Nature of Courses	Core	Elective Courses			Ability Enhancement Courses		Total Credits
Year	Course Structure	Core	Dissertation/ Project	Generic Elective	Discipline Specific Elective	Ability Enhancement Compulsory Courses	Skill Enhancement Courses	
2015	ECE	146	10	8	16	15	0	195

Core	Basic Sciences (BS) including Mathematics, Physics, Chemistry, Biology	Engineering Sciences (ES) including Materials, WS, ED, Basics of EE/ME/CSE	Interdisciplinary Core	Discipline Core	Total Credits
146	18	20	18	90	146

DAV UNIVERSITY, JALANDHAR

Syllabus

Course Title: Engineering Mathematics-I

Paper Code: MTH151A

L	T	P	Credits
4	0	0	4

Objective: The aim of this course is to familiarize the students with the theory of matrices which are used in solving equations in mechanics and the other streams. This course also provides a comprehensive understanding of the origin and development of ideas to exhibit the techniques origin and development of ideas to exhibit the techniques of solving ordinary differential equations.

Unit-A

Rank of matrices, Inverse of Matrices, Gauss Jordan Method, reduction to normal form, Consistency and solution of linear algebraic system of equations, Gauss Elimination Method, Eigen values and Eigen vectors, Diagonalisation of Matrix, Cayley Hamilton theorem. Orthogonal, Hermition and unitary matrices.

Unit-B

Concept of limit and continuity of a function of two variables, Partial derivatives, Homogenous Function , Euler's Theorem, Total Derivative, Differentiation of an implicit function, chain rule, Change of variables,Jacobian, Taylor's and McLaurin'sseries. Maxima and minima of a function of two and three variables: Lagrange's method of multipliers.

Unit-C

Formation of ordinary differential equations, solution of first order differential equations by separation of variables, Homogeneous equations, Reduce to Homogenous, exact differential equations, equations reducible to exact form by integrating factors, equations of the first order and higher degree, clairaut's equation.

Unit-D

Solution of differential equations with constant coefficients: method of differential operators. Non – homogeneous equations of second order with constant coefficients: Solution by method of variation of parameters, Simultaneously Linear differential equation.

References:

1. Grewal, B.S. *Higher Engineering Mathematics*. New Delhi: Khanna Publication, 2009.
2. Kreyszig, Erwin. *Advanced Engineering Mathematics*. New Delhi: Wiley Eastern Ltd., Latest Edition.
3. Jain, R K, and K Iyengar S R. *Advanced Engineering Mathematics*, New Delhi: Narosa Publishing House, Latest Edition.
4. Thomas, George B. and Finney Ross L. *Calculus and Analytic Geometry*. New Delhi Addison Wesley, Latest Edition.

DAV UNIVERSITY, JALANDHAR

Course Title: Chemistry

Course Code: CHE151A

L	T	P	Credits
4	0	0	4

Course Objectives:

The objective of the Engineering Chemistry is to acquaint the student with the basic phenomenon/concepts of chemistry for the development of the right attitudes by the engineering students to cope up with the continuous flow of new technology. The student will able to understand the new developments and breakthroughs efficiently in engineering and technology.

Expected Prospective:

This course will equip students with the necessary chemical knowledge concerning the fundamentals as well as new technology in the field of chemistry.

Unit- A

Spectroscopy and its Applications

General Introduction: Introduction, electromagnetic spectrum, absorption and emission spectrum, atomic and molecular spectroscopy, types of molecular spectra, experimental techniques, selection rules, width and intensities of spectral lines.

UV/Visible Spectroscopy: types of electronic Transitions, Chromophores, Auxochromes, Effect of conjugation on Chromophores, Factors affecting λmax and intensity of spectral lines, effect of solvent on λ max, isobestic point, applications.

IR Spectroscopy: Infrared region, fundamental modes of vibrations and types, theory of infrared spectra, vibrational frequency and energy levels, an harmonic oscillator, modes of vibrations of polyatomic molecules, characteristic signals of IR spectrum, finger print region, factors affecting vibrational frequency; applications.

NMR Spectroscopy: Principle and instrumentation, relaxation processes, proton magnetic resonance spectroscopy, number of signals, Chemical shift, Spin-Spin Splitting, coupling constant, applications.

Unit- B

Water and its treatment

Introduction, hardness of water, degree of hardness, units of hardness, boiler feed water: specification, scales and sludge formation; priming& foaming, boiler corrosion, caustic

embrittlement, treatment of boiler feed water, internal treatment of water; softening of water by lime-soda, zeolite and ion exchange methods, desalination of water; Water for domestic use: purification of water for domestic use.

Corrosion and its Prevention

Introduction; different types of corrosion - wet and dry corrosion; mechanism of wet corrosion; comparison of dry and wet corrosion, Types of electrochemical corrosion: galvanic corrosion, concentration cell corrosion or differential aeration corrosion, waterline corrosion, pitting corrosion, crevice corrosion, stress corrosion, intergranular corrosion; other forms of corrosion: atmospheric corrosion, soil corrosion, microbiological corrosion, erosion corrosion, Filliform corrosion, stray current corrosion, passivity, galvanic series, factors influencing corrosion, various methods of corrosion control.

Unit-C

Chemistry in Nanoscience and Technology

Introduction, Materials self-assembly, molecular vs. material self-assembly, hierarchical assembly, self-assembling materials, two dimensional assemblies, mesoscale self-assembly, coercing colloids, nanocrystals, supramolecular structures, nanoscale materials, future perspectives applications, nanocomposites and its applications.

Unit-D

Polymers and polymerization

Introduction, monomer and repeating unit, degree of polymerization, functionality, classification of polymers: based on origin, monomers, structure, method of synthesis, tacticity or configuration, action of heat, chemical composition, ultimate form; types of polymerization, specific features of polymers, regularity and irregularity, tacticity of polymers, average molecular weights and size, determination of molecular weight by number average methods, effect of molecular weight on the properties of polymers, introduction to polymer reinforced composites.

References:

1. William Kemp, *Organic Spectroscopy*, Palgrave Foundations, Latest Edition.

2. D. A. Skoog, F. J. Holler and A. N. Timothy, *Principle of Instrumental Analysis*, 5th Edition., Saunders College Publishing, Philadelphia, Latest Edition.

3. C. P. Poole, Jr., F. J. Owens, *Introduction to Nanotechnology*, WileyInterscience, Latest Edition.

4. L.E. Foster, Nanotechnology, *Science Innovation & Opportunity*, Pearson Education, Latest Edition.

5. P. Ghosh, *Polymer Science and technology*(2nd Edition), Tata McGraw Hill, 2008.

6. Wiley *Engineering Chemistry*, Second Edition, 2013.

DAV UNIVERSITY, JALANDHAR

Course Title: Computer Fundamentals and Programming
Course Code: CSE101A

L	T	P	Credits
4	0	0	4

Course Objective: To get basic knowledge of computers (hardware and software), its components and Operating systems. To acquire programming skills in C, basic knowledge of Internet

Unit-A

Introduction to Computers

Define a Computer System, Block diagram of a Computer System and its working, memories, Volatile and non-volatile memory, cache, virtual, secondary storage devices-Magnetic Tape, Hard Disk, CD-DVD, Magnetic Disk, Various input devices including keyboard, Mouse, Joystick, Scanners and Various output devices including Monitors, Printers, Plotters

Operating Systems

Computer Software and its types and Hardware, Operating Systems, their types and functions

Unit-B

Working Knowledge of Computer System

Introduction to word processors and its features, creating, editing, printing and saving documents, spell check, mail merge, creating power point presentations, creating spreadsheets and simple graphs.

Fundamentals of Internet Technology

Local area networks, MAN and wide area network, Internet, WWW, E-mail, Browsing and Search engines, Internet Connectivity, Network Topology, Hub, Switches, Router, Gateway.

Unit-C

Basic Constructs of C

Keywords, Identifiers, Variables, Data Types and their storage, Arithmetic Operators, Relational Operators, Logical Operators, Bitwise Operators, Increment & Decrement Operators, Expressions, Conditional Expressions, Assignment Operators and Expressions, External Variables and Scope of Variables, Structure of C Program.

Control Structures

Decision making statements: if, nested if, if – else ladder, switch, Loops and iteration: while loop, for loop, do – while loop, break statement, continue statement, goto statement.

Unit-D

Functions

Advantages of functions, function prototype, declaring and defining functions, return statement, call by value and call by reference, recursion, and storage classes.

Arrays and Strings

Declaration of arrays, initialization of array, accessing elements of array, I/O of arrays, passing arrays as arguments to a function, strings, I / O of strings, string manipulation functions (strlen, strcat, strcpy, strcmp)

References:

1. V.K. Jain, *Fundamentals of Information Technology and Computer Programming*, PHI. Latest Edition.
2. Anita Goel, *Computers Fundamentals*, Pearson Publications
3. Brian Kernighan and Dennis M. Ritchie, *The C Programming Language*, Prentice Hall, 2nd Edition 2007.
4. K.N.King, *C Programming : A Modern Approach*, W.W. Norton Company 2nd edition (2008).
5. Herbert Schildt , *C: The Complete Reference*, Tata Mcgraw Hill Publications 4th edition.
6. Gottfired, *Programming in ANSI C, Schaum Series*, TMH publications, 2nd Edition (Latest Edition).

DAV UNIVERSITY, JALANDHAR

Course Title: Environmental Studies

Paper Code: EVS100

L	T	P	Credits
4	0	0	4

Course Objective: This course aims at understanding the students in aspects of environmental problems, its potential impacts on global ecosystem and its inhabitants, solutions for these problems as well as environmental ethics which they should adopt to attain sustainable development.

Unit- A

The multidisciplinary nature of environmental studies

Definition, scope and importance, Need for public awareness

Natural Resources: Renewable and non-renewable resources:

Natural resources and associated problems

(a) **Forest resources:** Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

(b) **Water resources:** Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) **Mineral resources:** Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) **Food resources:** World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) **Energy resources:** Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

(f) **Land resources:** Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Ecosystem:

- Concept of an ecosystem

- Structure and function of an ecosystem
- Producers, consumers and decomposers
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids
- Introduction, types, characteristic features, structure and function of the following ecosystem:

a) Forest ecosystem

b) Grassland ecosystem

c) Desert ecosystem

d) Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Unit -B

Biodiversity and its conservation

- Introduction – Definition: Genetic, Species and Ecosystem Diversity
- Bio-geographical classification of India
- Value of biodiversity: Consumptive use, Productive use, Social, Ethical, Aesthetic and Option values
- Biodiversity at global, national and local levels
- India as a mega-diversity nation
- Hot-spots of biodiversity
- Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity, global and national efforts.

Environmental Pollution

- Definition, causes, effects and control measures of:

a) Air pollution

b) Water pollution

c) Soil pollution

d) Marine pollution

e) Noise pollution

f) Thermal pollution

g. Nuclear pollution

- Solid waste management: Causes, effects and control measures of urban and industrial wastes.

- Role of an individual in prevention of pollution

- Pollution case studies

- Disaster management: floods, earthquake, cyclone and landslides

Unit- C

Social Issues and the Environment

- Population growth, variation among nations, Population explosion – Family Welfare Programmes.

- Environment and human health,

- From unsustainable to sustainable development

- Urban problems and related to energy

- Water conservation, rain water harvesting, watershed management

- Resettlement and rehabilitation of people; its problems and concerns. Case studies.

- Environmental ethics: Issues and possible solutions

- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.

- Wasteland reclamation

- Consumerism and waste products

- Environmental Laws: The Environment Protection Act, 1986; The Air (Prevention and Control of Pollution) Act, 1981; The Water (Prevention and control of Pollution) Act 1974; The Wildlife Protection Act, 1972; Forest Conservation Act, 1980.

- Issues involved in enforcement of environmental legislation

- Public Awareness

Unit- D

Human Population and Environment

- Population Growth and Variations among Nations
- Population Explosion
- Human Rights
- Value Education
- HIV / AIDS
- Women and Child Welfare
- Role of Information Technology in Environment and Human Health
- Case Studies

Field Work

- Visit to a local area to document environmental assets river/ forest/ grassland/hill/mountain
- Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds
- Study of simple ecosystems-Pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

References:

1. Odum, EP. *Basic Ecology*. Japan: Halt Saundurs, Latest Edition.
2. Botkin, DB, and Kodler EA. *Environmental Studies: The Earth as a living planet.* New York: John Wiley and Sons Inc., Latest Edition.
3. Singh, JS, Singh, SP, and Gupta SR. Ecology, *Environment and Resource Conservation.* New Delhi: Anamaya Publishers, 2006.
4. De, AK. *Environmental Chemistry*. New Delhi: Wiley Eastern Ltd., Latest Edition.
5. Sharma, PD. *Ecology and Environment*. Meerut Rastogi Publications, Latest Edition

DAV UNIVERSITY, JALANDHAR

Course Title: Engineering Drawing

Course Code: MEC101A

L	T	P	Credits
2	0	4	4

Course Objectives: Students will be able to use the techniques to interpret the drawings and to use it in the field work of engineering. They will learn various lines, planes, solids and their sectioning and to develop their lateral surfaces. Concepts of orthographic and isometric projections

Unit-A

Drawing Techniques

Introduction to drawing instruments, various types of lines and their convention, principles of dimensioning, Engineering symbols, Gothic lettering in single stroke as per SP-46 code (Vertical and inclined)

Scales

Concept of scaling, construction of plane and diagonal scales

Unit-B

Projection of Points

Concept of plane of projections (Principle planes), First and third angle projections; projection of points in all four quadrants, shortest distance problems

Projection of Lines and Planes

Projection of line parallel to both planes, perpendicular to one plane, inclined to one and both the reference planes and their traces. Plane perpendicular to one plane inclined to one and both the reference planes and their traces. Concept of profile plane and auxiliary planes, To find the true length, α, β, θ and Φ.

Unit-C

Projection of Solids

Right and oblique solids; solids of revolution and polyhedrons, projection of solid with axis perpendicular to one plane and parallel to one or both reference planes. Projection of solid with axis inclined to one or both reference planes.

Sectioning of Solids

Theory of sectioning, types of section planes, their practice on projection of solids, Sectioning by auxiliary planes,to find true section of truncated solids.

Unit-D

Development of Surfaces

Method of Development, Development of surfaces: Parallel line and Radial line method. Development of oblique solids, Development of curved surfaces.

Orthographic and Isometric Views

Draw orthographic views from isometric view or vice-a-versa, Missing line and missing view

References:

1. Jolhe, A.J., *Engineering Drawing*, Tata McGraw-Hill, New Delhi.
2. Gill, P.S., *Engineering Drawing,* S.K. Kataria and Sons, Ludhiana
3. French T.E. and Vierck, C.J., *Graphic Science*, McGraw-Hill, New York
4. Zozzora F., *Engineering Drawing,* McGraw Hill, New York

DAV UNIVERSITY, JALANDHAR

Course Title: Basic Communication Skills

Course Code: ENG151A

L	T	P	Credits
3	0	0	3

Course Objective:

- To enhance students' vocabulary and comprehensive skills through prescribed texts.
- To hone students' writing skills.

Learning Outcomes: Students will be able to improve their writing skills as well as will enrich their word power.

Unit – A

Applied Grammar (Socio-Cultural Context)

1. Parts of Speech: Noun, Pronoun, Adjective, Verb, Adverb, Preposition, Conjunction, Interjection
2. Tenses (Rules and Usages in Socio-cultural contexts)
3. Modals: Can, Could, May, Might, Will, Would, Shall, Should, Must, Ought to
4. Passive/Active
5. Reported/Reporting Speech

Unit – B

Reading (Communicative Approach to be followed)

1. J M Synge: Riders to the Sea   (One Act Play)
2. Anton Chekhov : Joy   (Short Story)
3. Swami Vivekanand : The Secret of Work (Prose)

Unit – C

Writing

1. Essay Writing and Letter Writing
2. Report Writing
3. Group Discussion & Facing an Interview

References:

a. Books

1. Kumar, Sanjay and PushpLata. *Communication Skills*. India: OUP, 2012. Print.
2. Vandana, R. Singh. *The Written Word* by. New Delhi: Oxford University Press, 2008. Print.

b. Websites

1. www.youtube.com (to download videos for panel discussions). Web.
2. www.letterwritingguide.com. Web.
3. www.teach-nology.com.Web.
4. www.englishforeveryone.org.Web.
5. www.dailywritingtips.com.Web.
6. www.englishwsheets.com.Web.
7. www.mindtools.com.Web.

DAV UNIVERSITY, JALANDHAR

Course Title: Chemistry Lab

Course Code: CHE152

L	T	P	Credits
0	0	2	1

Course Objectives:

This course is intended to learn the basic concepts of Engineering Chemistry Laboratory. The present syllabus has been framed as per the recent research trends in the subject. The various experiments have been designed to enhance laboratory skills of the undergraduate students.

Expected Prospective:

The students will be able to understand the basic objective of experiments in Engineering chemistry, properly carry out the experiments, and appropriately record and analyze the results through effective writing and oral communication skills. They will know and follow the proper procedures and regulations for safe handling and use of chemicals.

List of Practicals:

1. Verify Lambert Beer's law using spectrophotometer and $CoCl_2$ or $K_2Cr_2O_7$ solution.
2. Determine the strength of HCl solution by titrating against NaOHsolutionconductometerically.
3. Determination of the strength of HCl solution by titrating against NaOH using pH meter.
4. Determination of total hardness of water (tap) using standard EDTA solution and Eriochrome black T indicator.
5. Determination of alkalinity of water.
6. Determination of surface tension of given liquid by using Stalagmometer.
7. Determination of residual chlorine in a water sample.
8. Determination of Flash & Fire point of given a given lubricating oil by Pensky-Marten's apparatus.
9. Determination of the viscosity of given lubricating oil by using Redwood Viscometer.
10. Preparation of a polymer phenol/urea formaldehyde resin.
11. Determination of moisture, volatile matter and ash content in a given sample of coal by proximate analysis.
12. Determination of dissolved oxygen present in given sample of water.

References:

1. Levitt, B.P. Findlay's Practical Physical Chemistry, 9th edition, Longman Group Ltd., Latest Edition.
2. Yadav, J.B. Advanced Practical Physical Chemistry.
3. Vogel, A. I. A textbook of Quantitative Inorganic Analysis, Longman Gp. Ltd, 4th edition, Latest Edition.

DAV UNIVERSITY, JALANDHAR

Course Title: Computer Fundamentals and Programming Lab

Course Code: CSE103

L	T	P	Credits
0	0	2	1

Instruction for Students: The students will be attending a laboratory session of 2 hours weekly and they have to perform the practical related to the following list.

1. Practical know-how of various internal and external Hardware components of a computer (including basic working of peripheral devices).
2. Introduction to Operating Systems; installing Windows; basics of windows.
3. Working knowledge of Internet.
4. Introduction to word processor and mail merge.
5. Introduction to MS-Excel.
6. Working on MS-PowerPoint.
7. Introduction to basic structure of C program, utility of header and library files.
8. Implementation of program related to the basic constructs in C
9. Programs using different data types in C
10. Programs using Loops and Conditional Statements in C
11. Programs using functions by passing values using call by value method.
12. Programs using functions by passing values using call by reference method.
13. Programs using arrays single dimension in C.
14. Program to implement array using pointers
15. Programs related to string handling in C

DAV UNIVERSITY, JALANDHAR

Course Title: Basic Communication Skills Lab

Course Code: ENG152

L	T	P	Credits
0	0	2	1

Course Objective:

- To improve fluency in speaking English.

- To promote interactive skills through Group Discussions and role plays.

Learning Outcome: Students will get exposure to speaking through the above mentioned interactive exercises. In addition, they will develop a technical understanding of language learning software, which will further improve their communicative skills.

Unit – A Speaking/Listening

1. Movie-Clippings   (10 Hrs)
2. Role Plays   (10 Hrs)
3. Group Discussions   (10 Hrs)

References:

1. Gangal, J. K. *A Practical Course in Spoken English.* India: Phi Private Limited, 2012. Print.

2. Kumar, Sanjay and PushpLata. *Communication Skills*. India: OUP, 2012. Print.

Websites

1. www.youtube.com (to download videos for panel discussions).Web.

2. www.englishforeveryone.org.Web.

3. www.talkenglish.com.Web.

4. www.mindtools.com.Web.

DAV UNIVERSITY, JALANDHAR

Course Title: Engineering Mathematics-II
Course Code: MTH152A

L	T	P	Credits
3	1	0	4

Objective:

The objective of the course is to equip the students with the knowledge of concepts of vectors and geometry and their applications. A flavour of pure mathematics is also given to the readers.

Unit-A

Functions of Complex Variables: Complex Numbers and elementary functions of complex variable De-Moivre's theorem and its applications. Real and imaginary parts of exponential, logarithmic, circular, inverse circular, hyperbolic, inverse hyperbolic functions of complex variables. Summation of trigonometric series. (C+iS method).

Unit-B

Integral Calculus: Rectification of standard curves; Areas bounded by standard curves; Volumes and surfaces of revolution of curves;

Multiple Integrals: Double and triple integral and their evaluation, change of order of integration, change of variable, Application of double and triple integration to find areas and volumes. Centre of gravity and Moment of inertia

Unit-C

Vector Calculus: Scalar and vector fields, differentiation of vectors, velocity and acceleration.

Vector differential operators: Del, Gradient, Divergence and Curl, their physical interpretations. Line, surface and volume integrals.

Application of Vector Calculus: Flux, Solenoidal and Irrotational vectors. Gauss Divergence theorem. Green's theorem in plane, Stoke's theorem (without proofs) and their applications

Unit-D

Infinite Series: Convergence and divergence of series, Tests of convergence (without proofs): Comparison test, Integral test, Ratio test, Raabe's test, Logarithmic test, Cauchy's root test and Gauss test. Convergence and absolute convergence of alternating series, Uniform Convergence and Power Series

References:

1. Grewal, B.S., *Higher Engineering Mathematics.* New Delhi: Khanna Publication, 2009

2. Kreyszig, Erwin, *Advanced Engineering Mathematics.* New Delhi: Wiley Eastern Ltd., Latest Edition.

3. Jain, R K, and K Iyengar S R., *Advanced Engineering Mathematics*, New Delhi: Narosa Publishing House, Latest Edition.

4. Thomas, George B. and Finney Ross L., *Calculus and Analytic Geometry*. New Delhi Addison Wesley, Latest Edition**.**

DAV UNIVERSITY, JALANDHAR

Course Title: Engineering Physics

Course Code: PHY151A

Total Lecture: 60

L	T	P	Credits
4	0	0	4

Course Objective: The aim of this course on physics is to make the student of engineering understand the basic concepts of physics which will form the basis of certain concept in their respective fields.

Unit-A

PHYSICAL OPTICS:

Interference: Division of wave front, Fresnel's biprism, division of amplitude, Newton's rings and applications.

Diffraction:

Difference between Fraunhofer and Fresnel diffraction, Fraunhofer diffraction through a slit, plane transmission diffraction grating, its dispersive and resolving power.

Polarization: Polarised and unpolarised light, double refraction, Nicol prism, quarter and half wave plates.

Unit-B

LASER: Spontaneous and stimulated emission, Laser action, Characteristics of laser beam, concept of coherence, HeNe laser, Semiconductor lasers and applications

FIBRE OPTICS: Propagation of light in fibres, numerical aperture, single mode and multimode fibres, applications

Unit-C

DIELECTRICS:

Molecular Theory, polarization, displacement, susceptibility, dielectric coefficient, permittivity, relations between electric vectors, Gauss's law in the presence of a dielectric, energy stored in an electric field, Behaviour of dielectric in alternating field and ClausiusMossotti equation.

Unit-D

QUANTUM MECHANICS:

Difficulties with Classical physics, Introduction to quantum mechanics simple concepts, Black Body radiation, Planck's Law of radiation and its limitations, Group velocity and phase velocity, Schrodinger's wave equations and their applications.

SUPER CONDUCTIVITY:

Introduction (experimental survey), Meissner effect, Type I and type II superconductors, London equation, Elements of BCS theory, Applications of superconductors.

References:

1. Sear, F.W. *Electricity and Magnetism.* London: Addison-Wesley, Latest Edition.
2. Resnick and Halliday. *Physics.*New York: Wiley, Latest Edition.
3. Lal,B. and Subramanyam, N.*A Text Book of Optics.* New Delhi: S. Chand and Company Limited, Latest Edition.
4. Jenkins, and White. *Fundamental of Physical Optics*. New York: Tata McGraw-Hill, Latest Edition.
5. Griffiths,D*. Introduction to Electrodynamics,* New Delhi: Prentice Hall, Latest Edition.
6. Beiser, A. *Perspective of Modern Physics.* New Delhi: McGraw Hill Ltd., Latest Edition.

DAV UNIVERSITY, JALANDHAR

Course Title: **Mechanical Engineering Fundamentals**

Course Code: MEC103

L	T	P	Credits
4	0	0	4

Course Objectives:

To impart the basic knowledge of thermodynamic principles, design principles, power transmission devices, power producing and power absorbing devices.

Unit-A

Fundamental Concepts of Thermodynamics

Introduction, Thermodynamic System and its types, Boundary and its types, Surroundings, Thermodynamic properties, State, Path, process and cycles, Thermodynamic Equilibrium, Working Substance, Microscopic and Macroscopic Analysis, Units and Dimensions, Quasi Static Process, Reversible and Irreversible processes, Point Function and Path Function, Mechanical and Thermodynamic work, P-dv Work (Displacement Work), Work is a Path Function, Equations for work done in various processes

Laws of Thermodynamics

Zeroth law of Thermodynamics, Temperature, Thermometry (Measurement of temperature), Temperature Scales, Energy, Potential and Kinetic Energies at Micro and Macro Level, Internal Energy, Law of conservation of energy, Joule's Experiment, First law of thermodynamics (Open and Closed System), Energy – A property of system, Enthalpy, Entropy, Heat, Heat vs Temperature, specific heat, Heat Capacity, Specific heat at constant volume, Specific heat at constant pressure, Adiabatic Index, Limitations of first law of thermodynamics

Unit-B

Pressure

Pressure Concept and Definition, Pressure conversion Table, Atmospheric pressure, Standard Atmospheric Pressure, Gauge Pressure, Vacuum Pressure, Absolute pressure, Properties of fluid, Pressure head of a Liquid, Pascal's Law, Pressure measurement: Mechanical Gauges and Manometers, Mechanical Gauges: (Bourdon tube pressure gauge, Diaphragm pressure gauge, Dead weight), Manometers: (Principle/Advantage/Limitation/ Classification), Piezometer, Single U tube manometer (Numerical for Vacuum and Gauge pressure), [Simple problems on above topics]

DAV UNIVERSITY, JALANDHAR

Heat Transfer

Introduction, Heat Transfer vs Thermodynamics, Applications, Thermal Conductivity, Thermal Resistance, Modes of heat transfer, Spectrum of electromagnetic radiation, Surface emission properties, Absorptivity, Reflectivity and Transmissivity, Fourier law, Newton's law of cooling, Stefan Boltzmann's Law, Heat Exchangers (Applications, Selection, Classification), Thermal Insulation (Properties of insulation, Types of Insulations, Thermal Insulating Materials)

Power Absorbing Devices

Power Absorbing Devices, Difference between Hydraulic pump, Air compressor, Fan, Blower, Pump (Function, Selection, Applications), Classification of Pump, Positive displacement and Dynamic Pumps, Reciprocating Pumps and its types, Rotary Pumps and its types, Centrifugal Pump, Axial Pump

Unit-C

Power Producing Devices Boiler

States of matter, Changing State of Matter, Sublimation, Effect of temperature during change of Phase, Steam boiler, Application, Classification of boilers, Types of boilers (Brief Description), Essentials of a good boiler, Advantages of superheating the steam, Comparison between Water tube and Fire tube boilers, Function of boiler Mountings and Accessories

Turbines

Turbine, Classification based on working fluid, Classification of hydraulic turbines, Selection of hydraulic turbines, Impulse Turbines (Pelton Wheel/ Turgo/ Cross Flow), Reaction Turbines (Francis/ Kaplan/ Propeller)

Internal Combustion Engines

Heat Engine, Types of Heat Engine, Advantages, Disadvantages and Applications, Classification of IC Engine, Engine Components (Location, Function and Material), Basic Terminology used in IC engine, Four stroke Cycle Engines (SI and CI), Two stroke Cycle Engines (SI and CI)

Unit-D

Principles of Design

Need of design, Product Life Cycle, Material properties and selection, Factors affecting material selection, Stress and Strain and its types, Hooke's law, Modulus of Elasticity, Longitudinal and

Lateral Strain, Poisson's ratio, Stress- Strain Curve for ductile material and brittle material, Factor of Safety, Centre of Gravity, Centroid, Centroid of areas of plain, Figures (Without Derivation), Centroid of areas of composite sections (Without Derivation), Moment of Inertia, Radius of gyration, Theorem of perpendicular axis, Theorem of parallel axis, MI of L, I and T sections, [Simple problems on above topics]

Power Transmission Devices and Machine Elements

Individual and group drive system (advantages and Disadvantages), Belt drive (Types: V and Flat Belts and their Applications, Advantages and Disadvantages), Ropes drive (Types: Fiber and Wire Ropes and their Applications, Advantages and Disadvantages), Chain drive (Applications, advantages and Disadvantages, Sprockets), Gear drive (Types of Gears), Power transmission shafts, Types of shafts, Application of shafts, Axle, Keys (Function, Classification), Coupling (Function, Classification: Rigid and Flexible), Flanged coupling, Oldham's coupling, Universal coupling, Bearings and their types, Flywheel construction and types

References:

1. Rajan T.S. *Basic Mechanical Engineering*, New Delhi: New Age Publishers.
2. Singh Sadhu *Principles of Mechanical Engineering*, New Delhi: S Chand Publishers.
3. Shankar V.P., *Basic Mechanical Engineering*, New Delhi: Laxmi Publishers.
4. Phthak G. K., *Basic Mechanical Engineering*, New Delhi: Rajsons Publications.
5. Kumar Parveen, *Basic Mechanical Engineering*, New Delhi: Pearson Education

DAV UNIVERSITY, JALANDHAR

Course Title: Electrical and Electronics Technology

Course Code: ELE101

L	T	P	Credits
4	0	0	4

Unit-A

D.C Circuit Analysis:

Voltage source, current source, dependent and independent sources, analysis of D.C circuit by KCL and KVL , Nodal and Mesh analysis, The venin theorem , Norton theorem, superposition theorem, Maximum Power Transfer Theorem

Unit-B

A.C Circuit Analysis:

Review of single phase A.C. circuit under sinusoidal steady state, solution of R.L.C. Series circuit, the j operator, complex representation of impedance, solution of series and parallel circuit, series and parallel resonance, 3 phase A.C. Circuit, star and delta connections, line and phase quantities solution of 3 phase circuits, balance supply voltage and balanced supply voltage and balance load, phasor diagram, measurement of power and power factor by two wattmeter method.

Unit-C

Magnetic Circuit:

Review of laws of electromagnetism, Flux, MMF and their relation. Comparison of   electrical and magnetic circuit, B-H Curve, saturation leakage and fringing.Analysis of series and parallel magnetic circuit, AC Excitation in magnetic circuits, Hysteresis and eddy currents.

Transformers:

Single phase transformer, basic concepts constructional detail, type, voltage current and impedance Transformation, phasor diagram, equivalent circuit, voltage regulation, oc/sc test, losses and efficiency concept of All day efficiency , autotransformer.

Unit-D

Rotating Electrical Machines:

Basic concepts, working principle and general construction of DC machines (motor/generators), torque and EMF expression

DAV UNIVERSITY, JALANDHAR

Basic Electronics:

P-Type and N-Type semiconductor, concept of diode, transistor and their application, introduction to OPAMP, application of op amp as a subtractor , summer, differentiator, integrator, logic gates AND ,OR, NOT, NOR, NAND etc.

References:

1. M.S. Sukhija, T.K. Nagsarkar, *Basic Electrical and Electronics Engineering*, Oxford University Press, 2012.
2. Ashfaq Husain, HarsoonAshfaq, *Fundamentals of Electrical Engineering*, 4th Edition, Dhanpat Rai and Co., 2013
3. V.N. Mittle, *Basic Electrical Engineering*, 2nd Edition, Tata McGraw Hill Publication.
4. B.L. Theraja, A.K. Theraja, *A Text Book of Electrical Technology*, Volume-1, S. Chand Publication
5. Debashisha Jena, *Basic Electrical Engineering*, 1st edition, Wiley India Publication, 2012.
6. B.L. Theraja, R.S. Sedha, *Principles of Electric Devices and Circuits*, S. Chand Publication, 1st edition, 2006

Course Title: Human Values and General Studies

Course Code: SGS107

Course Objectives

L	T	P	Credits
4	0	0	4

a) To sensitize students about the role and importance of human values and ethics in personal, social and professional life.

b) To enable students to understand and appreciate ethical concerns relevant to modern lives.

c) To prepare a foundation for appearing in various competitive examinations

d) To sensitize the students about the current issues and events of national and international importance

e) To provide opportunity to the students to study inter disciplinary subjects like Geography, Science, Economy, Polity, History, International Relations etc.

Unit-A

Human Values

1. **Concept of Human Values:** Meaning, Types and Importance of Values.

2. **Value Education :** Basic guidelines for value education

3. **Value crisis and its redressal**

Being Good and Responsible

1. Self Exploration and Self Evaluation

2. Acquiring Core Values for Self Development

3. Living in Harmony with Self, Family and Society

4. Values enshrined in the Constitution: Liberty, Equality

5. Fraternity and Fundamental Duties.

Unit-B

Value – based living

1. Vedic values of life

2. *Karma Yoga* and *Jnana Yoga*

3. *AshtaMarga* and *Tri-Ratna*

Ethical Living:

1.   Personal Ethics
2.   Professional Ethics
3.   Ethics in Education

Unit-C

General Geography

World Geography

The Universe, The Solar System, The Earth, Atmosphere, The World we live in, Countries rich in Minerals, Wonders of the World, Biggest and Smallest.

Indian Geography

Location, Area and Dimensions, Physical Presence, Indian States and Union Territories, Important sites and Monuments, Largest-Longest and Highest in India.

General History

Glimpses of India History, Ancient Indian, Medieval India, Modern India, Various Phases of Indian National Movement, Prominent Personalities, Glimpses of Punjab history with special reference to period of Sikh Gurus

Glimpses of World History

Important Events of World History, Revolutions and Wars of Independence, Political Philosophies like Nazism, Fascism, Communism, Capitalism, Liberalism etc.

Indian Polity: Constitution of India

Important Provisions, Basic Structure, Union Government, Union Legislature and Executive, State Government: State Legislature and Executive, Indian Judiciary, The Election Commission, Panachayati Raj System, RTI etc.

General Economy

The process of liberalization, privatization, globalization and Major World Issues, Indian Economy, Indian Financial System, Major Economic Issues, Economic Terminology.

Unit-D

General Science

General appreciation and understandings of science including the matters of everyday observation and experience, Inventions and Discoveries

Sports and Recreation

The World of Sports and recreation, Who's Who is sports, Major Events, Awards and Honours. Famous personalities, Festivals, Arts and Artists

Current Affairs

National and International Issues and Events in News, Governments Schemes and Policy Decisions

Miscellaneous Information

Who is who

Books and Authors, Persons in News, Awards and Honours, Abbreviations and Sports

References:

1. Human Values, A N Tripathi, New Age International Publishers, New Delhi, Third Edition, 2009

2. Professional Ethics, R. Surbiramanian, Oxford University Press, New Delhi, 2013.

3. Human Values and Professional Ethics, RishabhAnand, SatyaPrakashan, New Delhi, 2012

4. Human Values and Professional Ethics, Sanjeev Bhalla, SatyaPrakashan, New Delhi, 2012.

5. Human Values and Professional Ethics, RituSoryan Dhanpat Rai & Co. Pvt. Ltd., First Edition, 2010.

6. Human Values and Professional Ethics by Suresh Jayshree, Raghavan B S, S Chand & Co. Ltd. , 2007.

7. Human Values and Professional Ethics, Yogendra Singh, AnkurGarg, Aitbs publishers, 2011.

8. Human Values and Professional Ethics, Vrinder Kumar, Kalyani Publishers, Ludhiana, 2013.

9. Human Values and Professional Ethics, R R Gaur, R. Sangal, GP Bagaria, Excel Books, New Delhi 2010.

10. Values and Ethics, Dr.BramwellOsula, Dr.SarojUpadhyay, Asian Books Pvt. Ltd., 2011.

11. Indian Philosophy, S. Radhakrishnan, George Allen &Unwin Ltd., New York: Humanities Press INC, Latest Edition.

12. Essentials of Hinduism, Jainism and Buddhism, A N Dwivedi, Books Today, New Delhi – Latest Edition

13. Dayanand : His life and work, SurajBhan, DAVCMC, New Delhi – 2001.

14. Esence of Vedas, KapilDevDwivedi, Katyayan Vedic SahityaPrakashan, Hoshiarpur, 1990.

15. Vedic Concepts, Prof. B BChaubey, Katyayan Vedic SahityaPrakashan, Hoshiarpur, 1990.

16. Advance Objective General Knowledge, R. S. Aggarwal, S. Chand Publisher (2013)

17. Concise General Knowledge Manual 2013, S. Sen, Unique Publishers,2013

18. Encyclopedia of General Knowledge and General Awareness by R P Verma, Penguin Books Ltd (2010)

19. General Knowledge Manual 2013-14, Edgar Thorpe and Showick Thorpe, The Pearson, Delhi.

20. General Knowledge Manual 2013-14, MuktikantaMohanty, Macmillan Publishers India Ltd., Delhi.

21. India 2013, Government of India (Ministry of Information Broadcasting), Publication Division, 2013.

22. Manorama Year Book 2013-14, MammenMethew, Malayalam Manorama Publishers, Kottayam, 2013.

23. Spectrum's Handbook of General Studies – 2013-14, Spectrum Books (P) Ltd., New Delhi

CURRENT AFFAIRS

Magazines

Economic and Political Weekly, Yojna, the Week, India Today, Frontline, Spectrum.

Competition Success Review, Competition Master, Civil Services Chronicle, Current Affairs, World Atlas Book

Newspapers

The Hindu, Times of India, The Hindustan Times, The Tribune

DAV UNIVERSITY, JALANDHAR

Course Title: **Manufacturing Practice**

Course Code: MEC104

L	T	P	Credits
0	0	4	2

Course Objective:

1. Know basic workshop processes, Read and interpret job drawing.
2. Identify, select and use various marking, measuring, holding, striking and cutting tools & equipment's
3. Operate and control different machines and equipment's.

CARPENTRY SHOP

a) Preparation of half lap joint

b) Preparation of Mortise and Tenon Joint

c) Preparation of a Dove & Tail joint

d) To prepare a White board duster

Welding Shop:

a) Preparation of Joint by Arc Welding

b) Preparation of Joint by using Gas Welding

c) Preparation of Joint by MIG/ TIG Welding

d) Preparation of Joint by Spot/ Seam Welding

Smithy Shop

a) To Forge the L – Hook

b) To Forge a Chisel

c) To Forge a Cube from a M.S Round

d) To forge a screw driver

Fitting Shop

a) Filing a dimensioned rectangular or square piece and prepare a sq. fitting

b) Preparation of T fitting male part

c) Preparation of U fitting Female part

d) Internal thread Cutting in Square piece and external thread cutting on a rod and assembling as a paper weight

Foundry Shop:

a) To make a Mould of solid pattern

b) To prepare a mould of sleeve fitting using gating system

c) To make a Mould of Split Pattern using Cope & Drag

d) To check the Hardness of the Mould

To check the Moisture Content in the Molding Sand

To check the Compressive Strength of Molding Sand

Sheet-Metal Shop

a) Preparation of a funnel from G.I. sheet

b) Preparation of a book rack stand from G.I. Sheet

c) Preparation of a leak proof tray with inclined edges from G.I. Sheet

d) Preparation of a square pen stand from G.I. Sheet with riveting at corners

Machine Shop

a) To make a job using step turning and grooving

b) To make a job using knurling and threading

c) To make a multi operation job on a Lathe machine

d) To make V – slot by using shaper machine

Electrical Shop

a) Layout of electrical tube light wiring

b) Layout of stair case wiring using two way switch

c) Testing and rectification of simulated faults in electrical appliances such as 'Electric Iron' Ceiling Fan. Electric kettle

d) To fabricate a circuit for the electrical wiring of, Fan with regulator and Bulb through a main switch and its testing using a series lamp

References:

1. Johl K. C., *Mechanical Workshop Practice*, Prentice Hall India, 1st Edition.

2. Bawa H.S., *Workshop Technology*, Tata McGraw Hill, 7th Edition.

DAV UNIVERSITY, JALANDHAR

Course Title: Engineering Physics Lab
Course Code: PHY152

L	T	P	Credits
0	0	2	1

Objective: The laboratory exercises have been so designed that the students learn to verify some of the concepts learnt in the theory courses. They are trained in carrying out precise measurements and handling sensitive equipments.

Note:

- Students are expected to perform at least eight-ten experiments out of following list. The experiments performed in first semester cannot be repeated in second Semester.
- The examination for both the courses will be of 3 hours duration

List of Experiments:

Experimental skills: General Precautions for measurements and handling of equipment, representation of measurements, Fitting of given data to a straight line, and Error analysis, Significant figures and interpretation of results.

1. To determine the Refractive Index of the Material of a given Prism using Sodium Light.
2. To determine the Dispersive Power and resolving power of the Material of a given Prism using Mercury Light.
2. To determine wavelength of sodium light using Fresnel Biprism.
3. To determine wavelength of sodium light using Newton's Rings.
4. To determination Wavelength of Sodium Light using Michelson's Interferometer.
5. To determine the wavelength of Laser light using Diffraction of Single Slit.
6. To determine the wavelength of (1) Sodium and (2) Mercury Light using Plane Diffraction Grating.
7. To determine the (1) Wavelength and (2) Angular Spread of HeNe Laser using Plane Diffraction Grating.
8. To study the wavelength of spectral lines of sodium light using plane transmission grating.
9. To study the specific rotation of sugar solution Laurent's half shade polarimeter method
10. To study the numerical aperture and propagation losses using HeNe laser Optical fibre set up.

11. To compare the focal length of two lenses by Nodal slide method.

12. To find the unknown low resistance by Carey Foster bridge.

13. To determine the beam divergence of the HeNe laser.

14. To study the Meissner's effect in superconducting sample.

15. To study the Faraday law of electromagnetic induction.

16. To study the capacitance by flashing/quenching of Neon bulb kit

17. To compare the two unknown capacitances of two capacitors by using DeSauty's bridge.

18. To find our out the unknown inductance by using the Anderson's bridge method.

19. To study the numerical aperture and propagation losses for He-Ne laser by using the optical fibre set up for

20. To study the Planck's constant by using photoelectric cell method.

DAV UNIVERSITY, JALANDHAR

Course Title: Electrical and Electronics Technology Lab

Course Code: ELE102

L	T	P	Credits
0	0	2	1

List of Experiments

1. To verify Ohm's Law, Kirchhoff's Current Law and Kirchhoff's Voltage Law.
2. To verify Thevenin's and Norton's theorems.
3. To verify Superposition theorem.
4. To verify Maximum Power Transfer theorem.
5. To study frequency response of a series R-L-C circuit and determine resonant frequency and Q-factor for various values of R, L and C
6. To study frequency response of a parallel R-L-C circuit and determine resonant frequency and Q-factor for various values of R, L and C.
7. To perform direct load test of a transformer and plot efficiency versus load characteristics.
8. To perform open circuit and short circuit test on transformer.
9. To perform speed control of DC motor.
10. Measurement of power in a three phase system by two wattmeter method.
11. To plot the V-I characterics of PN-junction diode.
12. To verify the truth table of logic gates.

DAV UNIVERSITY, JALANDHAR

	L	T	P	Credits
Course Title: Digital Electronics	4	0	0	4
Course Code: ECE201				

Course Objectives

- Understand concepts of combinational and sequential circuits.
- Analyze the synchronous and asynchronous logic circuits.
- Understand concepts of memory, programmable logic and digital integrated circuits.
- Design Combinational and sequential systems.

Unit-A

Number System and Binary Code (15 Hours)

Introduction, Binary, Octal, Hexadecimal & some nonstandard Number :- Conversions, Addition, Subtractions, Multiplication, Division, Weighted- Non weighted codes, Signed - unsigned numbers, Binary Subtractions using 1's and 2's compliment, ASCII code, Excess 3 code, Grey code, BCD code and BCD additions & BCD Subtractions.

Unit-B

Minimization of logic function (12 Hours)

Review of gates: - OR, AND, NOT, NOR, NAND, EX-OR, EX-NOR, Universal gates.

Basic theorem of Boolean algebra, Sum of Products and Product of Sums, canonical form, Minimization using: - Boolean algebra, K-map and Q-M method.

Unit-C

Combinational Circuits (9 Hours)

Introduction, Combinational circuit design, Encoders, decoders, Adders, Sub tractors and Code converters, Parity checker, seven segment display, Magnitude comparators. Multiplexers, De-multiplexer, Implementation of Combinational circuit using MUX & De-MUX.

Sequential Circuits (8 Hours)

Introduction, flip flops, Clocked flip flops, SR, JK, D, T and edge triggered flip-flops, Conversions of Flip flops, Shift Registers, Type of Shift Registers, Ring Counter, Twisted Ring Counter, Counters, Counter types, counter design with state equation and state diagrams.

Unit-D

D/A and A/D Converters   **(5 Hours)**

Introduction, Weighted register D/A converter, binary ladder D/A converter, steady state accuracy test, monotonicity test, D/A accuracy and resolution, A/D converter:- Simultaneous, Counter type, Continuous, Successive approximation, Single and dual slope A/D converter, A/D accuracy and resolution.

Semiconductor Memories   **(4 Hours)**

Introduction, Memory organization, Classification and characteristics of memories, Sequential memories, ROMs, R/W memories, Content addressable memories, PLA and PAL.

Logic Families   **(4 Hours)**

RTL, DCTL, DTL, TTL, ECL, CMOS and its various types, Comparison of logic families.

References:

1. Morris, Mano. *Digital Design*. Prentice Hall of India Pvt. Ltd.
2. Donald P.Leach & Malvino, Albert Paul. Digital Principles and Applications. New Delhi, Tata McGraw Hill. Latest Edition. 5 ed.
3. Jain, R.P. *Modern Digital Electronics*. Tata McGraw–Hill. New Delhi, Latest Edition. 3rd ed.,
4. Floyd ,Thomas L. *Digital Fundamentals.* Pearson Education. New Delhi. Latest Edition
5. Tocci, Ronald J., Neal S. Widmer, Gregory L. & Moss, *Digital System -Principles and Applications.* Pearson Education.
6. Roth. *Fundamentals of Logic Design*. Cengage Learning.

DAV UNIVERSITY, JALANDHAR

Course Title: Electronics Devices and Circuits

Paper Code: ECE202

L	T	P	Credits
4	0	0	4

Course Objective:

The purpose of this course is to provide a basis for understanding the characteristics, operation and limitations of semiconductor devices. After successful completion of the course, students will be able:

- To understand the physical construction, working and operational characteristics of Semiconductor devices.
- To understand the operation of power supply circuits built using filters, rectifiers and voltage regulators.
- To do operating point calculations, working and design of basic amplifiers, power amplifiers and tuned amplifiers.
- To understand basic working & design of wave shaping circuits.

Unit-A

Semiconductor Diodes   **(10 Hours)**

PN junction Diode - VI characteristics, qualitative analysis of its behavior, Rectifiers-half wave and full wave, clippers, clampers, clamping circuit theorem, Voltage multipliers, Special purpose diodes - Zener diode, Tunnel diode, Varactor diode.

Unit-B

Bipolar Junction Transistor   **(10 Hours)**

Transistors-construction, operation, characteristics, parameters, Transistor as an amplifier at low frequency, Hybrid model of BJT, Analysis of amplifier using Hybrid model of BJT, Ebers-moll model, Transistor at high frequency and hybrid pi-model, Amplifier types-CE, CB, CC.

Transistor Biasing and Stabilization   **(10 Hours)**

DC operating point, DC Biasing circuits-fixed bias, emitter bias, voltage divider bias, voltage feedback, Bias stability, Stabilization against variation in ICO, VBE and β, Bias compensation.

Unit-C

Field-Effect Transistor   **(10 Hours)**

The junction FET - construction, operation, characteristics, parameters, Biasing of JFET, Small signal analysis of JFET as an amplifier, MOSFET- construction, operation, characteristics, parameters, MOSFET as an amplifier, Biasing.

Unit-D

Multistage Amplifiers   **(10 Hours)**

Amplifier frequency response-low frequency range and high frequency, Frequency response of multistage amplifiers, various coupling methods for multistage amplifiers.

Opto-Electronic Devices   **(10Hours)**

Photodiode, Phototransistor, Solar cells, LED, Lasers, Optical couplers.

References

1. Boylestad, Nashelsky. *Electronic Devices and Circuit Theory.* Pearson Education, 7th Indian Reprint (Latest Edition). 8th Ed

2. Floyd, Thomas L. *Electronic Devices.* Pearson Education Inc. Delhi. Sixth Edition,

3. Sedra, Adel S., Smith & Kenneth C. *Microelectronic Circuits.* New York. Oxford University Press. Fourth Edition.

4. Millman, Jacob & Halkias, Christos C. *Integrated Electronics.* New Delhi. Tata McGraw Hill.

5. Streetman, Ben J. Banerjee, Sanjay. *Solid State Electronic Devices.* PHI. 5th Ed.

DAV UNIVERSITY, JALANDHAR

Course Title: Circuit Theory

Paper Code: ELE201

L	T	P	Credits
4	0	0	4

Objective:

The objective of the course is to enable the students to understand the basic concepts related to Network Theorems for AC and DC Networks, Network Analysis and Synthesis, Circuit Theory and Filters and their applications.

Unit-A

Circuit Concepts and Network Theorems

Energy Sources, Independent and dependent sources, Source transformation, Kirchhoff's Laws, Nodal and Mesh analysis in electric circuits, A.C. and D.C. Network Theorems: Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum Power Transfer theorem, Millman's theorem, Reciprocity theorem, Substitution theorem, Compensation theorem, Tellegen's theorem, Numerical Problems.

Unit-B

Graph Theory

Concept of network graph, terminology used in network graph, relation between twigs and links, formation of incidence matrix, tie-set matrix, cut-set matrix, Kirchhoff's voltage law into topological form, Kirchhoff's current law into topological form, relationship between branch voltage matrix, twig voltage matrix and node voltage matrix, relation between branch current matrix and loop current matrix.

Unit-C

Two Port Network Analysis

Introduction, Network elements, classification of network, network configuration, Open Circuit Impedance Parameters, Short-Circuit admittance parameters, Hybrid Parameters, ABCD Parameters, Inter-Relationships between parameters of two port network, Expression of Input-Output impedances in terms of two port parameters, different types of interconnections of two port networks.

Time and Frequency Domain Analysis: Representation of basic circuits in terms of generalized frequency and their response, Laplace transform of shifted functions, transient and steady response, Time domain behaviors from poles and zeros, Convolution Theorem

DAV UNIVERSITY, JALANDHAR

Unit-D

Network Synthesis

Network functions, Impedance and Admittance function, Transfer functions, Hurwitz Polynomials, Positive real functions, LC Network Synthesis, Foster's Canonic Form, Relationship between transfer and impulse response, poles and zeros and restrictions, Network function for two terminal pair network, Sinusoidal network in terms of poles and zeros, Real liability condition for impedance synthesis of RL and RC circuits, Network synthesis techniques for 2-terminal network, Foster and Cauer forms, Foster and Cauer forms.

Filters: Classification of filters, characteristics impedance and propagation constant of pure reactive network, Ladder network, T-section, π-section, terminating half section, Pass bands and stop bands, Design of constant-K, m-derived filters, Composite filters.

References:

1. Chakraborty Abhijit, *Circuit Theory*, 2ndEdition, Dhanpat Rai, Latest Edition.
2. Bird John, *Electrical Circuit Theory and Technology*, Newnes. 2nd Ed.
3. Chaudhury D. Roy, *Networks and Synthesis.* New Age International.
4. Edminister J.A., *Electric Circuits*. Tata McGraw Hill. Latest Edition. 4th Edition.
5. Iyer T.S.K.V., *Circuit Theory*, Tata McGraw Hill, 2006.
6. Network Synthesis by IVS Iyer
7. Mohan, Sudhakar Sham, *Circuits and Networks Analysis and Synthesis*, 2NdEdition, Tata McGraw Hill, 2005.
8. Van Valkenberg, M.E., *Network Analysis and Synthesis*, PHI learning, 2009.

DAV UNIVERSITY, JALANDHAR

Course Title: Object Oriented Programming

Course Code: CSE201

L	T	P	Credits
4	0	0	4

Course Objective: To understand the basic concepts of object oriented programming language.

Learning Outcomes: Students will feel comfortable working with computers and will have practical knowledge about Object-Oriented programming language (C++ Language).

Unit-A

Object-Oriented Programming Concepts **(9)**

- Introduction, comparison between procedural programming paradigm and object-oriented programming paradigm
- Basic concepts of object-oriented programming — concepts of an object and a class, interface and implementation of a class, abstraction, encapsulation, data hiding, inheritance, overloading, polymorphism
- Declaring and initializing pointers, accessing data through pointers.   2 hours

Standard Input / Output **(5)**

- Concept of streams, hierarchy of console stream classes
- Input/output using overloaded operators >> and << of I/O stream classes, formatting output
- Manipulators

Unit-B

Functions and Arrays **(9)**

- Defining a function, Actual and Formal Arguments, Local and global variables
- Nested functions, recursive functions
- Array declaration, character array, multidimensional array, arrays and pointers

Classes and Objects **(7)**

- Specifying a class, creating class objects, accessing class members
- Access specifiers, static members, nested classes, local classes, abstract classes
- Constructors and Destructors, copy constructor, dynamic constructors, explicit constructors, advantages and disadvantages of constructor and destructor

Unit-C

Operator Overloading and Type Conversion **(7)**
- Overloading operators, rules for overloading operators
- Overloading of various operators
- Type conversion

Inheritance **(7)**
- Introduction, defining derived classes
- Types of inheritance, virtual base class
- Pure virtual functions, overriding member functions

Polymorphism **(7)**
- Concept of binding - early binding and late binding
- Virtual functions, abstract classes
- Virtual destructors

Unit-D

Exception Handling **(5)**
- Review of traditional error handling, basics of exception handling
- Exception handling mechanism
- Throwing mechanism, catching mechanism

Files **(4)**
- File streams, hierarchy of file stream classes
- Error handling during file operations
- Reading/writing of files, updating files

References:
1. E. Balagurusamy, *Object Oriented Programming with C++*. Tata McGraw Hill.
2. D. Ravichandran. *Programming in C++*
3. Lafore R. *Object Oriented Programming in C++.* Waite Group.
4. Herbert Schildt. *The Complete Reference to C++ Language.* McGraw Hill-Osborne.
5. Bjarne Stroustrup. *The C++ Programming Language.* Addison Wesley.

6. Lippman F. B. *C++ Primer*. Addison Wesley.

DAV UNIVERSITY, JALANDHAR

Course Title: Engineering Mathematics-III
Course Code: MTH252A

L	T	P	Credits
3	1	0	4

Objective:

The objective of the course is to enable the students to understand the basic concepts related to Laplace transforms, Fourier series, ordinary differential and partial differential equations and their applications.

Unit-A   14 HOURS

Fourier series: Periodic functions, Euler's formula. Dirichlet's conditions. Fourier series of discontinuous functions. Fourier series of Even and Odd functions, half range expansions, Fourier series of different wave forms, Complex form of Fourier series. Fourier Transformation.

Unit-B   14 HOURS

 Laplace Transforms: Laplace transforms of various standard functions, Linear property of Laplace transforms, Shifting property and change of scale, inverse Laplace transforms, transform of derivatives and integrals, Laplace transform of unit step function, impulse function, periodic functions, applications to solution of ordinary linear differential equations with constant coefficients, and simultaneous differential equations.

Unit-C   14 HOURS

Partial Differential Equations: Formulation of partial differential equations, Linear partial differential equations, homogeneous partial differential equations with constant coefficients. Wave equation and Heat conduction equation in one dimension. Two dimensional Laplace equation and their applications, solution by the method of separation of variables.

Unit-D   15 HOURS

Analytic Function: Limits, continuity and derivative of the function of complex variable, Analytic function, Cauchy-Riemann equations, conjugate functions, harmonic functions; **Complex Integration:** Line integrals in the complex plane, Cauchy's theorem, Cauchy's integral formula and derivatives of analytic function. Taylor's and Laurent's expansions

(without proofs), singular points, poles, residue, Integration of function of complex variables using the method of residues.

References:

1. Jain, R. K. & Iyengar, S. R. K. *Advanced Engineering Mathematics*. New Delhi Narosa Publishing House. Latest Edition. 2nd Ed.
2. Singh R, Ravish. & M. Bhatt *Engineering Mathematics a Tutorial Approach*, McGraw Hill.
3. Grewal, B.S *Higher. Engineering Mathematics*. Khanna Publication.40th Edition.
4. Erwin, Kreyszig. *Advanced Engineering Mathematic.* Wiley Eastern Limited. 2006. 8th edition.
5. Zill , Dennis G. & Patrick D. Shanahan. *A first course in complex analysis with applications, Jones and Bartlett Learning*, Latest Edition.

DAV UNIVERSITY, JALANDHAR

Course Title: Digital Electronics Laboratory

Paper Code: ECE204A

L	T	P	Credits
0	0	3	2

Course Objectives:

To reinforce learning in the accompanying ECE201 course through hands-on experience with digital electronic circuit analysis, design, construction, and testing.

Learning Outcomes:

To develop necessary skill in designing, analyzing and constructing digital electronic circuits**.**

List of Experiments

1. Verification of the truth tables of TTL gates, e.g., 7400, 7402, 7404, 7408, 7432, 7486.
2. Verify the NAND and NOR gates as universal logic gates.
3. Verification of the truth table of the Multiplexer 74150.
4. Verification of the truth table of the De-Multiplexer 74154.
5. Design and verification of the truth tables of Half and Full adder circuits.
6. Design and verification of the truth tables of Half and Full subtractor circuits.
7. Design and test of an S-R flip-flop using NOR/NAND gates.
   a) Verify the truth table of a J-K flip-flop (7476)
   b) Verify the truth table of a D flip-flop (7474)
8. Operate the counters 7490, 7493 and 74194. Verify the frequency division at each stage and with a low frequency clock (say 1 Hz) display the count on LEDs.
9. Verify the truth table of decoder driver 7447/7448. Hence operate a 7 segment LED display through a counter using a low frequency clock.
10. Repeat the above with the BCD to Decimal decoder 7442 and an array of LEDs
11. Design and test D/A converter using R-2R Ladder Network
12. Study and test of A/D converter.

DAV UNIVERSITY, JALANDHAR

Course Title: Electronics Devices and Circuits Laboratory

Paper Code: ECE205

L	T	P	Credits
0	0	2	1

Course Objectives:

To reinforce learning in the accompanying ECE202 course through hands-on experience by examining the electrical characteristics of various semiconductor devices, such as diodes, BJTs and FETs.

Learning Outcomes:

After completion of this course students will be able to understand experimentally the

- The characteristics of diodes, BJT's and FET's.
- The characteristics of transistors under various biasing conditions
- The response of various special purpose electron devices.

List of Experiments

1. To study Characteristics of Half, Full & center tapped rectifiers. To study bipolar transistor as a switch.
2. To plot a load line for a CE amplifier and show effect of input signal on Q-point.
3. To demonstrate use of a BJT in a CE amplifier circuit configuration and study its frequency response.
4. To demonstrate use of a BJT in a CC amplifier circuit configuration and study its frequency response.
5. To demonstrate use of a BJT in a CB amplifier circuit configuration and study its frequency response.
6. To study emitter follower circuit.
7. To demonstrate and study a two stage RC coupled amplifier.
8. To demonstrate and study a Transformer coupled amplifier.
9. To demonstrate working of a JFET and study its V-I characteristics.
10. To experimentally study working of a CS JFET amplifier.

DAV UNIVERSITY, JALANDHAR

Course Title: Object Oriented Programming Laboratory

Course Code: CSE205

L	T	P	Credits
0	0	4	2

Instruction for Students: The candidate will be attending a laboratory session of 4 hours weekly and students have to perform the practical related to the following list.

1. Introduction to basic structure of C++ program, utility of header and library files.
2. Implementation of program related to the basic constructs in C++
3. Programs using different data types in C++
4. Programs using Loops and Conditional Statements in C++
5. Programs using arrays single dimension in C++.
6. Programs using functions by passing values using call by value method and call by reference method.
7. Programs related to string handling in C++
8. Program to demonstrate the objects of the class and their working
9. Programs to implement the working of constructor & destructor
10. Programs to implement the concept of operator overloading
11. Programs to implement Inheritance and its types
12. Programs using early and late binding
13. Programs to show the working of abstract classes
14. Programs to show the working of Exception Handling
15. Program to illustrate the concept of file handling

DAV UNIVERSITY, JALANDHAR

Course Title: Electronics Measurements and Instrumentation

Paper Code: ECE203

L	T	P	Credits
4	0	0	4

Course Objective:

The main objective of this subject is to help students identify the different latest measurement techniques available for specific engineering applications. This course will lead the students to

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

Unit-A

Fundamentals **(8 Hours)**

Generalized instrumentation system, Advantages of instrumentation system, Objective of measurement, Standards of measurements, Classification of errors. Statistical analysis Static Characteristics- Accuracy, Precision, sensitivity, threshold, resolution, repeatability, drift. Dynamic Characteristics.

Measuring Instruments **(8 Hours)**

Resistance measurements using Wheatstone bridge, Kelvin Double Bridge, AC bridges: Maxwell bridge, Maxwell Wein Bridge, Hay's Bridge, Schering Bridge, and Anderson Bridge.

Unit-B

Signal Analyzers **(6 Hours)**

Wave Analyzers: Frequency selective wave analyzer, heterodyne wave analyzer, Harmonic Distortion Analyzers, Total Harmonic Distortion, Intermodulation Distortion and Spectrum Analyzers.

Oscilloscope **(6 Hours)**

CRO, Block Diagram of CRO, CRT, Graticules, electrostatic deflection sensitivity, time base generator, Lissajous figures, types of CRO probes. Application of CRO, Dual Beam CRO, Dual Trace CRO, Sampling and storage CRO.

Unit-C

Transducers **(8 Hours)**

Electrical Transducers , Classification of Transducers ,Characteristics and choice of Transducers, Strain gauge, LVDT, thermocouple, RTD, Thermistor, piezoelectric, crystal and photoelectric transducers and their applications.

Storage and Display Devices **(8 Hours)**

Necessity of recorders, recording requirements, graphic recorders, and strip chart recorders, X-Y Recorder, magnetic tape recorders. LED, LCD, Segmental Display, Dot Matrices, Segmental gas discharge display

Unit-D

Data Transmission and Telemetry **(8 Hours)**

Introduction, method of data transmission, General telemetry system, Land line telemetry systems, RF Telemetry System and applications

Data Acquisition Systems **(8 Hours)**

Instrumentation system, types of instrumentation system, component of an analog data Acquisition Systems, digital data Acquisition Systems, uses of data Acquisition Systems

References:
1. Carr. *Element of Electronic Instrumentation & Measurment.* Pearson Education.
2. Kishore. *Electronic Measurments & Instrumentation*. Pearson Education.
3. Sawhney, A. K. *Electrical and Electronic Measurements and Instrumentation.*
4. Cooper, D. *Electronic Instrumentation and Measurement Techniques*
5. Electronic Instrumentation, by H.S. Kalsi, Tata McGraw Hill

DAV UNIVERSITY, JALANDHAR

Course Title: Analog Communication System

Paper Code: ECE207A

L	T	P	Credits
4	0	0	4

Course Objective:

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

Learning Outcomes:

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

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

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Unit-A

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Base Band Signals and Systems   **(6 Hours)**

Introduction, Elements of communication system, Noise Figure & noise factor, Noise equivalent temperature. Modulation & Demodulation, Mixing; Linear & Nonlinear, need of modulation, types of modulation systems, basic transmission signals, multiplexing technique.

Analog Modulation Techniques   **(7 Hours)**

Introduction, theory of amplitude modulation; AM power calculations, AM current calculations, AM modulation with a complex wave, theory of frequency modulation;

mathematical analysis of FM, spectra of FM signals, narrow band of FM, Wide band FM, Theory of phase modulation, comparison of AM, FM & PM

Unit-B

AM Transmission (5 Hours)

Introduction, generation of Amplitude Modulation, Low level and high level modulation, basic principle of AM generation; square law modulation, Amplitude modulation in amplifier circuits, suppressed carrier AM generation (Balanced Modulator), ring Modulator.

AM Reception (7 Hours)

Receiver Parameters; Selectivity, Sensitivity, Fidelity, Tuned Ratio Frequency (TRF) Receiver, Super heterodyne Receiver; Basic elements of AM super heterodyne Receiver; RF Amplifier, IF Amplifier, AM detector; square law detector, Envelope or Diode detector, AGC, Double hetro-dyne communication receiver.

Unit-C

FM Transmission (6 Hours)

FM allocation standards, generation of FM by direct method, varactor diode Modulator, Cross by Direct FM Transmitter, Phase-Locked-Loop Direct FM Transmitter, Indirect generation of FM; Armstrong method, Frequency stabilized reactance FM transmitter.

FM Reception (8 Hours)

Frequency demodulators, Tuned circuit frequency discriminators; Slope Detector, Balance Slope Detector, Foster Seeley discriminator, Ratio Detector, FM detection using PLL, Zero crossing detector as a Frequency Demodulator, quadrature FM demodulator, pre emphasis and de-emphasis, limiter circuits, FM Capture effect, FM receiver, FM stereo transmission and reception.

Unit-D

SSB Transmission (7 Hours)

Introduction, Single Side band systems, AM-SSB; Full carrier, Suppressed carrier , reduced carrier, Independent side band, Vestigial side band, Comparison of SSB Transmission to conventional AM, Generation of SSB; Filter method, Phase Shift Method, Third Method

SSB Reception (6 Hours)

SSB Product Demodulator, Balanced Modulator as SSB Demodulator, Single Side band receivers; Single side band BFO Receivers, Coherent Single side band BFO Receivers, Single Side band Envelop detection receiver, Multi-Channel Pilot Carrier SSB Receiver.

Pulse Modulation Transmissions and Reception **(5 Hours)**

Introduction, Sampling Theorem Pulse Amplitude Modulation (PAM), Natural PAM Frequency Spectra for PAM , Flat-top PAM, Sample and hold circuits, PAM Modulator Circuit, Demodulation of PAM Signals, Pulse Time Modulation (PTM); Pulse Width Modulation(PWM), Pulse Position Modulation (PPM), PPM Demodulator.

References:

1. Kennedy & Davis. *Electronic communication Systems.* Tata Mcgraw Hill.
2. Kumar, Manoj. & Manisha. *Analog Communication Systems.* New Delhi. Satya Prakashan.
3. Tomasi. *Electronic Communication System.* Pearson Education.
4. Roddy. *Electronic Communication.* Pearson Education.
5. Symon Hykens. *Analog Communication Systems.* John Wiley & Sons.
6. Taub & Schilling. *Principles of Communication System.* Tata Mc-Graw Hill.

DAV UNIVERSITY, JALANDHAR

Course Title: Signal and Systems

Paper Code: ECE209

L	T	P	Credits
4	0	0	4

Course Objectives:

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

Learning Outcomes:

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

- Various classifications of both Continuous time and discrete time Signals and Systems.
- Spectral analysis of Periodic and Aperiodic Signals using Fourier series.
- Analysis and characterization of the CT system through Laplace transform.
- Analysis and characterization of the DT system through Difference equation.
- Analysis and characterization of the DT system through Z transform**.**

Unit-A

Classification of Signals And Systems   **(13 hours)**

Classification of Signals: Continuous time signals , Discrete time signals – Periodic and Aperiodic signals – Even and odd signals – Energy and power signals –Deterministic and random signals –Complex exponential and Sinusoidal signals .Unit step, Unit ramp, Unit impulse – Representation of signals in terms of unit impulse .Classification of Systems: Continuous time systems, Discrete time systems , Linear system – Time Invariant system – causal system – BIBO system – Systems with and without memory – LTI system.

Unit-B

Analysis of Continuous Time Signals   **(13 hours)**

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

transform – Parseval's relation for energy signals – Frequency spectrum –Analysis of LTI system using Fourier methods.

LTI Continuous Time System **(13 hours)**

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

Unit-C

Analysis Of Discrete Time Signals And Systems **(11 hours)**

Representation of sequences – Discrete Time Fourier Transform (DTFT) , Discrete Fourier Transform (DFT) and its properties – Solution of linear constant coefficient difference equations with initial conditions, Zero state response and Zero input response– impulse response – Convolution sum , Frequency response.

Unit-D

LTI DT System Characterization And Realization **(13 hours)**

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

References:
1. Oppenheim, Allan V., Wilsky. S. & S.H.Nawab. *Signals and Systems*. Pearson Education.
2. Rawat, Tarun Kumar. *Signal and Systems.* Oxford Press. 2010. First edition
3. Edward. W Kamen. & Bonnie's Heck. *Fundamentals of Signals and Systems.* Pearson Education.
4. Haykins, Simon. *Communication Signals & System.* John Wiley & Sons.
5. Hsu. Ranjan. Schaum's. *Signals and Systems*. Tata McGraw Hill.

Course Title: Electromagnetic Field Theory

Paper Code: ECE210

L	T	P	Credits
4	0	0	4

Course Objective:

To enable the students understand the universal theoretical concepts in three dimensional real world and find solution to problems related to electro-magnetic wave propagation.

Learning Outcomes:

- To impart knowledge on the basic concepts of electric and magnetic fields.
- To educate scientifically about Maxwell's equations and Poynting theorem
- To interpret the Wave propagation in between parallel plates.
- To emphasize the significance of different types of waveguides.

Unit-A

Introduction **(10 Hours)**

Review of Electrostatic and Magneto statics.

Time Varying Fields **(10 Hours)**

Maxwell's equations in differential and integral forms concept of displacement current. Boundary conditions.

Unit-B

Electromagnetic Waves **(10 Hours)**

Wave equation and its solution in different media, plane wave, Sinusoidal time variation, polarization. Reflection of waves by perfect di electronics and by perfect insulators. Surface impedance, Poynting theorem and Poynting vector.

Guided Waves **(10 Hours)**

Waves between parallel planes. TE and TM waves and their characteristics. TEM waves, velocities of propagation, Attenuation in parallel plane guides, wave impedance.

Unit-C

Transmission Lines **(10 Hours)**

Circuit representation of parallel plane transmission lines. Parallel plane transmission line with losses. Low loss RF and UHF transmission lines. Distortion less condition. Transmission line charts-impedance matching.

Unit-D

Wave Guides   **(10 Hours)**

Rectangular and circular wave guides. TE and TM waves in rectangular wave guides. Impossibility of TEM wave in wave guides. Wave impedance and characteristics impedances. Transmission line analogy for wave guides. Attenuation and factor of wave guides. Dielectric slab wave guides.

References:

1. Sadiku, Matthew N.O. *Elements of Electromagnetic*. Oxford Univ. Press.2009. , 4th ed.
2. Prasad, K.D. *Electromagnetic field and waves.*
3. Kraus, John D. *Electromagnetic*
4. Kaduskar. *Principles of Electromagnetic*
5. Jordan, Edward C. *Electromagnetic Waves and Radiating Systems*

DAV UNIVERSITY, JALANDHAR

Course Title: Analog Electronics

Paper Code: ECE211

L	T	P	Credits
4	0	0	4

Course Objectives:

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

Learning Outcomes:

At the end of this course, the students will learn

- Working of power amplifiers and tuned amplifiers.
- Working of different types of feedback amplifiers & oscillators.
- Frequency response and design of tuned amplifiers.
- Basic working & design of wave shaping circuits.

Unit-A

High Frequency Transistor (10 Hours)

The high frequency T model, common base short circuit current frequency response, alpha cutoff frequency, common emitter short circuit current frequency response, hybrid pi CE transistor model, hybrid pi conductance in terms of low frequency h parameters, CE short circuit current gain obtained with hybrid pi model, current gain with resistive load.

Tuned Amplifiers (8 Hours)

Single tuned, double tuned and stagger tuned amplifiers and their frequency response characteristics.

Unit-B

Large Signal Amplifiers (10 Hours)

Class A direct coupled with resistive load, Transformer coupled with resistive load, harmonic distortion, variation of output power with load, Push-Pull Amplifiers, operation of class- B push-pull amplifier, crossover distortion, transistor phase inverter, complementary- symmetry amplifier.

Unit-C

Feedback Amplifiers **(10 Hours)**

Concept of feedback, Positive and negative feedback, Voltage and current feedback, Series and shunt feedback, Effect of feedback on performance characteristics of an amplifier.

Oscillators **(8 Hours)**

Condition for sustained oscillation, Barkhausen criterion, R-C phase shift, Hartley, Colpitts, Crystal and Wien Bridge Oscillators, Frequency stability criterion.

Unit-D

Wave shaping circuits **(10 Hours)**

Multi-vibrators (A stable, Mono-stable, Bi-Stable), High pass and low pass filters using R-C Circuits and R-L, R-L-C Circuits & their response to step input, Pulse input, Square input and Ramp Input

Regulated Power Supplies **(6 Hours)**

Zener diode as Voltage Regulator, Transistor Series and Shunt Regulators, Current limiting, Line and Load Regulation.

References:

1. Boylestad, Nashelsky. *Electronic Devices and Circuit Theory*. Pearson Education. 2009. 10th Ed.
2. Floyd. & Thomas L. *Electronic Devices. Pearson Education Inc.*, Delhi. Latest Edition. Sixth Edition.
3. Sedra., Adel., S., & Smith, Kenneth C. *Microelectronic Circuits.* New York. Oxford University Press. 2013. Sixth Edition.
4. Jacob, Millman.& Halkias,Christos C. *Integrated Electronics.* Tata McGrawHill. New Delhi.
5. Streetman, Ben J. & Sanjay Banerjee. *Solid State Electronic Devices.* PHI. Latest Edition. 5th Ed.

Course Title: Electronic Measurements and Instrumentation Laboratory

Paper Code: ECE206

L	T	P	Credits
0	0	2	1

Course Objective:

To reinforce learning in the accompanying ECE203 course through hands-on experience with electronic measurement devices. This course is intended to understand the students to critically analyze the operation of various transducers for electronic measurement.

Learning Outcomes:

After completion of this course, the students will be capable of working with various electronic measurement tools. The student will be familiar with the working of various transducers.

List of Experiments

1. Measurement of Inductance by Maxwell's Bridge.
2. Measurement of small resistance by Kelvin's Bridge.
3. Measurement of Capacitance by Schering Bridge.
4. Measurement of Frequency by Wein Bridge.
5. Measurement of medium resistance by Wheat Stone's Bridge.
6. Determination of frequency & phase angle using C.R.O.
7. To determine output characteristic of a LVDT and determine its sensitivity.
8. Study characteristics of temperature transducer of Thermocouple
9. Study characteristics of temperature transducer of Thermistor
10. Study characteristics of temperature transducer of RTD
11. Study characteristics of Light transducer like Photovoltaic cell, Phototransistor and Pin Photodiode with implementation of small project using signal conditioning circuit.

DAV UNIVERSITY, JALANDHAR

Course Title: Analog Communication Systems Laboratory

Paper Code: ECE212A

L	T	P	Credits
0	0	3	2

Course Objective:

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

Learning Outcomes:

- To practice the basic theories of analog communication system.
- To provide hands-on experience to the students, so that they are able to apply theoretical concepts in practice.

List of Experiments

1. To generate & observe A.M. signal. Calculate modulation index for different values of modulating signal.
2. To generate DSB-SC AM signal using balanced modulator & detection of DSB –SC signal.
3. To generate SSB AM signal & detection of SSB signal.
4. To generate VSB AM signal & detection of VSB signal.
5. To generate a FM Signal using Varactor & reactance modulation.
6. Detection of FM Signal using PLL & foster seelay & resonant detector.
7. To Study Super heterodyne AM receiver and measurement of receiver parameters viz. sensitivity, selectivity & fidelity.
8. Sampling Theorem & Reconstruction of Signal from its samples using Natural Sampling, Flat Top Sampling & Sample & Hold Circuits & effect of duty cycle.
9. To generate & observe PAM signal & demodulate it.
10. To generate & observe PWM signal & demodulate it.
11. To generate & observe PPM signal & demodulate it.

DAV UNIVERSITY, JALANDHAR

Course Title: Signals and Systems Laboratory Using MATLAB /Mentor DSP

Paper Code: ECE213

L	T	P	Credits
0	0	2	1

Course Objective:

To reinforce learning in the accompanying Course ECE209, this lab has been introduced. This course will help the students to simulate the various signal transforms through MATLAB/ Mentor DSP.

Learning Outcomes:

After completion of this course students will be able to understand experimentally the

- The Generation of elementary signal
- To perform various operations over signals
- To understand various concepts about signal that are helpful in understanding Digital Processing of the signal.

List of Experiments

1. Generation of continuous and Discrete Unit step signal.
2. Generation of exponential and Ramp Signal in Continuous and Discrete Domain.
3. To generate sine and cosine signals of various frequencies using MATLAB
4. To study Continuous and discrete time Convolution.
5. Adding and subtracting two Given Signals (Continues as well as Discrete Signals)
6. To study the discrete Fourier transform of different elementary signals.
7. To study inverse discrete Fourier transform of different elementary signals.
8. To perform integration and differentiation on various elementary signals.
9. To develop program for finding response of the LTI system described by the difference equation.
10. To develop program for finding magnitude and phase response of LTI system described by system function H (z).

Course Title: Analog Electronics Laboratory

Paper Code: ECE214A

L	T	P	Credits
0	0	2	1

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

Learning Outcomes:

At the end of this course, the students will learn

- Working of power amplifiers and tuned amplifiers.
- Working of different types of feedback amplifiers & oscillators.
- Frequency response and design of tuned amplifiers.
- Basic working & design of wave shaping circuits

List of Experiments

1. Frequency response analysis of Tuned amplifiers.
2. Frequency response analysis of Feedback amplifier.
3. Study of Multi-vibrators (A-stable, Mono-stable, Bi-stable Multi-vibrator).
4. To study the characteristics of a Class- A amplifier.
5. To study the characteristics of Class- B amplifier.
6. To study the characteristics of Class- B push-pull amplifier.
7. To study the characteristics of complementary symmetry amplifier.
8. To study the response of RC phase shift oscillator and determine frequency of oscillation.
9. To study the response of Hartley oscillator and determine frequency of oscillation.
10. To study the response of Colpitt's oscillator and determine frequency of oscillation.
11. To study the response of Wien Bridge oscillator and determine frequency of oscillation

DAV UNIVERSITY, JALANDHAR

Course Title: Microprocessor and Microcontroller

Paper Code: ECE301

L	T	P	Credits
4	0	0	4

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

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

- Understand fundamental operating concepts behind microprocessors and microcontrollers.
- Appreciate the advantages in using microprocessors / microcontrollers in engineering applications.
- Design microprocessor based solutions to problems.
- Understand low-level programming.
- Apply this knowledge to more advanced structures.

Unit-A

Introduction   **(5 Hours)**

Introduction to Microprocessors, classification, recent microprocessors.

Microprocessor Architecture   **(10 Hours)**

8085 microprocessor Architecture. Bus structure, I/O, Memory &System buses, concept of address Bus, Data Bus & Control Bus, Synchronous & Asynchronous buses. Instruction execution sequence & Data Flow, Instruction cycle.

Unit-B

Instruction set & Assembly Languages Programming   **(12 Hours)**

Introduction, instruction & data formats, addressing modes, status flags, 8085 instructions, Data transfer operations, Arithmetic operations, Logical operations, Branch operations.

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Unit-C

Interfacing Devices   **(13 Hours)**

Programmable Peripheral Interface (8255) - Programmable Interval Timer (8254) - Programmable Interrupt Controller (8259A) - Programmable DMA Controller (8257) Programmable Communication Interface (8251A) – Programmable Keyboard and Display Controller (8279).

Unit-D

Basic architecture of higher order microprocessor   **(10 Hours)**

Basic introduction to 8086, Architecture, Segmentation & addressing modes.

Microcontroller-8051   **(10 Hours)**

Register Set-Architecture of 8051 microcontroller- I/O and memory addressing- Interrupts- Instruction set- Addressing modes.

References:

1. Gaonkar, Ramesh. *8085 Microprocessor*. PHI Publications.

2. Mazidi, Muhammad Ali. & Mazidi, Janice Gillispie. *The 8051 Microcontroller and Embedded systems.* Pearson Education. Latest Edition. 7th Edition,.

3. Doughlas.V.Hall. *Microprocessor and Interfacing Programming and Hardware.* McGraw Hill. Latest Edition. Revised 2nd edition.

4. Steve, Furbe., *ARM System on Chip Architecture.* Pearson Education. Latest Edition. Second Edition,

DAV UNIVERSITY, JALANDHAR

Course Title: Digital Communication System

Paper Code: ECE302

L	T	P	Credits
4	0	0	4

Course Objective:

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

Learning Outcomes:

This subject will help the student to learn and understand

- The process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals and digital modulation systems.
- Baseband and pass band transmission systems.
- M-ary signaling and spread spectrum Techniques.

Unit-A

Digital Transmission (15 Hours)

Introduction, Advantages of Digital Transmission, Pulse Code Modulation; PCM Sampling, Sampling Rate, Aliasing, quantization error, Uniform and Non uniform quantization, Dynamic Range, Coding efficiency, A law & μ law companding, Bandwidth of PCM, Block diagram of PCM system, Delta Modulation, Continuously variable Slope Delta Modulator (CVSDM) or Adaptive Delta Modulation, Differential Pulse Code Modulation, Inter-symbol Interference, Eye Patterns, Signal power in binary digital signals.

Unit-B

Digital Carrier Line Encoding & Multiplexing Techniques (15 Hours)

Line Coding & its properties. NRZ & RZ types, signaling format for unipolar, Polar, bipolar (AMI) & Manchester coding and their power spectra (No derivation), HDB and B8ZS signaling, Fundamentals of time division multiplexing

Unit-C

Basic Digital Carrier Modulation & Demodulation Techniques (15 Hours)

Introduction, Information capacity, Shannon Limit for Information capacity, Bit Rate,

Baud & M-Ary Encoding, Amplitude Shift Keying (ASK), ASK Spectrum, ASK Modulator, Coherent ASK Detector, Non- coherent ASK Detector, Frequency Shift Keying (FSK), FSK Bit Rate and Baud, Bandwidth and Frequency Spectrum of FSK, FSK Transmitter, Non-coherent FSK Detector, Coherent FSK Detector, FSK Detection Using PLL, Binary Phase Shift Keying, Binary PSK Spectrum, BPSK Transmitter, Coherent PSK Detection,

Unit-D

Advanced Digital Carrier Modulation & Demodulation Techniques (15 Hours)
Quadrature Phase Shift Keying (QPSK), QPSK Demodulator, Offset QPSK, π /4 QPSK, Comparison of conventional QPSK, Offset QPSK and π/4 QPSK, M-Ary BPSK e.g. 8 PSK & 16 PSK, Quadrature Amplitude Modulation (QAM); 8 QAM & 16 QAM transmitters and receivers, Band Width efficiency, Carrier Recovery; Squaring Loop & Costas Loop, Differential PSK, DBPSK transmitter and receiver, Constant Envelop Modulation; Minimum Shift Keying (MSK) & Gaussian Minimum Shift Keying (GMSK)

References:

1. Tomasi, Wayne. *Advanced Communication Systems*. Pearson. 5th edition
2. Proakis. *Digital Communication.* PHI
3. Lathi, B.P. *Modern Digital and Analog communication systems.* Oxford Publications.
4. Nguyen, Ha. *A first course in Digital Communication.* Cambridge Publications
5. Bernard, Sklar. *Digital Communications Fundamental and Applications.* PHI
6. Schling, Taub, *Principles of Communication Systems.* Mc Graw Hill

DAV UNIVERSITY, JALANDHAR

Course Title: Linear Integrated Circuits

Paper Code: ECE304A

L	T	P	Credits
4	0	0	4

Course Objective:

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

Learning Outcomes:

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

Unit-A

Differential And Cascade Amplifiers   **(10 Hours)**

Introduction, Differential Amplifier, Differential Amplifier Circuit Configuration, Dual Input-Balanced output Differential Amplifier, Dual Input-Unbalanced output Differential Amplifier, Single Input-Balanced output Differential. Amplifier, Single Input-unbalanced output Differential Amplifier with their DC and AC analysis, Differential Amplifier with swamping resistors, Constant current bias, Current Mirror, Cascaded differential Amplifier Stages, Level Translator, CE-CB configuration.

Unit-B

Introduction to Operational Amplifiers   **(10 Hours)**

Block diagram of a typical Op-Amp, Schematic symbol, integrated circuits and their types, IC package types, Pin Identification and temperature range, Interpretation of data sheets, Overview of typical set of data sheets, Characteristics and performance parameters of and Op-Amp, Ideal Op-Amp, Equivalent circuit of an Op-Amp, Ideal voltage transfer curve, Open loop configurations: Differential, Inverting & Non Inverting. Practical Op-Amp: Input offset voltage, Input bias current, Input offset current, total output offset voltage, Thermal drift, Effect of variation in power supply voltages on offset voltage, Change in Input offset voltage and Input offset current with time, Temperature and supply voltage sensitive parameters, Noise, Common Mode configuration and common mode rejection Ratio.

Negative Feedback in Op-Amps (8 Hours)

Block diagram representation of feedback configurations, Voltage-series feedback Amplifier, Voltage shunt feedback amplifier, Differential amplifiers with one op-amp, two op-amps and three op-amps.

Unit-C

Frequency Response of an Op-Amp (5 Hours)

Frequency response, Compensating Networks, Frequency response of Internally compensated Op-Amps, Frequency response of Noncompensated Op-amps, Closed loop frequency response, Slew rate, causes of slew rate and its effect on applications

Applications of Op-Amp (10 Hours)

DC and AC amplifiers, Peaking Amp, Summing, Scaling and Averaging Amp, Instrumentation Amplifier, V to I and I and to V converter, Log and Antilog Amp, Integrator, Differentiator. Active filters: First order LP Butterworth filter, Second order LP Butterworth filter, First order HP Butterworth filter, Second order HP Butterworth filter, Higher order filters, Band pass filter, Band reject filters, All pass filter, Phase shift oscillator, Wein bridge oscillator, Quadrature oscillator, Square wave generator, Triangular wave generator, Saw tooth wave generator, Voltage controlled oscillator, Basic comparator, Zero crossing detector, Schmitt trigger, window detector, V to F and F to V converters, A to D and D to A converters, Peak Detector, Sample and Hold Circuit.

Unit-D

Specialized IC Applications (7 Hours)

555 Timer: Pin configuration, Block diagram, application of 555 as Monostable and Astable Multivibrator.

Phase Lock Loops (5 Hours)

Operating principles & applications of 565PLL

Voltage Regulators (5 Hours)

Fixed voltage regulators, Adjustable voltage regulators, Switching Regulators.

References:

1. Gayakwad, Ramakant . *Op Amps & Linear Integrated circuits*
2. Coughlin *Op Amps & Linear Integrated circuits*
3. Dudeja, RaviRaj. *Op Amps & Linear Integrated circuits*

4. B.S.Sonde, *System design using Integrated Circuits* , New Age Pub, 2nd Edition, 2001

5. Gray and Meyer, *Analysis and Design of Analog Integrated Circuits*, Wiley International, 2005.

6. J.Michael Jacob, *Applications and Design with Analog Integrated Circuits*, Prentice Hall of India, 1996.

7. William D.Stanley, *Operational Amplifiers with Linear Integrated Circuits*, Pearson Education, 2004.

Course Tittle: Linear Control System
Paper Code: ICE208

L	T	P	Credits
4	0	0	4

Course Objective:
- To teach the fundamental concepts of Control systems and mathematical modeling of the System
- To study the concept of time response and frequency response of the system
- To teach the basics of stability analysis of the system

Learning Objective:
- Formulation of equation of linear electrical, mechanical, thermal, pneumatic and hydraulic system, electrical, mechanical analogies
- Typical test – input signals
- Necessity of compensation
- Control components.

UNIT-A

Introductory Concepts: Plant, Systems, Servomechanism, regulating systems, disturbances, Open loop control system, closed loop control systems, linear and non-linear systems, time variant and invariant, continuous and sampled-data control systems, Block diagrams, some illustrative examples.

Modeling: Formulation of equation of linear electrical, mechanical, thermal, pneumatic and hydraulic system, electrical, mechanical analogies. Use of Laplace transforms, Transfer function, concepts of state variable modeling. Block diagram representation, signal flow graphs and associated algebra, characteristics equation.

UNIT-B

Time Domain Analysis: Typical test – input signals, Transient response of the first and second order systems, Time domain specifications, Dominant closed loop poles of higher order systems, Steady state error and coefficients, pole-zero location and stability, Routh-Hurwitz Criterion.

Frequency Domain Analysis: Frequency response specifications, Closed loop frequency response, Relation between time and frequency response for second order systems, Log, Magnitude versus Phase angle plot.

UNIT-C

Stability Analysis: Absolute and relative stability, Polar plots and Nyquist stability criterion, Bode plots-gain margin & phase margin, M and N loci.

Root Locus Technique: The extreme points of the root loci for positive gain, Asymptotes to the loci, Breakaway points, intersection with imaginary axis, location of roots with given gain and sketch of the root locus plot, criterion for stability.

UNIT-D

Compensation: Necessity of compensation, series and parallel compensation, compensating networks, applications of lag and lead-compensation.

Control Components: Error detectors – potentiometers and synchros, servo motors, a.c. and d.c. techno generators, Magnetic amplifiers.

References:
1. Ogata, K. *Modern Control Engineering*.   Pearson
2. Nagrath & Gopal. *Control System Engineering.* New Age
3. Gopal ,M. *Control Systems- Principles & Design*. TMH   .
4. Choudhury, Roy. *Modern Control Engineering*. PHI

DAV UNIVERSITY, JALANDHAR

Course Title: Numerical Methods

Paper Code: MTH256A

L	T	P	Credits
3	0	0	3

Course Objectives

The aim of this course is to teach the applications of various numerical techniques for a variety of problems occurring in daily life. At the end of the course, the students will be able to understand the basic concepts in Numerical Analysis of differential equations.

Unit-A

Approximate numbers, Significant figures, rounding off numbers, Error Absolute, Relative and percentage

Non-Linear Equations: Bisection, Regula-Falsi, Secant, Newton-Raphson, General Iteration Method. Rate of convergence

Unit-B

Systems of Simultaneous Linear Equations: Direct methods: Gauss elimination method, Gauss Jordon method, Matrix inversion method; Iterative methods: Jacobi method and Gauss-Seidel method, Power method for finding largest Eigen value.

Unit-C

Operators: Forward, Backward and Shift (Definitions and some relations among them).

Newton forward and backward, Gauss backward and forward interpolation, Stirling formula, Bessel formula, Lagrange's interpolation, Hermite Interpolation, Newton divided difference Interpolation. Numerical Differentiation, Maximum and Minimum values of a tabulated function.

Unit-D

Numerical Integration: General Quadrature formula, Trapezoidal Rule, Simpson's 1/3-Rule, Simpson's 3/8-Rule, Boole's rule, Weddle's Rule.

Numerical solutions to first order ordinary differential equations: Taylor's Series method, Picard's Method, Euler's and modified Euler's methods, Runge-Kutta methods

References:

1. Jain, M.K. *Numerical Analysis for Scientists and Engineers*. New Delhi: S.B.W. Publishers, Latest Edition.

2. Grewal B.S. *Numerical Methods in Engineering & Science With Programs In C& C++.* New Delhi: Khanna Publishers, 2012.

3. Golub G.H. and Ortega, J.M. *Scientific Computing and Differential Equations: An Introduction to Numerical Methods*. London: Academic Press, Latest Edition.

4. John H. Mathews and Kurtis D. Fink, *Numerical Methods using Matlab*, 4th Ed., PHI Learning Private Limited, 2012.

DAV UNIVERSITY, JALANDHAR

Course Title: Microprocessor and Microcontroller Laboratory

Paper Code: ECE306A

L	T	P	Credits
0	0	2	1

Course Objective:

This course is intended for physical understanding of Microprocessor and microcontroller.

Learning Outcomes:

The students will learn the programming in assembly language and will understand the architecture of Microprocessor and Microcontroller

List of Experiments

Unit-A: General Purpose Programming Exercises

Minimum six experiments to be conducted.

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

Unit-B: Interfacing With Application Boards

Minimum six experiments to be conducted

1. 8255 PPI.
2. Transfer data serially between two kits (Study of 8253/8251).
3. 8279 Keyboard & display
4. Seven segment display
5. LCD Display
6. Traffic light.
7. 8259 programmable interrupt controller.
8. 8257/8237 DMA controller.

9.   8 bit ADC and 8 bit DAC.

10. Stepper motor control.

11. DC motor speed measurement and control module.

12. Real Time Clock.

13. Logic Controller.

DAV UNIVERSITY, JALANDHAR

Course Title: Digital Communication Systems Laboratory

Paper Code: ECE307

L	T	P	Credits
0	0	3	2

Course Objective:

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

Learning outcome:

The course will help the students:

- To demonstrate digital communication concepts using hands-on experience and using simulation environments such as Matlab/Simulink, or LabVIEW or ComSim
- To use commercial, modular systems which have some distinct advantages over bread boarding to examine more complex communication topics and to deliver a hands-on laboratory experience.

List of Experiments

1. Analysis of Time Division Multiplexing system.
2. Analysis of pulse code modulation and demodulation.
3. Analysis of delta modulation and demodulation and observe effect of slope overload.
4. Analysis pulse data coding techniques for various formats.
5. Data decoding techniques for various formats.
6. Analysis of amplitude shift keying modulator and demodulator.
7. Analysis of frequency shift keying modulator and demodulator.
8. Analysis of phase shift keying modulator and demodulator.
9. Error Detection & Correction using Hamming Code
10. Digital link simulation; error introduction & error estimation in a digital link using MATLAB (SIMULINK)/ComSim.

DAV UNIVERSITY, JALANDHAR

Course Title: Linear Integrated Circuits Laboratory

Paper Code: ECE308

L	T	P	Credits
0	0	2	1

Course Objectives:

The purpose of the lab is to train the students to design and analyze the operation of operational amplifier and oscillator circuits and understand their functionality

Learning Outcomes

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

List of Experiments

1. To study differential amplifier configurations.
2. To measure the performance parameters of an Op amp.
3. Application of Op amp as Inverting and Non Inverting amplifier.
4. To study frequency response of an Op Amp
5. To use the Op-Amp as summing, scaling & averaging amplifier.
6. To use the Op-Amp as Instrumentation amplifier
7. Design differentiator and Integrator using Op-Amp.
8. Application of Op Amp as Log and Antilog amplifier
9. Design Low pass, High pass and Band pass 1st order Butterworth active filters using Op Amp.
10. Design Phase shift oscillator using Op-Amp.
11. Design Wein Bridge oscillator using Op-Amp.
12. Application of Op Amp as Saw tooth wave generator.
13. Application of Op Amp as Zero Crossing detector and window detector.
14. Application of Op Amp as Schmitt Trigger.
15. Design a delay circuit using 555.

16. To examine the operation of a PLL and to determine the free running frequency, the capture range and the lock in range of PLL.

DAV UNIVERSITY, JALANDHAR

Course Title: Industrial Training-I

Paper Code: ECE315

L	T	P	Credits
0	0	0	2

Course Objective: To provide hands-on experience where electronics and communication engineering projects are carried out.

Learning Outcome: This will help students to implement the classroom learning in practical life

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

This course is mandatory and the student has to pass the course to become eligible for the award of degree. The student shall make a presentation before a committee constituted by the department which will assess the student based on the report submitted and the presentation made. Marks will be awarded out of 100 and appropriate grades assigned as per the regulations

DAV UNIVERSITY, JALANDHAR

Course Title: Antenna Engineering

Paper Code: ECE305

L	T	P	Credits
4	0	0	4

Course Objective:

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

Learning Outcomes

- Study of various antennas, arrays and radiation patterns of antennas.
- To learn the basic working of antennas.
- To understand various techniques involved in various antenna parameter measurements.
- To understand the propagation of radio waves in the atmosphere.

Unit-A

Introduction (8 Hours)

Physical concept of Radiation in single wire, two wire, and dipole, Current Distribution on a thin wire antenna.

Fundamental Parameters of Antenna (10 Hours)

Radiation Pattern, Radiation Power Density, Radiation intensity, Directivity, Gain, Antenna efficiency, Beam width, Bandwidth, Polarization, Antenna Input Impedance, Elementary idea about self and mutual impedance, Radiation efficiency, Effective aperture, Antenna Temperature.

Unit-B

Linear Wire Antennas (10 Hours)

Retarded potential, Infinitesimal dipole, Current distribution of short dipole and half wave dipole, Far-field, Radiating near-field and reactive near-field region, Monopole and Half wave dipole.

Antenna Arrays (8 Hours)

Array of two point sources, Array factor, n-element linear array with uniform amplitude and spacing, Analysis of Broadside array, Ordinary end-fire array, Hansen-wood yard end fire

array, n-element linear array with non-uniform spacing, Analysis of Binomial and Dolph Tschebyscheff array, Scanning Array, Superdirective array.

Unit-C

Aperture Antennas **(8 Hours)**

Field Equivalence principle, Rectangular and circular aperture antennas, Horn antenna, Babinet's Principle, Slot Antenna, Reflector antenna.

Ground wave Propagation **(10 Hours)**

Friis Free space equation, ,Reflection from earth's surface, Surface and Space wave propagation for vertical and horizontal dipole, Field strength of Space wave, Range of space wave propagation, Effective earth's radius, Effect of earth imperfections and atmosphere on space wave propagation, Modified refractive index, Duct propagation, Tropospheric propagation.

Unit-D

Ionosphere Propagation **(6 Hours)**

Structure of ionosphere, propagation of radio waves through ionosphere, Refractive index of ionosphere, Reflection and refraction of waves by ionosphere, Critical frequency, Maximum usable frequency, Optimum working frequency, Lowest usable high frequency, virtual height, Skip Distance, Effect of earth's magnetic field

References:
1. Balanis C.A. & John. *Antenna Theory*. Wiley & Sons.
2. Jordan E.C. *Electromagnetics and radiating systems*. PHI.
3. Collins R.E. *Antenna and radio wave propagation.* McGraw Hill.
4. Krauss J.D., *Antenna Theory.* McGraw Hill.

DAV UNIVERSITY, JALANDHAR

Course Title: Microwave and Radar Engineering

Paper Code: ECE309

L	T	P	Credits
4	0	0	4

Course Objective:

This course is designed to expose the basics of microwave devices and to introduce the students to radars and their applications

Learning Outcomes:

This course will lead the students to understand the fundamentals of microwave devices and circuits. This will help them to learn microwave measurements. The students will also learn the radars and their uses.

Unit-A

Microwave Tubes (10 Hours)

Limitations of conventional tubes, construction, operation and properties of Klystron Amplifier, reflex Klystron, Magnetron, TWT, BWO, Crossed field amplifiers.

Microwave Solid State Devices (10 Hours)

Limitation of conventional solid state devices at MW, Transistors (Bipolar, FET), Diodes (Tunnel, Varactor, PIN), Transferred Electron Devices (Gunn diode), Avalanche transit time effect (IMPATT, TRAPATT, SBD)

Unit-B

Microwave Components (10 Hours)

Analysis of MW components using s-parameters, Junctions (E, H, and Hybrid), Directional coupler, Bends and Corners, MW posts, S.S. tuners, Attenuators, Phase shifter, Ferrite devices (Isolator, Circulator, and Gyrator), Cavity resonator, and Matched termination.

Unit-C

Microwave Measurements (8 Hours)

Power measurements using calorimeters and bolometers, Measurement of SWR, Frequency and wavelength, Microwave bridges.

Introduction to Radar Systems (7 Hours)

Basic Principle: Block diagram and operation of Radar, Radar range Equation, PRFs and Range Ambiguities, Applications of Radar.

Unit-D

Doppler Radars   **(8 Hours)**

Doppler determination of velocity, CW radar and its limitations, FMCW radar, Basic principle and operation of MTI radar, Delay line cancellers, Blind speeds and staggered PRFs.

Scanning and Tracking Techniques   **(7 Hours)**

Various scanning techniques (Horizontal, vertical, spiral, palmer, raster, nodding), Angle tracking systems (Lobe switching, conical scan, monopulse), Range tracking systems, Doppler (velocity) tracking systems

References

1. Samuel, Liao. *Microwave devices and circuits.* PHI
2. Kulkarni, M. *Microwave devices and radar engg.* Umesh Publications
3. Merill, I. & Skolnik *Introduction to radar systems*
4. Collin, R.E. *Foundation of Microwave Engg.* McGraw Hill
5. Gupta, K.C. *Microwave Engg*

DAV UNIVERSITY, JALANDHAR

Course Name: Embedded Systems

Course Code: ECE310A

L	T	P	Credits
4	0	0	4

Course Objective

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

Learning Outcomes

- To provide in-depth knowledge about embedded processor, its hardware and software.

- To explain programming concepts and embedded programming assembly language and C

Unit-A

Introduction to Embedded systems design: Introduction to Embedded system, Embedded System Project Management, Use of software tools for development of an ES.

8051 Microcontroller: Microprocessor V/s Micro-controller, 8051 Microcontroller: General architecture; Memory organization.

Unit-B

8051 Instructions: Instruction set: Data Move Operations, Logical Operations, Arithmetic Operations, Jump, Loop and Call Subroutine, Advanced Instructions.

8051 Addressing Modes: Immediate and register addressing mode, Accessing memory using different addressing modes, Bit addresses for I/O & RAM, Extra-128 byte on-chip RAM in 8052.

8051 Ports & Hardware Connections: I/O programing, I/O bit manipulation programming, Pin-description, explaining the Hex File.

Unit-C

8051 Timers & Counters: Timer programing, Counter Programing, programming in C of timers and counters.

8051 Serial Programming: Basics of serial programming, serial communication; RS232 connections, Serial Port programming in Assembly & C.

Unit-D

8051 Interrupts: 8051 interrupts, Timer interrupts, external hardware interrupts, serial communication interrupts, Interrupt priority, Interrupt programming in C.

8051 Interfacing and Applications: Interfacing External Memory, Keyboard and Display Devices: LED, 7-segment LED display, LCD.

References:

1. Ayala, K. *The 8051 Microcontroller.* Thomson Delmar Learning. 2007. 3rd Ed.
2. Mazidi, M.A. *The 8051 Microcontroller & Embedded Systems using Assembly & C.* Pearson Ed, 2009. 2nd Edition,
3. Ghoshal, S. *8051 Microcontroller.* Pearson Education. 2010.
4. Uma Rao, K. & Pallavi, A. *The 8051 Microcontrollers.* Pearson Ed. 2009.

DAV UNIVERSITY, JALANDHAR

Course Title: Digital Signal Processing

Paper Code: ECE311

L	T	P	Credits
4	0	0	4

Course Objective:

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

Learning Outcomes:

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

- Structures of discrete time signals and systems.
- Fast Fourier Transform Implementations, Frequency response and design of FIR and IIR filters.
- Finite word length effect.

Unit-A

Review of discrete time signals and systems   **(10 hours)**

Overview of signals and systems, DFT–FFT using DIT and DIF algorithms, Inverse DFT-FFT using DIT and DIF algorithms, Applications, Circular convolution.

Design and implementation of IIR filters   **(10 hours)**

Design of analog filters using Butterworth and Chebyshev approximations, IIR digital filter design from analog filter using impulse invariance technique and bilinear transformations.

Unit-B

Design and implementation of FIR filters   **(10hours)**

Linear phase response, Design techniques for FIR filters, Fourier series method and frequency sampling method –Design of Linear phase FIR filters using windows: Rectangular, Henning and Hamming windows.

Unit-C

Finite word length effects in digital filters   **(15hours)**

Fixed point arithmetic, effect of quantization of the input data due to Finite word length. Product round off, need for scaling, Zero input limit cycle oscillations - Limit cycle oscillations due to overflow of adders, Table look up implementation to avoid multiplications.

DAV UNIVERSITY, JALANDHAR

Unit-D

Processor Fundamentals   **(15 hours)**

Features of DSP processors – DSP processor packaging (Embodiments) – Fixed point Vs floating point DSP processor data paths – Memory architecture of a DSP processor (Von Neumann – Harvard) – Addressing modes – pipelining – TMS320 family of DSPs (architecture of C5x).

References:

1. Proakis, John G. & Dimitris C. *Digital Signal Processing Principles, Algorithms and Applications*, Pearson Education. 2007. Fourth edition

2. Venkataramani.B. & Bhaskar,M. *Digital Signal Processors, Architecture, Programming and Application.* New Delhi. Tata McGraw Hill. Latest Edition.

3. Mitra, Sanjit. *Digital Signal Processing, A Computer based approach.* New Delhi.Tata McGraw Hill. 2011.

DAV UNIVERSITY, JALANDHAR

Course Title: Microwave and Radar Engineering Laboratory

Paper Code: ECE312

L	T	P	Credits
0	0	3	2

Course Objective:

Microwave communication deals with the study of operation and characteristics of microwave sources and microwave components. It also deals with the measurement of load impedance VSWR, antenna gain and radiation pattern.

Learning Outcomes:

This course will lead the students

To familiarize the students with microwave communication techniques/technologies.

List of Experiments

1. Study of microwave components and instruments.
2. Measurement of crystal characteristics and proof of the square law characteristics of the diode.
3. Measurement of klystron characteristics.
4. Measurement of VSWR and standing wave ratio.
5. Measurement of Dielectric constants.
6. Measurement of Directivity and coupling coefficient of a directional coupler.
7. Measurement of Q of a cavity.
8. Calibration of the attenuation constant of an attenuator.
9. Determination of the radiation characteristics and gain of an antenna.
10. Determination of the phase-shift of a phase shifter.
11. Determination of the standing wave pattern on a transmission line and finding the length and position of the short circuited stub.

DAV UNIVERSITY, JALANDHAR

Course Name: Embedded Systems Laboratory

Course Code: ECE313A

L	T	P	Credits
0	0	2	1

Course Objectives: To assist the theory content taught in ECE310 and to provide knowledge on the embedded system design, embedded programming and their operating system.

Learning Outcomes

- To provide in-depth knowledge about embedded processor, its hardware and software.
- To explain programming concepts and embedded programming assembly language and C

List of Experiments:

1. Write assembly language program to learn and understand basic register transfer instructions.

2. Write assembly language program to learn and understand basic arithmetic instructions of 8051.

3. Write assembly language program to learn and understand data move operations and demonstrate memory organization, addressing modes of 8051.

4. Write assembly & C language program to learn and understand 8051 pin-out and I/O programming.

5. Write assembly & C language program to learn and understand 8051 timers viz. Timer0 & Timer1.

6. Write assembly & C language program to learn and understand 8051 serial port programming and RS232 protocol.

7. Write assembly & C language program to learn and understand 8051 Interrupt programming.

8. Write assembly & C language program to understand and demonstrate LED, 7-segment, LCD interfacing.

9. Write assembly & C language program to understand and demonstrate Keyboard interfacing.

10. Write assembly & C language program to understand and demonstrate ADC interfacing with 8051.

11. Write assembly & C language program to understand and demonstrate serial communication with PC via COM port.

	L	T	P	Credits
Course Title: Digital Signal Processing Laboratory	0	0	3	2
Paper Code: ECE314				

Course Objective:

To provide an introduction to DSP. The emphasis is on using MATLAB as a platform for understanding DSP techniques

Learning Outcomes:

The successful completion of this course will help the students to develop the programming skills in MATLAB. They will understand the physical significance of FIR and IIR filters. This course will also help them to understand the finite effect length errors.

List of Experiments

1. To study circular convolution with various methods.
2. To study auto correlation and cross correlation between signals.
3. To develop program for conversion of direct form realization to cascade form realization.
4. To develop program for cascade realization of IIR and FIR filters.
5. To develop program for designing FIR filter using rectangular window study its frequency response
6. To develop program for designing FIR filter using hanning window study its frequency response
7. To develop program for designing FIR filter using hamming window and study its frequency response
8. To develop program for designing IIR filter using butterworth approximations.
9. To develop program for designing IIR filter using chebyshev approximations.
10. To develop a program to explain finite length effects.

DAV UNIVERSITY, JALANDHAR

Course Title: DATA STRUCTURE

Course Code: CSE353

L	T	P	Credits
4	0	0	4

Course Objective:-To impart knowledge of Data Structure and How to design algorithms to solve different types of problems and to differentiate linear and nonlinear data structure.

Learning outcomes:-After reading data structure, student will be able to explain data structure and its scope in computer science. After completion of data structure, students will be able to find the best solution about specific types logical and mathematical problems.

UNIT-A

Introduction

Basic terminology, Data structure and their types, Data structure operations Algorithm: Complexity and Time Space Trade off

Array

Representation of Linear array in memory, traversing linear array, Searching Techniques: Linear search, Binary Search, Multi-dimensional array: 2D-array, representation of 2D-array in memory

UNIT-B

Linked List

Representation of Linear Linked List , Traversing a linked list , operations on linked list , Memory Allocation , Garbage collection , overflow and underflow , Doubly linked list , circular Linked List Header Linked List , application of linked list**.**

UNIT-C

Stacks and Queues

Operation on stack : push , arithmetic expression , polish notation , quick sort : An application of stack , complexity of quick sort , Recursion , Tower of Hanoi , representation of queue , Deques , priority queues.

Trees

Basic terminology, Binary tree, complete binary tree, extended binary tree 2-tree, traversing binary tree: Preorder, in order and Post order. Binary search tree, Searching& Inserting in binary search tree. Heap; Heap sort, General tree.

UNIT-D

Graphs

Basic terminology, Representation of Graph, Traversing of Graph; BFS, DFS. Applications of Graph.

Sorting

Bubble Sort, Insertion Sort, Selection Sort, Merging. Merge Sort, Hashing; Hash Functions**.**

References:

1. Lipschutz Schaum series. TataMcGrawHill.

2. Langsam. Y., Augenstein, M.J. & Tanenbaum, A.M. *Data Structures using C and C++*. Pearson Education. 2nd Edition.

3. Kruse, R., Tondo, C.L. & Mogalla. *Data Structures & Program Design* in C. Pearson Education. 2nd Edition.

4. Horowitz, E., Sahni,D. & Mehta. *Fundamentals of Data Structures in C++.* Universities Press 2. 2nd Edition

DAV UNIVERSITY, JALANDHAR

Course Name: Digital System Design

Paper Code: ECE461

L	T	P	Credits
4	0	0	4

Course Objective

The Course intends to educate the student on the Front end design aspects of Very large Scale Integration Chip manufacturing Cycle. The Course teaches the Verilog Hardware Description language (HDL) that shall help in describing a circuit to the tools for simulation and further processing of the same towards manufacturing the chip. The course helps the student in understanding the tricks of developing good HDL descriptions.

Learning Outcomes:

- Acquired knowledge of combinational and sequential subcircuit design
- Acquired knowledge to build logic circuits based on PLDs, MUXes, ROMs
- Ability to learn and design Sequential Circuits
- Ability to learn and design Logic Circuits in Verilog Hardware Description Languages
- Ability to design ASM machines, Vending Machines etc.
- Learn about FPGAs, design and implementation using FPGAs.

Unit-A

Combinational Logic: Review of adders, Subtractor, Multipliers, Multiplexers, ROM, PLA, PAL and PLD.

Synchronous Sequential Logic: Flip-flops, Triggering of flip-flops, Analysis of clocked sequential circuits, State reduction and assignment, Flip-flop excitation tables, Design procedure, Design of counters.

Unit-B

Finite State Machines: Finite state model, Memory elements and their excitation functions, Synthesis of Synchronous sequential circuits, Capabilities and limitations of FSM, Design, Modeling and Simulation of Moore and Mealy machines.

Algorithmic State Machines: ASM chart, Timing considerations, Control implementation, Control Design with multiplexers, PLAs, etc.

Unit-C

Verilog: Lexical conventions, data types, system tasks and compiler directives. Modules and ports. Hierarchical Modeling Concepts; Gate-Level, Dataflow and Behavioral Modeling, User defined primitives.

Design of networks for Arithmetic and logical operations: Representation of fixed-point and floating-point numbers and their operations, ALU, Serial adder, Binary multiplier, Binary divider.

Unit-D

Designing with Programmable Logic Devices and Programmable Gate Arrays: Read only memories, Programmable logic arrays, Programmable array logic, designing with FPGAs, Xilinx series FPGAs.

References

1. Leach, Donald P. *Digital Principles and Applications.* TMH. Sixth Edition
2. Mano, M. M. *Digital Design*. PHI. 2002. 2nd Ed.
3. Palnitkar, S. *Verilog HDL A Guide to Digital Design and Synthesis.* PHI. Latest Edition.

DAV UNIVERSITY, JALANDHAR

Course Name: Digital System Design Laboratory

Paper Code: ECE462

L	T	P	Credits
0	0	3	2

Course Objective

The Course intends to educate the student on the Front end design aspects of Very large Scale Integration Chip manufacturing Cycle with help of practical skills. The course helps the student in understanding the tricks of developing good HDL descriptions.

Learning Outcomes:

- Acquired knowledge of combinational and sequential subcircuit design
- Acquired knowledge to build logic circuits based on PLDs, MUXs, ROMs
- Ability to learn and design Sequential Circuits

List of Experiments

1. To verify the behavior of Basic Logic Gates using Truth Table
2. Implement the design of 1-bit half adder circuit in Verilog, then using half adder design a 1-bit Full Adder.
3. Implementation of 4:1 MUX using 2:1 MUX.
4. Implementation of 8 bit Binary Comparator using 4-bit Binary Comparators
5. Implementation of BCD to 7-segment decoder.
6. Implementation of 4-bit BCD Adder using 4-bit Binary Adders.
7. Implementing a Full Adder using (a) Decoder (b) Multiplexer.
8. Design i) Level Triggered ii) Edge-Triggered SR,D, JK Flip Flops.
9. Develop a behavioural module named UDCounter that takes inputs CLK, RESET, EN, U/D; and counts up/down.
10. Develop a model for Grey Code Converter and write the testbench for the same.
11. Design an ASM that detects a sequence 11001.
12. Design a State Machine that gives a synchronous Grey Code Sequence

DAV UNIVERSITY, JALANDHAR

Course Title: Industrial Training-II

Paper Code: ECE400

L	T	P	Credits
0	0	0	2

Course Objective: To provide hands-on experience where electronics and communication engineering projects are carried out.

Learning Outcome: This will help students to implement the classroom learning in practical life

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

This course is mandatory and the student has to pass the course to become eligible for the award of degree. The student shall make a presentation before a committee constituted by the department which will assess the student based on the report submitted and the presentation made. Marks will be awarded out of 100 and appropriate grades assigned as per the regulations.

DAV UNIVERSITY, JALANDHAR

Course Name: Capstone Project

Paper Code: ECE402

L	T	P	Credits
0	0	8	4

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

Learning outcome: This will help the students such a way that, they carry out a comprehensive work on the chosen topic which will stand them in good stead as they face real life situations. The project work so chosen by the student shall culminate in gaining of major design experience in the related area of specialization

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

DAV UNIVERSITY, JALANDHAR

Course Title: Data Communication

Paper Code: ECE411

L	T	P	Credits
4	0	0	4

Course Objective:

The purpose of this course is to enable the students to understand the basics of Data communications concepts; network topologies; transmission media; network access control; communication protocols; network architecture; LANs, MANs, and WANs; internetworking.

Learning Outcomes

- Student can define and describe network architecture (layered approach and hierarchical approach).
- Student can describe analog and digital signals and their role in data transmission
- Student can describe the multiplexing of signals for data transmission and contention protocols.
- Student can describe data compression, data integrity, data security and their respective related techniques.
- Student can describe the features of flow control and related techniques

Unit-A

Data Communication Concepts (7 Hours)

Networks and open system standards: the OSI reference model, Network topologies and the physical layer, Bus/Tree topology, ring topology, star topology. The future of data communications

Data Transmission (8 Hours)

Transmission modes, Simplex, half-duplex, full-duplex communications, Serial and parallel transmission, Synchronous transmission, Asynchronous transmission, Interface standards, Multiplexing of signals, Data compression

Unit-B

Protocol Concepts - Media Access Control (7 Hours)

Protocol basics, MAC protocols (CSMA/CD and Token passing).

Data Security and Integrity (8 Hours)

Error detection and correction, Encryption and decryption, Viruses, worms, and hacking

Unit-C

Local Area Networks **(7 Hours)**

LAN standards (IEEE standards 802 for LANs), Interconnecting LANs, LAN Hardware (server platforms, backup devices, LAN adapters, printers, etc.), LAN system software, LAN application software, LAN selection criteria.

MANs and WANs **(8 Hours)**

Network routing, Public data networks, Circuit-switched data network, Packet-switched data network, Internet protocol, ISDN, Electronic mail.

Unit-D

Network Architecture **(8 Hours)**

Layered approach, Hierarchical approach.

Network Interconnections (Internetworking) **(7 Hours)**

LAN-to-LAN connections and LAN-to-Host connections o Repeaters, Bridges, Routers, and Gateways, Interconnection utilities

References:

1. Behrouz A. Forouzan *Data Communications and Networking 2/e,* SiE TMH Latest Edition
2. Tanenbaum, A. S. *Computer Networks*. 4th ed. Upper Saddle River, NJ : Prentice Hall, Latest Edition.

DAV UNIVERSITY, JALANDHAR

Course Name: Seminar

Paper Code: ECE450

L	T	P	Credits
0	0	4	2

Course Objective:

- To expose students to the 'real' working environment and get acquainted with the organization structure, business operations and administrative functions.
- To set the stage for future recruitment by potential employers.

Learning outcome:

As a part of the B.Tech ECE curriculum, ECE450-SEMINAR is a Practical course, in which the students of ECE are trained for presentation skills

DAV UNIVERSITY, JALANDHAR

Course Title: Technical Communication Skills
Course Code: ENG351

L	T	P	Credits
3	0	0	3

Course Objective: This paper, with a practice-oriented approach, aims to hone students' skills in all the dimensions of technical communication.

Learning

Outcomes: Students will show adequate understanding of technical communication skills.

Unit-A

- Nature of Technical Communication
- Verbal and Non-Verbal Communication
- Barriers to Communication

Unit-B

- Conversation: Formal and Informal
- Sounds of English (Speech Skills)
- Panel Discussion and Group Discussion
- Oral Presentation

Unit-C

- Report Writing
- Business and Technical Proposals
- Memos

Unit-D

- C.V. and Resume
- Business Letters and Application Letters
- Interview

References

1. Koneru, Aruna. *Professional Communication.* Delhi: McGraw, 2008. Print.
2. Rizvi, M. Ashraf. *Effective Technical Communication.* Delhi: McGraw, Latest Edition. Print.

3. Sharma, R.C. and Krishna Mohan. *Business Correspondence and Report Writing*. Delhi: McGraw, 2013. Print.
4. Tyagi, Kavita and Padma Misra. *Basic Technical Communication*. Delhi: PHI Learning, 2013. Print.

DAV UNIVERSITY, JALANDHAR

Course Title: Virtual Instrumentation

Paper Code: ECE331

L	T	P	Credits
4	0	0	4

Course Objective

To enable the students to understand basics, programming techniques, data acquisition and interfacing techniques of virtual instrumentation and to use VI for different applications.

Learning Outcomes

- The students will be able to familiarize the basics and need of VI.
- The students will be able to learn LabVIEW software basics.
- To get better understanding of data acquisition techniques.
- The students can have an exposure to different interfacing techniques.
- The students can able to design some real time application using LabVIEW software.

Unit-A

Virtual Instrumentation   (12 hours)

Historical perspective, Need of VI, Advantages of VI, Define VI, block diagram & architecture of VI, data flow techniques, graphical programming in data flow, comparison with conventional programming.

VI Programming Techniques   (12 hours)

VIS and sub-VIS, loops & charts, arrays, clusters, graphs, case & sequence structures, formula modes, local and global variable, string & file input.

Unit-B

Data acquisition basics   (12 hours)

Introduction to data acquisition on PC, Sampling fundamentals, Input/output techniques and buses. ADC, DAC, DIO, Counters & timers, PC Hardware structure, timing, interrupts, DMA, Software and Hardware Installation, Simple applications using NI MyDAQ and NI ELVIS.

Unit-C

LabVIEW in signal processing   (12 hours)

Waveform Generation, Sampling, Quantization, Aliasing, Signal Reconstruction. Fourier transforms, Power spectrum, Correlation methods, windowing & flittering. Digital Filter Design, IIR/FIR Filtering system Design, Adaptive Filter design.

DAV UNIVERSITY, JALANDHAR

Unit-D

Frequency domain processing **(12 hours)**

Discrete Fourier Transform and Fast Fourier Transform, STFT, Wavelet Transform, Signal Processing applications.

References

1. Sumathi & P.Surekha. *LabVIEW based Advanced Instrumentation.* Springer, 2007.
2. Jerome, Jovitha. *Virtual Instrumentation Using LabVIEW*. PHI Learning Pvt. Ltd, 2010.
3. Cory L.Clark. Labview *Digital Signal Processing and Digital Communication*.
4. Herbert. A. J. *The structure of Technical English.* Orient Longman, Latest Edition

DAV UNIVERSITY, JALANDHAR

Course Title: Satellite Communication

Paper Code: ECE332

L	T	P	Credits
4	0	0	4

Course Objective:

To enable the student to become familiar with satellites and satellite services.

Learning Outcomes:

- Overview of satellite systems in relation to other terrestrial systems.
- Study of satellite orbits and launching.
- Study of earth segment and space segment components
- Study of satellite access by various users.
- Study of DTH and compression standards.

Unit-A

SATELLITE ORBITS: Kepler's Laws, Newton's law, orbital parameters, orbital perturbations, station keeping, geo stationary and non Geo-stationary orbits – Look Angle Determination- Limits of visibility –eclipse-Sub satellite point –Sun transit outage-Launching Procedures - launch vehicles and propulsion.

Unit-B

SPACE SEGMENT AND SATELLITE LINK DESIGN: Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and command. Satellite uplink and downlink Analysis and Design, link budget, E/N calculation- performance impairments-system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations- System reliability and design lifetime.

Unit-C

SATELLITE ACCESS: Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Brocast, multiple access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum communication, compression – encryption

EARTH SEGMENT: Earth Station Technology--Terrestrial Interface, Transmitter and Receiver, Antenna Systems TVRO, MATV, CATV, Test Equipment Measurements on G/T, C/No, EIRP, Antenna Gain.

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Unit-D

SATELLITE APPLICATIONS: INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB)- Worldspace services, Business TV(BTV), GRAMSAT, Specialized services – E –mail, Video conferencing, Internet

References:

1. Dennis Roddy, 'Satellite Communication', McGraw Hill International, 4th Edition, 2006.
2. Wilbur L. Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, 'Satellite Communication Systems Engineering', Prentice Hall/Pearson, 2007.

DAV UNIVERSITY, JALANDHAR

Course Title: Probability and Random Processes

Paper Code: ECE333

L	T	P	Credits
4	0	0	4

Course Objective:

This course aims at providing the necessary basic concepts in random processes. Knowledge of fundamentals and applications of random phenomena will greatly help in the understanding of topics such as signals & systems, pattern recognition, voice and image processing and filtering theory.

Learning Outcomes: At the end of the course, the students would

- Have a fundamental knowledge of the basic probability concepts.
- Have a well-founded knowledge of standard distributions which can describe real life phenomena.
- Acquire skills in handling situations involving more than one random variable and functions of random variables.
- Understand and characterize phenomena which evolve with respect to time in probabilistic manner.
- Be able to analyze the response of random inputs to linear time invariant systems.

Unit-A

Random Variables: Discrete and continuous random variables – Moments – Moment generating functions and their properties. Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and normal distributions – Function of Random Variable.

Two Dimensional Random Variables: Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Regression – Transformation of random variables – Central limit theorem

Unit-B

Classification of Random Processes: Definition and examples – first order, second order, strictly stationary, wide-sense stationary and ergodic processes – Markov process – Binomial, Poisson and Normal processes – Sine wave process – Random telegraph process.

Unit-C

Correlation and Spectral Densities: Auto correlation – Cross correlation – Properties – Power spectral density – Cross spectral density – Properties – Wiener-Khintchine relation – Relationship between cross power spectrum and cross correlation function

Unit-D

Linear Systems with Random Inputs: Linear time invariant system – System transfer function – Linear systems with random inputs – Auto correlation and cross correlation functions of input and output – white noise.

References:

1. Oliver C. Ibe, "Fundamentals of Applied probability and Random processes", Elsevier, First Indian Reprint (2007) (For units 1 and 2)
2. Peebles Jr. P.Z., "Probability Random Variables and Random Signal Principles", Tata McGraw-Hill Publishers, Fourth Edition, New Delhi, Latest Edition.(For units 3, 4 and 5).
3. Miller,S.L and Childers, S.L, "Probability and Random Processes with applications to Signal Processing and Communications", Elsevier Inc., First Indian Reprint 2007.
4. H. Stark and J.W. Woods, "Probability and Random Processes with Applications to Signal Processing", Pearson Education (Asia), 3rd Edition, Latest Edition.
5. Hwei Hsu, "Schaum's Outline of Theory and Problems of Probability, Random Variables and Random Processes", Tata McGraw-Hill edition, New Delhi, Latest Edition.

DAV UNIVERSITY, JALANDHAR

Course Title: Digital Memory Systems

Paper Code: ECE334

L	T	P	Credits
4	0	0	4

Course Objective:

To learn and understand digital memory systems, organization, applications in computers and digital systems.

Learning Outcome:

* Understand the classifications of memories- ROM, RAM, Volatile and Non-volatile memories.
* Understand the basic memory organization.
* Enable the students to know computer memory systems- memory hierarchy and cache configurations.
* Overall coverage of semiconductor, magnetic and optical memories.

UNIT – A

Introduction

Memory Classification based on size, timing, access pattern, I/O architecture, and Application. Memory Architectures and building blocks.

UNIT – B

Non-volatile semiconductor memories

Read only memories: ROM cells, programming the ROM, NAND ROM, NOR ROM.
Non-volatile Read-Write Memories: Floating gate transistor, EPROM, EEPROM (E^{2}PROM), Flash EEPROM (Flash)

UNIT – C

Volatile semiconductor memories in computers

SRAM – SRAM cell, Operation, Read and Write mechanism, advantages. Computer memory hierarchy – Need, Cache memory (SRAM), different cache configurations, hit rate, access times, direct mapped and set-associative cache configurations.

UNIT – D

DRAM – DRAM cell, Operation, Read-Write mechanisms, charge leakage and refreshing mechanism.
Magnetic Memories: Floppy Disk Drives (FDD), Hard Disk Drives (HDD), their working principle, data encoding, read-write heads, physical organization of disks.

Optical Memories: CD, DVD, Blue-Ray technology: Read/Write mechanisms, R/W speed, data capacity, data organization on tracks and sectors.

References:

1. John L. Hennessy, David A. Patterson, "Computer Architecture – A Quantitative Approach", Morgan-Kaufman, Fifth edition, 2012.

2. Bruce Jacob, Spencer W.Ng., "Memory Systems- Cache, DRAM, Disk", Elsevier, 2008.

3. J. Rabaey, A. Chandrakasan, B. Nikolic, "Digital Integrated Circuits – A Design Perspective", 2nd Edition, PHI, 2013.

DAV UNIVERSITY, JALANDHAR

Course Title: MEMS Fundamentals	**L**	**T**	**P**	**Credits**
Paper Code: ECE431	4	0	0	4

Course Objective:

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

Learning Outcomes:

This course will lead the students to learn

- MEMS and micro fabrication.
- Essential electrical and mechanical concepts of MEMS.
- Various sensing and actuating technique.
- The polymer and optical MEMS.

Unit-A

Introduction to MEMS and Micro Fabrication (12 hours)

History of MEMS Development, Characteristics of MEMS, Miniaturization, Microelectronics integration, Mass fabrication with precision, Sensors and Actuators, Energy domain, Micro fabrication, microelectronics fabrication process, Silicon based MEMS processes, New material and fabrication processing, Points of consideration for processing. Anisotropic wet etching, Isotropic wet etching, Dry etching of silicon, deep reactive ion etching (DRIE), and Surface micromachining process, structural and sacrificial material.

Electrical and Mechanical concepts of MEMS (12 hours)

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

Unit-B

Electrostatic and thermal principle sensing and actuation (12 hours)

Electrostatic sensing and actuation, Parallel plate capacitor , Application, Inertial, pressure and tactile

sensor parallel plate actuator, comb drive, Thermal sensing and Actuations, Thermal sensors, Actuators, Applications Inertial, flow and infrared sensors.

Unit-C

Piezoresistive, piezoelectric and magnetic principle sensors and actuator **(12 hours)**

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

Unit-D

Polymer and Optical MEMS **(12 hours)**

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

References

1. Chang Liu. *Foundations of MEMS.* Pearson Indian Print. 2012 1st Edition.
2. Rebiz, Gaberiel M. *RF MEMS Theory,Design and Technology.* John Wiley & Sons, 2003.
3. Charles P. Poole and Frank J. Owens. *Introduction to Nanotechnology.* John Wiley & Sons, 2003.
4. Gardner, Julian W and Vijay K Varadhan. *Microsensors, MEMS and Smart Devices.* John Wiley & sons, Latest Edition.

DAV UNIVERSITY, JALANDHAR

Course Title: Optical Fibre Communication

Paper Code: ECE432

L	T	P	Credits
4	0	0	4

Course Objective:

To expose the basics of optical devices and components. To expose various optical fiber modes configurations and various signal degradation factors associated with optical fiber and to the design simple optical communication system.

Learning Outcomes:

This course will help the students

- To understand all Optical devices and components.
- To understand the principles of fiber-optic communications and the different kind of losses, signal distortion in optical wave guides and other signal degradation factors.
- To design the optical communication system.

Unit-A

Introduction **(10 hours)**

Need of Fiber Optic Communications, Evolution of Light wave Systems, Basic Concepts; Analog & Digital Signals, Optical Fibers as a Communication Channel, Optical Transmitters, Optical Receivers.

Optical Fibers **(8 hours)**

Geometrical-Optics Description; Step-Index Fibers, Graded Index Fibers, Single-Mode-Fibers, Fiber Losses; Attenuation Coefficient, Material Absorption, Rayleigh scattering, wave guide Imperfections, Fiber Manufacturing; Design Issues, Fabrication Methods, Cables and Connectors

Unit-B

Optical Transmitters **(12 hours)**

Basic Concepts; Emission and Absorption Rates, p-n Junctions, Non radiative Recombination, Semiconductor Materials, Light Emitting Diodes; Power-current Characteristics, LED spectrum, Modulation Response, LED Structures, Semi-Conductor Lasers

Unit-C

Optical Receivers **(14 hours)**

Basic concepts, p-n Photo Diodes, p-i-n Photo Diodes, Avalanche Photo Diode, MSM Photo detector, Receiver Design, Receiver Noise; Noise mechanism, Receiver sensitivity; Bit error rate, Minimum Receiver Power, Sensitivity Degradation, Receiver Performance.

Unit-D

Light Wave Systems **(10 hours)**

System Architecture, Loss limited Light wave systems, Dispersion limited Light wave systems, Power Budget, Long Haul systems, Sources of Power Penalty; Model Noise,

Multi-channel Systems **(6 hours)**

WDM Light wave systems, Optical TDM Systems, Subscriber Multiplexing, and Code Division Multiplexing.

References

1. Maenbaev & Scheiner. *Fiber optic Communications Technology.* Pearson Publications
2. Senior J. *Optical Fiber Communications Principles & Practice*. PHI.
3. Keiser, G. *Optical Fiber Communication*. McGraw Hill.

DAV UNIVERSITY, JALANDHAR

Course Title: Digital Image Processing and Pattern Recognition

Paper Code: ECE433

L	T	P	Credits
4	0	0	4

Course Objectives:

Introduce the student to analytical tools and methods which are currently used in digital image processing as applied to image information for human viewing. Then apply these tools in the laboratory in image restoration, enhancement and compression and pattern recognition.

Learning Outcomes:

This will help the student to

1. Develop an overview of the field of image processing.
2. Understand the fundamental algorithms and how to implement them.
3. Prepare to read the current image processing research literature.
4. Gain experience in applying image processing algorithms to real problem

Unit-A

Introduction: Digital Image processing, Origins of DIP, Examples, Fundamental steps in DIP, Components of DIP

Fundamentals: Elements of visual perception, Light and the electromagnetic spectrum, Image Sensing and acquisition, Image sampling and quantization, basic relationships between pixels

Unit-B

Image Enhancement Background, some basic gray level transformation, Histogram processing, enhancement using arithmetic/Logic operation, Basics of Spatial filtering, smoothing spatial filters, sharpening spatial filters, Introduction to the Fourier transform and the frequency domain, smoothing frequency domain filters, sharpening frequency domain filters, homomorphic filters & implementation

Unit-C

Image restoration: Noise models, restoration in the presence of noise only – spatial filtering, Periodic noise reduction by frequency domain filtering. Inverse filtering

Image compression: Fundamentals. Image compression models, error free compression, lossy compression

Unit-D

Pattern Recognition: Introduction, Probability, Statistical decision making, nonparametric decision

making, Clustering, Processing of waveforms, Image analysis.

References

1. Digital Image Processing, Woods & Gangzlez
2. Pattern Recognition, Pau & Gonzalez.

Course Title: CMOS Circuit Design

Paper Code: ECE434

L	T	P	Credits
4	0	0	4

Course Objective:

Learn, Understand and acquire ability to design CMOS Logic Circuits.

Learning Outcome:

- Understand the Physics of MOS device.

- Understand the CMOS process technology.

- Ability to design layout of CMOS circuits.

- Understand the characteristics of CMOS circuits.

- Ability to understand the basic difference between static and dynamic CMOS logic circuits.

- Understand CMOS transmission gates, latches and registers.

Unit-A

Introduction

Overview of VLSI Design Methodologies, VLSI Design Flow, Design Hierarchy. MOSFET Fabrication: Fabrication process flow, NMOS and CMOS fabrication.

Unit-B

MOS Transistor

MOS Structure, The MOS System under external bias, Operation of MOSFET, MOSFET Current/ Voltage Characteristics, Scaling and Small geometry effects and capacitances.

MOS Inverters

Introduction, Resistive Load Inverter, Inverters with n-type MOSFET load, CMOS Inverter. Switching Characteristics: Introduction, Delay – Time Definitions, Calculation of Delay Times, and Inverter Design with Delay Constraints.

Unit-C

Combinational MOS Logic Circuits

Introduction, MOS logic circuits with depletion NMOS Loads, CMOS logic circuits, complex logic circuits, CMOS transmission gates (pass gates).

Sequential MOS Logic Circuits

Introduction, behavior Bistable elements, SR latch circuits, clocked latch and FF circuits, CMOS D latch and edge triggered FF.

Unit-D

Dynamic logic circuits

Introduction, basic principle of pass transistor circuits, synchronous dynamic circuit techniques, dynamic CMOS circuit techniques, domino CMOS logic.

Low – Power CMOS Logic Circuits

Introduction, Overview of Power Consumption

References:

1. Sung-Mo Kang & Yosuf Leblebici, "CMOS Digital Integrated Circuits: Analysis & Design", TMH, 3rd Edition.
2. D. A. Pucknell and K. Eshraghian, "Basic VLSI Design: Systems and Circuits", PHI, 3rd Ed.
3. W. Wolf, Modern VLSI Design: System on Chip, Third Edition, Pearson, Latest Edition.

DAV UNIVERSITY, JALANDHAR

Course Title: Electronic Sensors and Transducers

Paper Code: ECE441

L	T	P	Credits
4	0	0	4

Course Objective:

To impart knowledge on various types of sensors and transducers, for the automation in science, engineering and medicine.

Learning outcomes:

The study of this course will lead to

- Understanding the basic concepts of various sensors and transducers.
- Develop knowledge in selection of suitable sensor based on requirement and application.

Unit-A

Introduction **(12 hours)**

Definition, classification, static and dynamic parameters, Characterization , Electrical, mechanical, thermal, optical, biological and chemical, Classification of errors , Error analysis, Static and dynamic characteristics of transducers, Performance measures of sensors.

Mechanical and electromechanical sensors **(12 hours)**

Resistive potentiometer, strain gauge, Inductive sensors and transducer, capacitive sensors, ultrasonic sensors.

Unit-B

Thermal and radiation sensor **(12 hours)**

Thermal Sensors: Gas thermometric sensors, acoustic temperature sensors, magnetic thermometer, resistance change -type thermometric sensors, thermo emf sensors, junction semiconductor types, Thermal radiation sensors, spectroscopic thermometry, Radiation Sensors: Photo detectors, photovoltaic and photo junction cells, photo sensitive cell, photo FETs and other devices.

Unit-C

Magnetic and electro-analytical sensor **(12 hours)**

Magnetic Sensors: Force and displacement measurement, magneto resistive sensors, Hall Effect sensor, Inductance and eddy current sensors, Angular/rotary movement transducer, Electromagnetic flow meter, squid sensor. Electro-analytical Sensors: Electro chemical cell, cell potential, sensor electrodes, electro ceramics in gas media, chemFET.

DAV UNIVERSITY, JALANDHAR

Unit-D

Sensors and their applications **(12 hours)**

Automobile sensor, Home appliance sensor, Aerospace sensors, sensors for manufacturing, medical diagnostic sensors and environmental monitoring.

References

1. Patranabis, D. *Sensor and Actuators.* Prentice Hall of India (Pvt) Ltd., 2006.
2. Ian Sinclair. Sensor and Transducers. Elsevier India Pvt Ltd, 2011, 3rd Edtion.
3. Sawhney.A.K, Puneeth sawhney. *A Course in Electrical and Electronic Measurements and Instrumentation.* Dhanpat Rai Publications, 2012.
4. Ernest O. Doeblin. *Measurement System, Application and Design*. Tata McGraw Hill Publishing Company Ltd., 2008, 5th Edition.

Course Title: Wireless Communication

Paper Code: ECE442

L	T	P	Credits
4	0	0	4

Course Objective:

To introduce students to the concepts of wireless systems and mobile systems.

Learning Outcomes:

To understand and gain complete knowledge about

- Basic wireless, cellular concepts.

- Radio wave propagation and Mobile Channel models.

- Various performance analysis of mobile communication system

- Standards 1G, 2G Basic system available.

Unit-A

Introduction **(10 hours)**

Mobile Radio Systems around the world, Examples of Wireless Communication Systems; Paging Systems, Cordless Telephone Systems, Cellular Telephone Systems, Comparison of common Wireless Communication systems

Digital Communication through fading multipath channels **(10 hours)**

Fading channel and their characteristics- Channel modelling, Digital signaling over a frequency non selective slowly fading channel- frequency selective slowly fading channel- Calculation of error probabilities- Tapped Delay line model- The RAKE demodulator- performance-Concept of diversity branches and signal paths- Combining methods- Selective diversity combining-pre-detection and post-detection combining- Switched combining- maximal ratio combining- Equal gain combining.

Unit-B

Multiple Access Techniques for Wireless Communications **(7 hours)**

Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Spread Spectrum Multiple Access, Space Division Multiple Access, Packet Radio Protocols; Pure ALOHA, Slotted ALOHA, Capacity of Cellular Systems

Wireless Networking **(10 hours)**

Introduction, Difference between Wireless & Fixed Telephone Networks, Development of Wireless Networks, Traffic Routing in Wireless Networks, Wireless Data Services, Common Channel signaling,

broad band ISDN & ATM, Signaling System No. 7(SS-7), Personal Communication Services/ Networks, Protocols for Network Access, Network Databases.

<div align="center">Unit-C</div>

Wireless Systems & Standards (10 hours)

AMPS and ETACS, United States digital cellular (IS- 54 & IS 136), Global system for Mobile (GSM); Services, Features, System Architecture, and Channel Types, Frame Structure for GSM, Speech Processing in GSM, CDMA Digital standard (IS 95); Frequency and Channel specifications, Forward CDMA Channel, Reverse CDMA Channel, CT2 Standard for Cordless Telephones, Personal Access Communication System, Pacific Digital Cellular, Personal Handyphone Systems, PCS and ISM Bands, Wireless Cable Television.

<div align="center">Unit-D</div>

Wireless Local Area Networks (WLAN) (10 hours)

Components and working of WLAN, transmission media for WLAN, Modulation techniques for WLAN (DSSS, FHSS), IEEE802.11 standards and protocols for WLAN (MACA, MACAW). Mobile Network and Transport layer: Mobile IP, Mobile TCP, traffic routing in wireless networks, wireless ATM. Wireless Local Loop (WLL), WLL Architecture, WLL Technologies and frequency spectrum.

Future trends (3 hours)

Blue Tooth technology, 4G mobile techniques, Wi-Fi Technology.

References:

1. Rappaport, Theodore S. *Wireless communications: Principles and practice.* Pearson Education
2. Pandya, Raj. *Mobile and Personal Communication systems and services.* Prentice Hall of India

DAV UNIVERSITY, JALANDHAR

Course Title: Multirate Systems and Filter Banks

Paper Code: ECE443

L	T	P	Credits
4	0	0	4

Course Objective:

The aim of this course is to introduce the idea of filter banks and wavelets and to describe the manner in which technical developments related to wavelets have led to numerous applications

Learning Outcomes:

After completing this course the student will be able to understand

- The design of various digital filters and multirate filters
- Design of perfect reconstruction filter banks for various applications
- Discrete Wavelet transform and its filter banks implementation
- Filter banks for Bio-signal analysis and audio and speech processing

Unit-A

Introduction: Review of discrete time systems, review of digital filters, filter design specifications, FIR filter design and IIR filter design.

Fundamentals of Multirate systems: Basic multirate operations, Interconnection of Building blocks, the polyphase representation, multistage implementations, applications of multirate systems.

Unit-B

Maximally Decimated Filter Banks: QMF filter banks, Errors created in QMF filter bank, A simple Alias free QMF system, Power symmetric QMF filter banks, M-channel filter banks, polyphase representation, perfect reconstruction systems

Unit-C

Para-unitary Perfect Reconstruction filter banks: Lossless transfer matrices, Filter bank properties introduced by para-unitariness, Two channel FIR Para-unitary QMF filter banks

Cosine Modulated filter bank: The pseudo QMF filter bank, Design of pseudo QMF bank, Cosine modulated perfect reconstruction systems

Unit-D

The wavelet transform and its relation to filter banks: The short time Fourier transform, the wavelet transform, discrete time orthogonal wavelets, continuous time orthonormal wavelet basis.

References

1. P. P. Vaidyanathan, Multirate Systems and Filter Banks , Pearson Education, Low Price Edition

2. K. P. Soman, K. I. Ramachandran, "Insight Into Wavelets - From Theory to Practice", Prentice Hall of India, Eastern Economy Edition, Prentice Hall of India Private Limited, M-97, Connaught Circus, New Delhi - 110 001, Copyright 2004, ISBN Number 81-203-2650-4.

DAV UNIVERSITY, JALANDHAR

Course Title: Digital Computer Design

Paper Code: ECE444

L	T	P	Credits
4	0	0	4

Course Objective:

To study the basic structure of a digital computer and to discuss in detail the organization of the Control unit, the Arithmetic and Logical unit, the Memory unit and the I/O unit.

Learning Outcome:

* Understanding of the basic structure and operation of a digital computer.
* Details of the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication &division.
* Details of the different types of control and the concept of pipelining.
* Hierarchical memory system including cache memories and virtual memory.

UNIT A

INTRODUCTION   (9 hours)

Evolution of Computers, VLSI Era, System Design- Register Level, Processor Level, CPU Organization, Data Representation, Fixed – Point Numbers, Floating Point Numbers, Instruction Formats, Instruction Types, Addressing modes.

DATA PATH DESIGN   (9 hours)

Fixed Point Arithmetic, Addition, Subtraction, Multiplication and Division, Combinational and Sequential ALUs, Carry look ahead adder, Robertson Algorithm, Booth's algorithm, non-restoring division algorithm, Floating Point Arithmetic, Pipeline Processing, Modified booth's Algorithm

UNIT B

CONTROL DESIGN   (9 hours)

Hardwired Control, Micro programmed Control, Multiplier Control Unit, CPU Control Unit, Pipeline Control, Instruction Pipelines, Pipeline Performance, and Superscalar Processing

UNIT C

MEMORY ORGANIZATION   (9 hours)

Random Access Memories, Serial - Access Memories, RAM Interfaces, Magnetic Surface Recording, Optical Memories, multilevel memories, Cache & Virtual Memory, Memory Allocation, Associative Memory.

UNIT D

SYSTEM ORGANIZATION **(9 hours)**

Communication methods, Buses, Bus Control, Bus Interfacing, Bus arbitration, IO and system control, IO interface circuits, Handshaking, DMA and interrupts

References:

1. John P.Hayes, "Computer architecture and Organisation", Tata McGraw-Hill, Third edition, 2012.
2. Carl.V. Hamacher, Zvonko Varanesic.G. and Safat G.Zaky, "Computer Organisation", V Edition, Reprint 2012,Tata McGraw-Hill Inc.
3. Morris Mano, "Computer System Architecture", Third Edition,Prentice-Hall of India, Latest Edition.
4. Paraami, "Computer Architecture", Eighth impression, 2011, Oxford Press.
5. Pal Chaudhuri. P, "Computer organization and design", 2nd Edition, Prentice Hall of India, 2007.

DAV UNIVERSITY, JALANDHAR

Course Title: Remote Sensing

Paper Code: ECE471

L	T	P	Credits
4	0	0	4

Course Objective:

- To provide exposure to students in gaining knowledge on concepts and applications leading to modelling of earth resources management using Remote Sensing
- To acquire skills in storing, managing digital data for planning and development.

Learning Outcomes:

- Fully equipped with concepts, methodologies and applications of Remote Sensing Technology.
- Acquire skills in handling instruments, tools, techniques and modeling while using Remote Sensing Technology
- It empowers the candidate with confidence and leadership qualities.

Unit-A

Remote Sensing : Definition – Components of Remote Sensing – Energy, Sensor, Interacting Body - Active and Passive Remote Sensing – Platforms – Aerial and Space Platforms – Balloons, Helicopters, Aircraft and Satellites – Synoptivity and Repetivity – Electro Magnetic Radiation (EMR) – EMR spectrum – Visible, Infra-Red (IR), Near IR, Middle IR, Thermal IR and Microwave – Black Body Radiation - Planck's law – Stefan-Boltzman law.

Unit-B

EMR interaction with atmosphere and earth materials: Atmospheric characteristics – Scattering of EMR – Raleigh, Mie, Non-selective and Raman Scattering – EMR Interaction with Water vapour and ozone – Atmospheric Windows – Significance of Atmospheric windows – EMR interaction with Earth Surface Materials – Radiance, Irradiance, Incident, Reflected, Absorbed and Transmitted Energy. Reflectance – Specular and Diffuse Reflection Surfaces- Spectral Signature – Spectral Signature curves – EMR interaction with water, soil and Earth Surface: Imaging spectrometry and spectral characteristics.

Unit-C

Optical and Microwave Remote Sensing: Satellites - Classification – Based on Orbits and Purpose – Satellite Sensors - Resolution – Description of Multi Spectral Scanning – Along and Across Track Scanners– Description of Sensors in Landsat, SPOT, IRS series – Current Satellites - Radar – Speckle - Back Scattering – Side Looking Airborne Radar – Synthetic Aperture Radar – Radiometer – Geometrical characteristics; Sonar remote sensing systems.

Unit-D

Geographic Information System: GIS – Components of GIS – Hardware, Software and Organizational Context – Data – Spatial and Non-Spatial – Maps – Types of Maps – Projection – Types of Projection - Data Input – Digitizer, Scanner – Editing – Raster and Vector data structures – Comparison of Raster and Vector data structure – Analysis using Raster and Vector data – Retrieval, Reclassification, Overlaying, Buffering – Data Output – Printers and Plotters

Miscellaneous Topics: Visual Interpretation of Satellite Images – Elements of Interpretation - Interpretation Keys Characteristics of Digital Satellite Image – Image enhancement – Filtering – Classification - Integration of GIS and Remote Sensing – Application of Remote Sensing and GIS – Urban Applications- Integration of GIS and Remote Sensing – Application of Remote Sensing and GIS – Water resources – Urban Analysis – Watershed Management – Resources Information Systems. Global positioning system – an introduction.

References:
1. M.G. Srinivas(Edited by), Remote Sensing Applications, Narosa Publishing House, Latest Edition. (Units 1 & 2).
2. Anji Reddy, Remote Sensing and Geographical Information Systems, BS Publications Latest Edition (Units 3, 4 & 5).

DAV UNIVERSITY, JALANDHAR

Course Title: Telecommunication Switching and Networks

Paper Code: ECE472

L	T	P	Credits
4	0	0	4

Course Objective:

To introduce fundamentals functions of a telecom switching office, namely, digital multiplexing, digital switching and digital subscriber access.

Learning Outcomes

- Student will understand the concepts of Frequency and Time division multiplexing.
- Student will understand digital multiplexing and digital hierarchy namely SONET / SDH

Unit-A

Multiplexing: Transmission Systems, FDM Multiplexing and modulation, Time Division Multiplexing, Digital Transmission and Multiplexing: Pulse Transmission, Line Coding, Binary N-Zero Substitution, Digital Biphase, Differential Encoding, Time Division Multiplexing, Time Division Multiplex Loops and Rings, SONET/SDH: SONET Multiplexing Overview, SONET Frame Formats, SONET Operations, Administration and Maintenance, Payload Framing and Frequency Justification, Virtual Tributaries, DS3 Payload Mapping, E4 Payload Mapping, SONET Optical Standards, SONET Networks. SONET Rings: Unidirectional Path-Switched Ring, Bidirectional Line-Switched Ring.

Unit-B

Digital Switching: Switching Functions, Space Division Switching, Time Division Switching, two- dimensional Switching: STS Switching, TST Switching, No.4 ESS Toll Switch, Digital Cross-Connect Systems, Digital Switching in an Analog Environment. Elements of SS7 signaling.

Network Synchronization Control and Management: Timing: Timing Recovery: Phase-Locked Loop, Clock Instability, Jitter Measurements, Systematic Jitter. Timing Inaccuracies: Slips, Asynchronous Multiplexing, Network Synchronization, U.S. Network Synchronization, Network Control, Network Management.

Unit-C

Digital Subscriber Access: ISDN Basic Rate Access Architecture, ISDN U Interface, ISDN D Channel Protocol. High-Data-Rate Digital Subscriber Loops: Asymmetric Digital Subscriber Line, VDSL. Digital Loop Carrier Systems: Universal Digital Loop Carrier Systems, Integrated Digital Loop Carrier Systems, Next-Generation Digital Loop Carrier, Fiber in the Loop, Hybrid Fiber Coax Systems, Voice band Modems: PCM Modems, Local Microwave Distribution Service, Digital Satellite Services.

Unit-D

Traffic Analysis: Traffic Characterization: Arrival Distributions, Holding Time Distributions, Loss Systems, Network Blocking Probabilities: End-to-End Blocking Probabilities, Overflow Traffic, Delay Systems: Exponential service Times, Constant Service Times, Finite Queues

References

1. J. Bellamy, "Digital Telephony", John Wiley, 2003, 3rd Edition.
2. JE Flood, "Telecommunications Switching, Traffic and Networks", Pearson

DAV UNIVERSITY, JALANDHAR

Course Title: Wavelet Theory and Applications

Paper Code: ECE473

L	T	P	Credits
4	0	0	4

Course Objectives: The objective of this course is to establish the theory necessary to understand and use wavelets and related constructions. A particular emphasis will be put on constructions that are amenable to efficient algorithms, since ultimately these are the ones that are likely to have an impact.

Learning Outcomes:
- To gain ability to analyse CWT and DWT.
- To gain ability to understand the applications of wavelet theory

Unit-A

Continuous Wavelet Transform Introduction, Continuous-time wavelets, Definition of the CWT, the VWT as a Correlation, Constant-Factor Filtering Interpretation and Time-Frequency Resolution, the VWT as an Operator, Inverse CWT, Problems.

Unit-B

Introduction to Discrete Wavelet Transform and Orthogonal Wavelet Decomposition:

Introduction, Approximation of Vectors in Nested Linear Vector Subspaces, Examples of an MRA, Problems.

Unit-C

MRA, Orthonormal Wavelets, And Their Relationship To Filter Banks: Introduction, Formal Definition of an MRA, Construction of General Orthonormal MRA, a wavelet Basic for the MRA, Digital Filtering Interpretation, Examples of Orthogonal Basic Generating Wavelets, Interpreting Orthonormal MRAs for Discrete-Time signals, Miscellaneous Issues Related to PRQME Filter Banks, generating Scaling Functions and wavelets from Filter Coefficient, Problems.

Unit-D

Wavelet Transform And Data Compression: Introduction, Transform Coding, DTWT for Image Compression, Audio Compression, And Video Coding Using Multi-resolution Techniques: a Brief Introduction.

References:
1. James S. Walker, "A Primer on Wavelets and their Scientific Applications", CRC Press.

2. Rao, "Wavelet Transforms", Pearson Education, Asia.
3. C. Sidney Burrus, Ramesh A. Gopinath, "Introduction to Wavelets and Wavelets Transforms", Prentice Hall.