DAV UNIVERSITY, JALANDHAR

DAV UNIVERSITY JALANDHAR

Course Scheme & Syllabus

For

B.Tech(Electronics and Communication Engineering)
(Program ID-17, 18)

1stTO 8thSEMESTER

Examinations 2014–2015 Session onwards

Syllabi Applicable For Admissions in 2014

DAV UNIVERSITY, JALANDHAR

Scheme of Courses B.Tech
B.Tech(Electronics and Communication Engineering)
Semester 1

S.No	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	MTH151	ENGINEERING MATHEMATICS-I	4	1	0	4	25	25	25	25	100
2	CHE151	CHEMISTRY	3	0	0	3	25	25	25	25	75
3	CSE101	BASIC COMPUTER TRENDS	4	0	0	4	25	25	25	25	100
4	EVS101	ENVIRONMENT EDUCATION, ROAD SAFETY AND LEGAL AWARENESS	4	0	0	4	25	25	25	25	100
5	SGS101	HUMAN VALUES & ETHICS	2	0	0	2	25	25	25	25	50
6	SGS104	STENOGRAPHY	2	0	0	2	25	25	25	25	50
7	MEC101	ENGINEERING DRAWING	2	0	4	4	25	25	25	25	100
8	CSE102	BASIC COMPUTER TRENDS -LAB	0	0	4	2	-	-	-	-	50
9	CHE152	CHEMISTRY-LAB	0	0	2	1	-	-	-	-	25
			21	**1**	**10**	**26**					**650**

A: <u>Continuous Assessment:</u>   Based on Objective Type Tests

  B: <u>Mid-Term Test-1:</u>   Based on Objective Type and Subjective Type Test

  C: <u>Mid-Term Test-2:</u>   Based on Objective Type and Subjective Type Test

  D: <u>End-Term Exam (Final):</u>   Based on Objective Type Tests

  E: Total Marks

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

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Scheme of Courses B.Tech

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Semester 2

S.No	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	MTH152	ENGINEERING MATHEMATICS-II	4	1	0	4	25	25	25	25	100
2	PHY151	PHYSICS	3	0	0	3	25	25	25	25	75
3	MEC102	FUNDAMENTALS OF MECHANICAL ENGINEERING	4	0	0	4	25	25	25	25	100
4	ELE101	ELECTRICAL & ELECTRONICS TECHNOLOGY	4	1	0	4	25	25	25	25	100
5	ENG151	BASIC COMMUNICATION SKILLS	3	0	0	3	25	25	25	25	75
6	SGS102	GENERAL KNOWLEDGE &CURRENT AFFAIRS	2	0	0	2	25	25	25	25	50
7	MGT151	FUNDAMENTALS OF MANAGEMENT	2	0	0	2	25	25	25	25	50
8	MEC104	MANUFACTURING PRACTICE	0	0	4	2	-	-	-	-	50
9	ELE102	ELECTRICAL & ELECTRONICS TECHNOLOGY -LAB	0	0	4	2	-	-	-	-	50
10	ENG152	BASIC COMMUNICATION SKILLS -LAB	0	0	2	1	-	-	-	-	25
11	PHY152	PHYSICS-LAB	0	0	2	1	-	-	-	-	25
			20	**2**	**12**	**28**					**700**

A: <u>Continuous Assessment:</u>   Based on Objective Type Tests

B: <u>Mid-Term Test-1:</u>   Based on Objective Type and Subjective Type Test

C: <u>Mid-Term Test-2:</u>   Based on Objective Type and Subjective Type Test

D: <u>End-Term Exam (Final):</u>   Based on Objective Type Tests

E: Total Marks

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Semester 3

S.No	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	ECE201	DIGITALELECTRONICS	4	0	0	4	25	25	25	25	100
2	ECE202	ELECTRONIC DEVICESAND CIRCUITS	4	0	0	4	25	25	25	25	100
3	ELE201	CIRCUITTHEORY	4	0	0	4	25	25	25	25	100
4	ENG251	ADVANCED COMMUNICATION SKILLS	4	1	0	4	25	25	25	25	100
5	CSE201	OBJECTORIENTEDPROGRAMMING	4	0	0	4	25	25	25	25	100
6	MTH252	ENGINEERINGMATHEMATICSIII	4	1	0	4	25	25	25	25	100
7	ECE204	DIGITALELECTRONICS LABORATORY	0	0	2	1	20			80	25
8	ECE205	ELECTRONIC DEVICESAND CIRCUITS LABORATORY	0	0	2	1	20			80	25
9	CSE205	OBJECTORIENTEDPROGRAMMING LABORATORY	0	0	4	2	20			80	50
			24	2	8	28					700

A: <u>Continuous Assessment:</u>   Based on Objective Type Tests
B: <u>Mid-Term Test-1:</u>   Based on Objective Type and Subjective Type Test
C: <u>Mid-Term Test-2:</u>   Based on Objective Type and Subjective Type Test
D: <u>End-Term Exam (Final):</u>   Based on Objective Type Tests
E: Total Marks
L: Lectures   T: Tutorial   P: Practical   Cr: Credits

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Semester 4

S.No	Paper Code	CourseTitle	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	ICE208	LINEAR CONTROLSYSTEMS	4	0	0	4	25	25	25	25	100
2	ECE207	ANALOGCOMMUNICATION SYSTEMS	3	0	0	3	25	25	25	25	75
3	ECE203	ELECTRONICS MEASUREMENTS AND INSTRUMENTATION	4	0	0	4	25	25	25	25	100
4	ECE209	SIGNALSAND SYSTEMS	4	0	0	4	25	25	25	25	100
5	ECE210	ELECTROMAGNETIC FIELD THEORY	4	0	0	4	25	25	25	25	100
6	ECE211	ANALOGELECTRONICS	4	0	0	4	25	25	25	25	100
7	ECE212	ANALOGCOMMUNICATION SYSTEMS LABORATORY	0	0	2	1	20			80	25
8	ECE213	SIGNALSAND SYSTEMSLABORATORY USINGMATLAB/MENTOR DSP	0	0	2	1	20			80	25
9	ECE214	ANALOGELECTRONICS LABORATORY	0	0	3	2	20			80	50
10	ECE206	ELECTRONICS MEASUREMENTS AND INSTRUMENTATION LABORATORY	0	0	2	1	20			80	25
			23	**0**	**9**	**28**					**700**

Note:At theend ofthe examination of 4thSemesterthestudentswill undergocompulsorysummertrainingfora periodof4weeks.Every studentwill submittheSummerTrainingReport withintwo weeks fromthestartof teachingfor5thSemester.

A: <u>Continuous Assessment:</u>   Based on Objective Type Tests
B: <u>Mid-Term Test-1:</u>   Based on Objective Type and Subjective Type Test

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C: <u>Mid-Term Test-2:</u>   Based on Objective Type and Subjective Type Test
D: <u>End-Term Exam (Final):</u>   Based on Objective Type Tests
E: Total Marks
L: Lectures   T: Tutorial   P: Practical   Cr: Credits

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Semester 5

S.No	Paper Code	CourseTitle	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	ECE301	MICROPROCESSORSAND MICROCONTROLLER	4	0	0	4	25	25	25	25	100
2	ECE302	DIGITALCOMMUNICATIONSYSTEM	4	0	0	4	25	25	25	25	100
3	CSE353	DATASTRUCTURES	4	0	0	4	25	25	25	25	100
4	ECE304	LINEAR INTEGRATEDCIRCUITS	3	0	0	3	25	25	25	25	75
5	ECE305	ANTENNAENGINEERING	4	0	0	4	25	25	25	25	100
6	ECE306	MICROPROCESSORSAND MICROCONTROLLERLABORATORY	0	0	3	2	25	25	25	25	50
7	ECE307	DIGITALCOMMUNICATIONSYSTEM LABORATORY	0	0	3	2		20		80	50
8	ECE308	LINEAR INTEGRATEDCIRCUITS LABORATORY	0	0	2	1		20		80	25
9	ECE315	INDUSTRIALTRAINING-I	0	0	0	4		20		80	100
			19	0	8	28					700

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C: <u>Mid-Term Test-2:</u>   Based on Objective Type and Subjective Type Test
D: <u>End-Term Exam (Final):</u>   Based on Objective Type Tests
E: Total Marks
L: Lectures   T: Tutorial   P: Practical   Cr: Credits

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Semester 6

S.No	Paper Code	CourseTitle	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	ECE309	MICROWAVEAND RADAR ENGINEERING	4	0	0	4	25	25	25	25	100
2		OPEN ELECTIVEI	3	0	0	3	25	25	25	25	75
3	ECE	ELECTIVE I	3	0	0	3	25	25	25	25	75
4	ECE310	EMBEDDED SYSTEMS	3	0	0	3	25	25	25	25	75
5	VLS402	VLSI TECHNOLOGY	3	0	0	3	25	25	25	25	75
5	ECE311	DIGITALSIGNALPROCESSING	4	0	0	4	25	25	25	25	100
6	ECE312	MICROWAVEAND RADARENGINEERING LABORATORY	0	0	3	2	20			80	50
7	ECE313	EMBEDDED SYSTEMSLABORATORY	0	0	3	2	20			80	50
8	ECE314	DIGITALSIGNALPROCESSING LABORATORY	0	0	3	2	20			80	50
			20	**0**	**9**	**26**					**650**

A: <u>Continuous Assessment:</u>   Based on Objective Type Tests
   B: <u>Mid-Term Test-1:</u>   Based on Objective Type and Subjective Type Test
   C: <u>Mid-Term Test-2:</u>   Based on Objective Type and Subjective Type Test
   D: <u>End-Term Exam (Final):</u> Based on Objective Type Tests
   E: Total Marks
   L: Lectures   T: Tutorial   P: Practical   Cr: Credits

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Semester 7

S.No	PaperCode	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	CSE351	INTRODUCTION TO COMPUTERNETWORKS	4	0	0	4	25	25	25	25	100
2		OPEN ELECTIVE II	3	0	0	3	25	25	25	25	75
3	ECE461	DIGITAL SYSTEMDESIGN	4	0	0	4	25	25	25	25	100
4	ECE	ELECTIVEII	3	0	0	3	25	25	25	25	75
5	ECE	ELECTIVEIII	3	0	0	3	25	25	25	25	75
6	ECE402	CAPSTONEPROJECT	0	0	0	6	25	25	25	25	150
7	ECE462	DIGITAL SYSTEMDESIGN LABORATORY	0	0	3	2	20			80	50
8	CSE361	INTRODUCTION TO COMPUTERNETWORKS LABORATORY	0	0	3	2	20			80	50
			17	**0**	**6**	**27**					**675**

A: <u>Continuous Assessment:</u>   Based on Objective Type Tests
B: <u>Mid-Term Test-1:</u>   Based on Objective Type and Subjective Type Test
C: <u>Mid-Term Test-2:</u>   Based on Objective Type and Subjective Type Test
D: <u>End-Term Exam (Final):</u>   Based on Objective Type Tests
E: Total Marks
L: Lectures   T: Tutorial   P: Practical   Cr: Credits

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Semester 8

S.No	Paper Code	CourseTitle	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	ECE404	INDUSTRIALTRAINING	0	0	0	16	20			80	400
			0	**0**	**0**	**16**					**400**

A: <u>Continuous Assessment:</u>   Based on Objective Type Tests
B: <u>Mid-Term Test-1:</u>   Based on Objective Type and Subjective Type Test
C: <u>Mid-Term Test-2:</u>   Based on Objective Type and Subjective Type Test
D: <u>End-Term Exam (Final):</u>   Based on Objective Type Tests
E: Total Marks
L: Lectures   T: Tutorial   P: Practical   Cr: Credits

Departmental ElectivesBasket

S.No	Course Code	Course Title
1	ECE401	OPTICAL FIBER COMMUNICATION
2	ECE454	DIGITAL IMAGE PROCESSING AND PATTERN RECOGNITION
3	ECE455	WIRELESS AND MOBILE COMMUNICATION
4	ECE456	FUNDAMENTAL OF MEMS
5	ECE457	SENSORS AND TRANSDUCERS
6	ECE458	VIRTUAL INSTRUMENTATION USING LABVIEW

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Syllabus

Course Title: Engineering Mathematics-I

L	T	P	Credits	Marks
4	1	0	4	100

Paper Code: MTH151

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.

NOTE:

- The question paperforend-semesterexamination will have a weightage of 25%. It willconsistof60 objective questions. Allquestionswill becompulsory.
- Two preannounced test will be conducted having a weightage of 25% each. Each preannounced test will consistof 20 objective type, 5short questions and one long answer type question. The student is expected toprovide reasoning/solution/workingfortheanswer. Thecandidateswill attemptall question. Choice will be given only in long answer type.Thequestionpaperis expected tocontainproblemstotheextent of40%of totalmarks.
- Four objective/MCQ type surprise test will be taken. Two best out of Four objective/MCQ type surprise test will be considered towards final each of 12.5% weightage to the final. Each surprise test will include 20-25 questions.
- Thebooksindicatedas text-book(s)aresuggestiveHowever, anyotherbookmaybefollowed.

UNIT-A   **13 HOURS**

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   **14 HOURS**

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's series. Maxima and minima of a function of two and three variables: Lagrange's method of multipliers.

UNIT-C   **11 HOURS** 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 10 HOUR

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, Power series method of solution.

Recommended Books

1. R K Jain and S R K Iyengar, Advanced Engineering Mathematics, 2nd Ed., Narosa Publishing House, New Delhi (2003).
2. G. B. Thomas, R. L. Finney : Calculus and Analytic Geometry, 11th Ed., Pearson Education.
3. E. Kreyszig. : Advanced Engineering Mathematics, Ninth Edition, John Wiley.
4. B.S Grewal, Higher Engineering Mathematics, Khanna Publication, Edition 41

DAV UNIVERSITY, JALANDHAR

Course Title: Chemistry

Paper Code: CHE151

L	T	P	Credits	Marks
3	0	0	3	75

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.

PART A

Spectroscopy and its Applications (12 Hrs)

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 λmax, isobestic point, applications.

IR Spectroscopy: Infrared region, fundamental modes of vibrations and types, theory of infrared spectra, vibrational frequency and energy levels, anharmonic 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.

PART B

Water and its treatment (7 Hrs)

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 (7 Hrs)

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, filiform corrosion, stray current corrosion, passivity, galvanic series, factors influencing corrosion, various methods of corrosion control.

PART C

Chemistry in Nano-science and Technology   **(7 Hrs)**

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

Part D

Polymers and polymerization   **(7 Hrs)**
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.

Suggested Books:

1. William Kemp, Organic Spectroscopy, Palgrave Foundations, 1991.
2. D. A. Skoog, F. J. Holler and A. N. Timothy, Principle of Instrumental Analysis, 5th Edition., Saunders College Publishing, Philadelphia, 1998.
3. C. P. Poole, Jr., F. J. Owens, Introduction to Nanotechnology, Wiley Interscience, 2003.
4. L.E. Foster, Nanotechnology, Science Innovation & Opportunity, Pearson Education, 2007.
5. P. Ghosh, Polymer Science and technology (2nd Edition), Tata McGraw Hill, 2008.
6. Wiley Engineering Chemistry, Second Edition, 2013.

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Course Title: Chemistry Lab

Course Code: CHE152

L	T	P	Credits	Marks
0	0	2	1	25

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 Practical:

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 NaOH solution conductometerically.
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.

Suggested Books:

1. Levitt, B.P. Findlay's Practical Physical Chemistry, 9th edition, Longman Group Ltd., 1973.

2. Yadav, J.B. Advanced Practical Physical Chemistry.

3. Vogel, A. I. A textbook of Quantitative Inorganic Analysis, Longman Gp. Ltd, 4th edition (2000).

DAV UNIVERSITY, JALANDHAR

Course Title: Engineering Physics

Course Code: PHY151

L	T	P	Credits	Marks
3	1	0	4	100

Unit-1 **(14)**

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-2 **(12)**
LASER: Spontaneous and stimulated emission, Laser action, Characteristics of laser beam, concept of coherence, He-Ne laser, Semiconductor lasers and applications
FIBRE OPTICS: Propagation of light in fibers, numerical aperture, single mode and multimode fibers, applications

Unit-3 **(9)**
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, behavior of dielectric in alternating field and ClausiusMosotti equation.

Unit-4 **(10)**
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.

REFERENCE BOOKS:
1. Electricity and Magnetism – F.W. Sear (Narosa)
2. Physics Vol. 1 & 2 – Resnick& Halliday (Wiley Eastern)
3. A Text Book of Optics – BrijLal and Subramanyam
4. Physical Optics – Jenkin's and White
5. Electromagnetism – David J. Griffiths
6. Perspective of Modern Physics – Arthur Beiser (TMH)

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Course Title: Engineering Physics Laboratory

Course Code: PHY152

L	T	P	Credits	Marks
0	0	2	1	25

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 equipment.

 Note:

- Students are expected to perform at least eight-ten experiments out of following list. Theexperimentsperformedin firstsemestercannotbe repeatedinsecond Semester.
- Theexaminationforboththecourseswill beof3hoursduration.
- Total marks of practical will include 20% weightage of Continuous Assessment and 80% end semester exam including Notebook / Viva / Performance/ written test**.**

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 insuperconducting 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.

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19. To study the numerical aperture and propagation losses for HeNelaserby using the optical fiber set up for
20. To study the Planck's constant by using photoelectric cell method.

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Course Title: Human Values and Ethics

L	T	P	Credits	Marks
2	0	0	2	50

Course Code: SGS101

Course Objectives

- To sensitize students about the role and importance of human values and ethics in personal, social and professional life.
- To encourage students to read and realize the values of enlightened human beings.
- To enable students to understand and appreciate ethical concerns relevant to modern lives.

Learning Outcomes:

Students becoming responsible citizens and better professionals who practise Values and Ethics in every sphere of life.

Unit - A

Human Values

1.	**Concept of Human Values:** Meaning, Types and Importance of Values.	**2 hours**
2.	**Human Values:** Lessons from the lives and teachings of great thinkers.	3 **hours**
3.	**Value Education :** The content of value education	**2 hour**
4.	Value crisis and its redressal	**1 hour**

Unit - B

Being Good and Responsible

1.	Self-Exploration and Self Evaluation	**2 hour**
2.	Acquiring Core Values for Self Development	**2 hour**
3.	Living in Harmony with Self, Family, Society and Nature	**3 hours**
4.	Values enshrined in the Constitution: Liberty, Equality Fraternity and Fundamental Duties.	3 **hours**

Unit - C

Value – based living

1.	Vedic values of life	**2 hour**
2.	Karma Yoga and Jnana Yoga	**2 hours**
3.	AshtaMarga and Tri-Ratna	**2 hours**
4.	Truth, Contentment and Wisdom	**2 hours**

Unit - D

Ethical Living

1.	Personal Ethics	**2 hours**

2.	Professional Ethics	**3 hours**
3.	Ethics in Governance	**2 hours**
4.	Ethics in Education	**2 hours**

Total = 35 hours

Suggested Readings:

1. Restoring Values (ed.) E. Sreedharan and Bharat Wakhlu, Sage Publications Ltd., New Delhi 2010.
2. Indian Ethos and Values by Nagarajan K, Tata McGraw Hill, 2011
3. Human Values, A N Tripathi, New Age International Publishers, New Delhi, Third Edition, 2009
4. Indian Ethos and Values in Management, 1st Edition by Sankar, Tata McGraw Hill Education Pvt. Ltd.
5. Values and Ethics, Osula, Asian Books, 2001.
6. Professional Ethics, R. Subramanian, Oxford University Press, New Delhi, 2013.
7. Human Values and Professional Ethics, RishabhAnand, SatyaPrakashan, New Delhi, 2012
8. Human Values and Professional Ethics, Sanjeev Bhalla, SatyaPrakashan, New Delhi, 2012.
9. Human Values and Professional Ethics, RituSoryanDhanpatRai& Co. Pvt. Ltd., First Edition, 2010.
10. Human Values and Professional Ethics by Suresh Jayshree, Raghavan B S, S Chand & Co. Ltd. , 2007.
11. Human Values and Professional Ethics, Dr. R K Shukla, AnuranjanMisra, A B Publication 2010.
12. Human Values and Professional Ethics, Sharma, Vayu Education of India Language publishers, 2012.
13. Human Values and Professional Ethics, S. Kannan, K. Srilakshmi, Taxmann Publication, Pvt. Ltd., 2009
14. Human Values and Professional Ethics, Smriti Srivastava, S K Kataria& Sons, 2001
15. Human Values and Professional Ethics, Yogendra Singh, AnkurGarg, Aitbs publishers, 2011.
16. Human Values and Professional Ethics, Vrinder Kumar, Kalyani Publishers, Ludhiana, 2013.
17. Human Values and Professional Ethics, R R Gaur, R. Sangal, GP Bagaria, Excel Books, New Delhi 2010.
18. Values and Ethics, Dr. BramwellOsula, Dr. SarojUpadhyay, Asian Books Pvt. Ltd., 2011.
19. Complete works of Swami Vivekanand, Advaita Ashram, Calcutta – 1931.
20. Indian Philosophy, S. Radhakrishnan, George Allen & Unwin Ltd., New York: Humanities Press INC, 1929.
21. Essentials of Hinduism, Jainism and Buddhism, A N Dwivedi, Books Today, New Delhi – 1979
22. Light of Truth :SatyarthParkash, Maharishi DayanandSaraswati, Arya Swadhyay Kendra, New Delhi, 1975.
23. Dayanand : His life and work, SurajBhan, DAVCMC, New Delhi – 2001.
24. Moral and Political Thoughts of Mahatma Gandhi, V. Raghavan, N Iyer, Oxford University Press India, New Delhi, 2000.
25. Guru Nanak Dev's view of life, Amplified by Narain Singh, Published by BhagatPuran Singh All India Pingalwara Society, Amritsar 2010.
26. Esence of Vedas, Kapil Dev Dwivedi, Katyayan Vedic SahityaPrakashan, Hoshiarpur, 1990.
27. Vedic Concepts, Prof. B BChaubey, Katyayan Vedic SahityaPrakashan, Hoshiarpur, 1990.

28. Mahatma Gandhi : Essays and Reflections on his life and work by SaravapalliRadhakrishnan, Zaico Publication, Mumbai, 1977.

29. LalaHarDayal, Hints for Self Culture, Jaico Publishing House, Mumbai, 1961.

30. Maharishi Swami DayanandSaraswati, The Light of Truth (The SatyarthaPrakashan), available at URL :

www. aryasamajjamnagar.org/download/satyarth_prakash_eng.pdf

31. Krishnamurti J, The First and Last Freedom, available at URL :
http://www.jiddu-krishanmurti.net/en/th-first-and-last-freedom/

32. Sri Raman Maharishi, Who Am I, available at URL :
http://www.sriramanamaharshi.org/resource_centre/publicatins/who-am-i-books/

33. Ramesh S Balsekar, Peace and Harmony in Daily Living, Yogi Impressions; 1st edition

DAV UNIVERSITY, JALANDHAR

Course Title: Basic Communication Skills

Course Code: ENG151

L	T	P	Credits	Marks
3	1	0	3	75

Course Objective:

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

Learning Outcomes:

Part – A

Applied Grammar (Socio-Cultural Context)

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

Part – B

Reading (Communicative Approach to be followed)

- J M Synge: Riders to the Sea   (One Act Play) **5 hours**
- Anton Chekhov : Joy   (Short Story) **4 hours**
- Swami Vivekanand : The Secret of Work (Prose) **5 hours**

Part – C

Writing

- Paragraph and Essay Writing **4 Hours**
- Letter Writing: Formal and Informal **4 hours**
- Notice and Email **4 hours**

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

  b. Websites

  1. www.youtube.com (to download videos for panel discussions)
  2. www.letterwritingguide.com
  3. www.teach-nology.com

4. www.englishforeveryone.org
5. www.dailywritingtips.com
6. www.englishwsheets.com
7. www.mindtools.com

NOTE:

- The question paper for end-semester examination will have a weightage of 25%. It will consist of 100 objective questions of equal marks. All questions will be compulsory.

- Two preannounced tests will be conducted having a weightage of 25% each. Each preannounced test will consist of 20 objective type, 5 short questions/problems on the UGC-NET (objective type) pattern as well as one long answer type question. Students are expected to provide reasoning/solution/working for the answer. They will attempt all questions. Choice will be given only in long answer type. The question paper is expected to contain problems to the extent of 40% of total marks.

- Four objective/MCQ type surprise tests will be taken. Two best out of four objective/MCQ type surprise tests will be considered towards final, each of 12.5% weightage to the final. Each surprise test will include 20-25 questions.

The books indicated as text-book(s) are suggestive However, any other book may be followed.

DAV UNIVERSITY, JALANDHAR

Course Title: General Knowledge and Current Affairs

Course Code: SGS102

L	T	P	Credits	Marks
2	0	0	2	50

COURSE OBJECTIVES

The study of General Knowledge and Current Affairs has become even more important today. It is not only a major constituent of most competitive examinations but also aids in acquiring general awareness.

The objectives of this course are:

- To introduce students with the course and contents of various competitive examinations
- To prepare a foundation for appearing in various competitive examinations
- To sensitize the students about the current issues and events of national and international importance
- To provide opportunity to the students to study inter disciplinary subjects like Geography, Science, Economy, Polity, History, International Relations etc.

Learning Outcomes:

- Students would get an opportunity to aspire, plan and prepare for various competitive examinations in advance.
- It would polish their personalities and sharpen the skills of debates, group discussions, communication, interview etc.
- Students would acquire general awareness of National and International Events.

Unit — A

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.   **2 hours**

Indian Geography :

Location, Area and Dimensions, Physical Presence, Indian States and Union Territories, Important sites and Monuments, Largest-Longest and Highest in India.   **2 hours**

General History

Glimpses of India History, Ancient Indian, Medieval India, Modern India, Various Phases of Indian National Movement, Prominent Personalities.   **2 hours**

Glimpses of World History

Important Events of World History, Revolutions and Wars of Independence, Political Philosophies like Nazism, Fascism, Communism, Capitalism, Liberalism etc.   **2 hour**

Unit — B

General Polity

World Politics – Major Actors and their political relations, UNO and other organizations viz: WTO, EU, SAARC, ASEAN, BRICS, WTO, OIC, OAU, OPEC, GCC etc.   **3hour**

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.   **2 hour**

General Economy :

The process of liberalization, privatization, globalization and Major World Issues. Indian Economy, Indian Financial System, Major Economic Issues, Economic Terminology. **3 hours**

Unit — C

General Science :

General appreciation and understandings of science including the matters of everyday observation and experience, Inventions and Discoveries.   **3 hours**

Sports and Recreation :   **3 hours**

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

Current Affairs :   **3 hours**

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

India and Neighbors: **2 hours**

Current phase relations with China, Pakistan, Bangladesh, Nepal, Sri Lanka and Afghanistan

Unit — D

Miscellaneous Information   **2 hours**

Who is who?

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

SUGGESTED READINGS:

Books

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

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

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

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

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

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

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

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

- Unique Quintessence of General Studies – 2013-14, Unique Publishers, 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: Electrical and Electronics Technology
Course Code: ELE101

L	T	P	Credits	Marks
4	1	0	4	100

UNIT 1: 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 2: 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 3: 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.

UNIT 4: 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 5: Rotating Electrical Machines

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

UNIT 6: 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.

DAV UNIVERSITY, JALANDHAR

Suggested Books:

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, DhanpatRai 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

DAV UNIVERSITY, JALANDHAR

	L	T	P	Credits	Marks
Course Title: Electrical and Electronics Technology Laboratory **Course Code: ELE102**	0	0	4	2	50

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 characteristics of PN-junction diode.
12. To verify the truth table of logic gates.

DAV UNIVERSITY, JALANDHAR

Course Title: Basic Communication Skills

Course Code: ENG 152

No. Of Lectures: 30

L	T	P	Credits	Marks
0	0	2	1	25

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	
• Movie-Clippings	10 hours
• Role Plays	10 hours
• Group Discussions	10 hours

Instructions:

1. Each student will prepare a scrap file on any of the topics given by class teacher. Student should be able to justify the contents of his/her Scrap file, which carries the weightage of 10 marks.Marks will be given for originality, creativity and presentation of thoughts.
2. In the end of semester, viva exam will be conducted. Viva will be for 10 marks. Spoken English will be the focus of exam. Examiner will ask questions related to scrap file and other general (non-technical) topics.
3. In the End-term exam, lab activity will carry the weightage of 10 marks.
4. Acknowledge all the sources of information in your scrap file.

References:

Books

1. Gangal, J. K. *A Practical Course In Spoken English.* India: Phi Private Limited, 2012.
2. Kumar, Sanjay and PushpLata. *Communication Skills*. India: OUP, 2012.

Websites
1. www.youtube.com (to download videos for panel discussions)
2. www.englishforeveryone.org
3. www.talkenglish.com
4. www.mindtools.com

DAV UNIVERSITY, JALANDHAR

Course Title: Stenography

Course Code: SGS104

L	T	P	Credits	Marks
2	0	0	2	50

Course Objective: The course is to inculcate writing and listening skills among the students. This would act as building blocks for the learner to begin the study of stenography. As the learners are from the senior secondary background the course has been created keeping in mind their requirements for the future.

Learning Outcome: After going through this course the participant would have understood the basic concepts of shorthand language and would be able to apply them in daily life. Completion of the course will improve their speed of writing and typing. They would be able to pronounce the English words correctly and can use effective English communication.

Section A

- The Consonants
- The Vowels
- Intervening Vowels and Position Grammalogues, Punctuation
- Alternative Signs for r and h
- Diphthongs Abbreviated w.
- Phaseography
- Tick the Circle s and z—Left and Right Motion
- Stroke s and z
- Large Circles sw and ss or sz
- Loops st and str.   **12 hours**

Section B

- Initial Hooks to Straight Strokes and Curves
- Alternative Forms for fr, vr, etc. Intervening Vowels
- Circle or Loop Preceding Initial Hook
- n and f Hooks
- Circles and Loops to Final Hooks.
- The shun hook.
- The Aspirate.
- Upward and Downward r.
- Upward and downward l and sh.
- Compound consonants
- Vowel indication.   12 hours

Section C

- The halving principle (section 1).
- The halving principle (section 2).
- The Doubling principle.
- Diphonic or two vowel signs.
- Medial semicircle.

- Prefixes negative words.
- Suffixes and terminations.
- Contractions.
- Figures, etc .proper names.   11 hours

Section D

- Note taking, transcription, etc.
- Essentials vowels.
- Special contractions.
- Advanced pharseography.
- Intersections.
- Business phrases.
- Banking and stockbroking phrases.
- Insurance and shipping phrases.
- Technical and railway phrases.
- Legal phrases.
- Special list of words.
- Shorthand in practice.   10 hours

Text Book:

1. Pitman Shorthand Instructor and Key Pearson publisher.

DAV UNIVERSITY, JALANDHAR

Course Title: Environment Education, Road Safety and Legal Awareness
Paper Code: EVS101

L	T	P	Credits	Marks
4	0	0	4	100

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 1

The multidisciplinary nature of environmental studies (2 Hours)

Definition, scope and importance, Need for public awareness

Natural Resources: Renewable and non-renewable resources: (8 Hours)

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: **(4 Hours)**

- 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 II

Biodiversity and its conservation   **4 Hours**

- 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.
- Genetically modified crops
- Cartagena Protocol
- Biodiversity Act

Environmental Pollution   **8Hours**

• 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

Indoor Pollution: **2 Hours**

- Practical tips on how to save the self from self-inflicted pollution.
- Basics of toxicity.
- Problems of lifestyle based diseases.
- Solutions needed for safety.

Unit III

Social Issues and the Environment   **7 Hours**

- 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

Human Population and Environment5 Hours

- 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

Global environmental issues   **5 Hours**

- Stockholm Conference
- Brundtland Commission
- Montreal Protocol
- Kyoto protocol
- Earth Summit
- World Summit

Unit IV

Road Safety   **6 Hours**

- Road safety: Concept and its importance.
- Attitude of people towards road safety
- Role of traffic police in road safety
- Traffic rules, Traffic signs, How to obtain driving license, Traffic offences, penalties and procedures,
- Common driving mistakes, Significance of first-aid in road safety
- Role of civil society in road safety and Traffic police-public relationship
- Motor Vehicle Act 1998 (2010)

Legal Awareness   **4 Hours**

- Legal literacy
- Child labour
- Domestic Violence
- Right to Education

Field Work   **5 Hours**

- 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)

Suggested Readings:

1. Odum, E.P. (1983). Basic Ecology. Halt Saundurs, International Edition, Japan.
2. Botkin, D.B. and Kodler, E.A. (2000). Environmental Studies: The Earth as a living planet. John Wiley and Sons Inc., New York.
3. Singh, J.S., Singh, S.P and Gupta S.R., (2006). Ecology, Environment and Resource Conservation, Anamaya Publishers, New Delhi.
4. De, A.K. (1990). Environmental Chemistry. Wiley Eastern Ltd. New Delhi.
5. Sharma, P.D. (2004). Ecology and Environment. Rastogi Publications, Meerut.
6. Uberoi, N.K.: Environmental Management, Excel Books, 2nd Edition, New Delhi.

DAV UNIVERSITY, JALANDHAR

Course Title: Fundamentals of Management

Course Code: MGT151

L	T	P	Credits	Marks
2	0	0	2	50

Course Objective: The course aims at developing an appreciation about the principles, functions of management and functioning of professional organisations.

Learning Outcomes: After completion of course students will be able to work professionally in organizations. They should be able to apply the principles and theories of management in the work context.

Unit – A

- Introduction to business management- Definition of management, characteristics of management, management as an art, science and profession, universality of management, levels of management, management process, managerial roles and skills, functional areas of management. 4 hours
- Planning- Introduction, planning and plan, strategy and strategic planning, main components of plan, vision, mission, purpose, objectives, goals and targets, Management by Objectives (MBO), 3 hours

Unit – B

- Forecasting: Meaning, process and importance, Decision-Making Process and types of decisions. 3 hours
- Organizing- Definition, characteristics, organizing process, authority, responsibility, power, delegation, decentralization, departmentation, span of control, organization chart and manuals. Forms of Organization Structure 4 hours

Unit – C

- Staffing- Introduction, factors affecting and qualities of good staffing, manpower planning, recruitment and selection. 3 hours
- Leadership- Characteristics, importance, style, role, quality and skills of leader. 2 hours
- Directing and Co-ordination- meaning, Fundamentals of motivation, motivation theories : Maslow's need hierarchy, Herzberg's Two-Factor Theory of Motivation, McGregor's Theory X and Theory Y. 4 hours

Unit – D

- Communicating- Definition, Characteristics, Communication process, importance and types of communication, barriers to communication. 4 hours
- Controlling- Meaning, characteristics, scope, control process, types of control, designing effective control systems. 3 hours

30 hours

Text Book:

1. Rudani Ramesh, Principles of Management, Tata, McGraw-Hill Education, 1st Edition

Reference Books:
1. Koontz H &Weihrich, Essentials of Management, 9th Edition 2013
2. Prasad L M, Principles and Practices of Management, Sultan Chand & Sons, New Delhi

Stoner J A F, Freeman R E and Gilbert D R, Management, Pearson Education, 6th Edition

DAV UNIVERSITY, JALANDHAR

Course Title: **Engineering Drawing**

Course Code: MEC101

Total Lectures: 90

L	T	P	CREDITS	Marks
2	0	4	4	100

Course Objectives: Students will get knowledge of various lines and dimension system, knowledge the concepts of orthographic projections, knowledge of developing the surfaces.

Part - A

Drawing Techniques **(12)**

Introduction to drawing instruments, various types of lines, principles of dimensioning, size and location dimensions, symbols, lettering in single stroke as per SP-46 code

Scales **(6)**

Concept of Reduced and Enlarge scale, Construction of plane and diagonal scales

Part - B

Projection of Points **(6)**

Concept of horizontal and vertical planes (Principle planes). First and third angle projections; projection of points in all four quadrants, shortest distance from reference line

Projection of Lines and Planes **(18)**

Projection of line 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. Profile plane. Auxiliary planes

Part - C

Projection of Solids **(12)**

Right and oblique solids; solids of revolution and polyhedrons etc. and 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 axis.

Sectioning of Solids **(9)**

Theory of sectioning, types of sectioning, and their practice on projection of solids, sectioning by auxiliary planes

Part - D

Interpretation of Views **(9)**

Draw orthographic views from isometric view, Missing line and missing view

Development of Surfaces (18)

Method of Development, Development of surfaces (pyramids, prisms, cylinders and cones). Development of oblique solids

Reference:

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: **Fundamentals of Mechanical Engineering**

Course Code: MEC102

L	T	P	CREDITS	Marks
4	0	0	4	100

Course Objectives: To impart the basic knowledge of thermodynamic principles, various power producing and power absorbing devices. To impart the knowledge of mechanical devices and manufacturing processes.

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Part - A

Fundamental Concepts of Thermodynamics (6)

Introduction, Thermodynamic System and its types, Boundary and its types, Surroundings, Thermodynamic properties, processes and cycles, Working Substance, Units and Dimensions, Mechanical and Thermodynamic work, Equations for work done in various processes, Heat, Pressure, Pressure measurement, Pressure exerted due to a column of fluid, Barometer, Mechanical gauges for pressure measurement: Bourdon tube pressure gauge, Diaphragm pressure gauge, Dead weight pressure gauge, Manometer: Piezometer, Single tube manometer(Numerical), Double tube manometer, Differential manometers

Laws of Thermodynamics (6)

Zero law of Thermodynamics, Thermodynamic property and Thermometers, Principle of temperature measurement, Scale of temperature, Microscopic and Macroscopic point of view, Quasi Static Process, Reversible and Irreversible processes, Energy and Forms of Energy i.e. store and transient, Law of conservation of energy, Joule's Experiment, First law of thermodynamics, Work is a path function and properties are point function, Internal energy, Enthalpy, Specific heat at constant volume, Specific heat at constant pressure, Adiabatic Index, Limitations of first law of thermodynamics

Part - B

Heat Transfer (5)

Introduction, Modes of heat transfer, Thermal Conductivity, Thermal Resistance, Fourier law, Newton's law of cooling, Stefan Boltsmann's Law, Heat Exchangers, Insulation, Properties of insulation, Types of Insulations

Power Producing Devices (6)

Forms of matter, Steam boiler, Classification of boilers, Types of boilers, Advantages of superheating the steam, Essentials of a good boiler, Comparison between Water tube and Fire tube boilers, Steam Turbines, Classification, Advantage, Working of common type of turbines, Hydraulic Turbines, Internal combustion engines, Two and Four stroke SI engines

Part - C

Power Absorbing Devices **(5)**

Power Absorbing Devices, Difference between Hydraulic pump, Air compressor, Fan, Blower, Classification, Positive displacement and Dynamic, Reciprocating, Rotary, Centrifugal, Axial along with their types, Uses of compressed air.

Principles of Design **(5)**

Need of design, Stress and Strain and its types, Hooke's law, Poisson's ratio, Stress- Strain Curve, Factor of Safety, Material properties and selection, Factors affecting material selection, Aesthetics.

Part - D

Mechanical Devices **(5)**

Individual and group drive system, Belt drive, Ropes, Chain drive, Gear drive, Clutches, Brakes

Machine Elements **(5)**

Power transmission shafts, Types of shafts, Shaft material, Application of shafts, Axle, Keys, Coupling and their types, Flanged coupling, Oldham's coupling, Universal coupling, Bearings and their types, Flywheel construction and types, Governor

References:

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

DAV UNIVERSITY, JALANDHAR

Course Title: **Manufacturing Practice**

Course Code: MEC104

L	T	P	CREDITS	Marks
0	0	4	2	50

COURSE OBJECTIVES:

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.

1   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

2   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

3   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

4   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

5   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
   e)   To check the Moisture Content in the Molding Sand
   f)   To check the Compressive Strength of Molding Sand

6   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

7   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

8   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: Basic Computer Trends

L	T	P	CREDITS	Marks
4	0	0	4	100

Course Code: CSE101

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.

Expected Outcome: Students will feel comfortable working with computers and will have practical knowledge about Internet and procedural programming language (C Language).

PART-A

Introduction to Computers (8)

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 (7)

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

PART-B

Working Knowledge of Computer System (6)

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 (8)

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

PART-C

Basic Constructs of C (8)

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 (8)

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.

DAV UNIVERSITY, JALANDHAR

PART D

Functions **(6)**

Advantages of using functions, structure of a function, declaring and definingfunctions, return statement, call by value and call by reference, recursion, and storage classes.

Arrays and Strings **(7)**

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 (1996).

DAV UNIVERSITY, JALANDHAR

Course Title: Basic Computer Trends Lab

Course Code: CSE102

L	T	P	Credits	Marks
0	0	4	2	50

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 arrays single dimension in C.
12. Programs using functions by passing values using call by value method.
13. Programs using functions by passing values using call by reference method.
14. Program to implement array using pointers

Programs related to string handling in C

DAV UNIVERSITY, JALANDHAR

Course Title: Engineering Mathematics-II

L	T	P	Credits	Marks
4	1	0	4	100

Course Code: MTH152

Objective:

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

NOTE:

- The question paperforend-semesterexamination will have a weightage of 25%. It willconsistof60 objective questions. Allquestionswill becompulsory.
- Two pre-announced test will be conducted having a weightage of 25% each. Each pre-announced test will consistof 20 objective type, 5short questions/problemson the UGC-NET (objective type) pattern as well as one long answer type question. The student is expected toprovide reasoning/solution/workingfortheanswer. Thecandidateswill attemptall question. Choice will be given only in long answer type.Thequestionpaperis expected tocontainproblemstotheextent of40%of totalmarks.
- Four objective/MCQ type surprise test will be taken. Two best out of four objective/MCQ type surprise test will be considered towards final each of 12.5% weightage to the final. Each surprise test will include 20-25 questions.
- The books indicated as text-book(s) are suggestive however, any other book may be followed.

Unit-A   14 HOURS

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.

Unit-B   15 HOURS

Differential Calculus: Curve tracing: Tracing of Standard Cartesian; Parametric and Polar curves.

Integral Calculus: Rectification of standard curves; Areas bounded by standard curves; Volumes and surfaces of revolution of curves; Applications of integral calculus to find Centre of gravity and moment of inertia.

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.

Unit-C   **13 HOURS**

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-D   **15 HOURS**

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.

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

References:

1. R K Jain and S R K Iyengar, Advanced Engineering Mathematics, 2nd Ed., Narosa Publishing House, New Delhi (2003).
2. Ravish R. Singh and M. Bhatt*Engineering Mathematics a Tutorial Approach*, McGraw Hill.
3. B.S Grewal, Higher Engineering Mathematics, Khanna Publication, Edition 40th Edition
4. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley Eastern Ltd. N.Delhi.Revised Edition 2003.

DAV UNIVERSITY, JALANDHAR

Course Title: Object Oriented Programming

Course Code: CSE201

L	T	P	Credits	Marks
4	0	0	4	100

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).

PART-A

1. **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

2. **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

PART-B

3. **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

4. **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

PART-C

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

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

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

PART-D

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

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

Reference books:
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. BjarneStroustrup, **"The C++ Programming Language"**, Addison Wesley.
6. Lippman F. B, **"C++ Primer"**, Addison Wesley.

DAV UNIVERSITY, JALANDHAR

Course Title: Object Oriented Programming (Practical)
Course Code: CSE205

L	T	P	Credits	Marks
0	0	4	2	50

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: Advanced Communication Skills
Course Code: ENG251
Total Lectures: 45

L	T	P	Credits	Marks
4	1	0	4	100

Course Objective

1. To improve fluency in speaking English.

2. To enhance students' vocabulary and comprehensive skills through prescribed texts.

3. To promote interactive skills through GDs and role plays

4. To hone students' writing skills

Learning Outcomes: Students will be able to communicate fluently and effectively. Moreover, they will enrich their vocabulary, which will support their reading, speaking and writing skills.

Unit – A Applied Grammar

• Phrase, Clause and Sentence	2 hours
• Conditional Sentences	3 hour
• Subject-Verb Agreement	2 hours
• Transformation of Sentences	3 hours
• Advanced Vocabulary	2 hour

Unit – B Reading

- H.H. Munro: The Open Window (Short Story)   4 hours
- Amrita Pritam: Today, I call Waris Shah, "Speak from your grave," (Poem) 4 hours
- Dr. Ambedkar: 'Dr. Ambedkar's Speech at Mahad', in Poisoned Bread 4 hours

Unit – C Writing

- Oral/PPT presentations   4 Hours
- Letter Writing/Memos/E-mails   4 hours
- Report Writing/Job Application/C.V./Resume   4 hours

Unit – D Speaking/Listening

- Interviews   4 hours
- Skit Enactment (Evaluative)   4 hours
- Panel Discussions   4 hours

References:

a. **Books**

1. Dangle, Aijun. *Poisoned Bread.* Hyderabad: Orient Longman,1994.
2. Gangal, J. K. *A Practical Course In Spoken English.* India: Phi Private Limited, 2012.
3. Kumar, Sanjay and PushpLata. *Communication Skills*. India: OUP, 2012.
4. Vandana, R. Singh.*The Written Word* by. New Delhi: Oxford University Press, 2008.

b. **Websites**

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

DAV UNIVERSITY, JALANDHAR

Course Title: Engineering Mathematics-III

Course Code: MTH252

L	T	P	Credits	Marks
4	1	0	4	100

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.

NOTE:

- The question paper for end-semester examination will have a weightage of 25%. It will consist of 60 objective questions. All questions will be compulsory.
- Two pre-announced test will be conducted having a weightage of 25% each. Each pre-announced test will consist of 20 objective type, 5 short questions/problems on the UGC-NET (objective type) pattern as well as one long answer type question. The student is expected to provide reasoning/solution/working for the answer. The candidates will attempt all question. Choice will be given only in long answer type. The question paper is expected to contain problems to the extent of 40% of total marks.
- Four objective/MCQ type surprise test will be taken. Two best out of four objective/MCQ type surprise test will be considered towards final each of 12.5% weightage to the final. Each surprise test will include 20-25 questions.
- The books indicated as text-book(s) are suggestive however, any other book may be followed.

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. R K Jain and S R K Iyengar, Advanced Engineering Mathematics, 2nd Ed., Narosa Publishing House, New Delhi (2003).
2. Ravish R. Singh and M. Bhatt*Engineering Mathematics a Tutorial Approach*, McGraw Hill.
3. B.S Grewal, Higher Engineering Mathematics, Khanna Publication, Edition 40th Edition.
4. Erwin Kreyszig, Advanced Engineering Mathematic, Wiley Eastern Limited, 8th edition, 2006.
5. Dennis G. Zill Patrick D. Shanahan, A first course in complex analysis with applications, Jones and Bartlett Learning, 2003.

DAV UNIVERSITY, JALANDHAR

Course Title: Digital Electronics

Paper Code: ECE201

L	T	P	Credits	Marks
4	0	0	4	100

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

Learning Outcomes:
At the end of the course students should be able to
- 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.

Section A
1. 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.

Section B
2. 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.

Section C
3. Combinational Circuits   (10 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.

4. **Sequential Circuits**   **(70 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.

Section D

5. **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.

6. **Semiconductor Memories**   **(4 Hours)**

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

7. **Logic Families**   **(4 Hours)**

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

Books Recommended

1. Morris Mano, Digital Design, Prentice Hall of India Pvt. Ltd
2. Donald P.Leach and Albert Paul Malvino, Digital Principles and Applications, 5 ed., Tata McGraw Hill Publishing Company Limited, New Delhi, 2003.
3. R.P.Jain, Modern Digital Electronics, 3 ed., Tata McGraw–Hill publishing Company limited, New Delhi, 2003.
4. Thomas L. Floyd, Digital Fundamentals, Pearson Education, Inc, New Delhi, 2003
5. Ronald J. Tocci, 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	Marks
4	0	0	4	100

Course Objective:

The purpose of this course is to provide a basis for understanding the characteristics, operation and limitations of semiconductor. This course also helps the students to understand the biasing of transistor circuits, optoelectronic devices, wave shaping circuits, and to design and analyze various electronic circuits and systems

Learning Outcomes:

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.

Section A
1. **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.

Section B
2. **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.
3. **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 I_{CO}, V_{BE} and β, Bias compensation.

Section C

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

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.

Section D

5. **Multistage Amplifiers** (10 Hours)

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

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

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

Books Recommended

1. BoylestadNashelsky, "Electronic Devices and Circuit Theory", 8th Ed., Pearson Education, 7th Indian Reprint (2004).
2. Floyd, Thomas L, "Electronic Devices", Pearson Education Inc., Delhi, Sixth Edition, (2002)
3. Sedra, Adel S and Smith, Kenneth C, "Microelectronic Circuits", Oxford University Press, New York, Fourth Edition, (1997)
4. Millman, Jacob and Halkias, Christos C, "Integrated Electronics" Tata McGraw- Hill, New Delhi.
5. Streetman Ben J, Sanjay Banerjee, "Solid State Electronic Devices", 5th Ed. PHI (2004)

DAV UNIVERSITY, JALANDHAR

Course Title: Electronics Measurements and Instrumentation

Paper Code: ECE203

Course Objective:

L	T	P	Credits	Marks
4	0	0	4	100

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

Learning Outcomes:

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.

Section A

1. **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.

2. **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.

Section B

3. **Signal Analyzers** (6 Hours)
   Wave Analyzers: Frequency selective wave analyzer, heterodyne wave analyzer, Harmonic Distortion Analyzers, Total Harmonic Distortion, Intermodulation Distortion and Spectrum Analyzers.

4. **Oscilloscope** (6Hours)
   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.

Section C

5. **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.

6. **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

Section D

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

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

8. **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

Recommended Books:

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

DAV UNIVERSITY, JALANDHAR

Course Title: Digital Electronics Laboratory
Paper Code: ECE204

L	T	P	Credits	Marks
0	0	2	1	25

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	Marks
0	0	2	1	25

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: Electronic Measurements and Instrumentation Laboratory

Paper Code: ECE206

L	T	P	Credits	Marks
0	0	2	1	25

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 Tittle: Linear Control System

L	T	P	Credits	Marks
4	0	0	4	100

Paper Code: ICE208

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-I

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.

(12 Hr)

UNIT-II

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.   12 Hr

UNIT-III

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.   12 Hr

UNIT-IV

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.

                                                                                12 Hr

Reference Books:

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

DAV UNIVERSITY, JALANDHAR

Course Title: Circuit Theory

Paper Code: ELE201

L	T	P	Credits	Marks
4	0	0	4	100

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.

NOTE:

- The question paperforend-semesterexamination will have a weightage of 25%. It willconsistof60 objective questions. Allquestionswill becompulsory.
- Two preannounced test will be conducted having a weightage of 25% each. Each preannounced test will consistof 20 objective type, 5short questions and one long answer type question. The student is expected toprovide reasoning/solution/workingfortheanswer. Thecandidateswill attemptall question. Choice will be given only in long answer type.Thequestionpaperis expected tocontainproblemstotheextent of40%of totalmarks.
- Four objective/MCQ type surprise test will be taken. Two best out of Four objective/MCQ type surprise test will be considered towards final each of 12.5% weightage to the final. Each surprise test will include 20-25 questions.
- Thebooksindicatedas text-book(s)aresuggestiveHowever, anyotherbookmaybefollowed.

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.

12 Hours

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.

10 Hours

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

12 Hours

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.

12 Hours

Text Book:

1. Chakraborty Abhijit, *Circuit Theory*, 2ndEdition, DhanpatRai, 2001.

Reference Books:

1. Bird John, *Electrical Circuit Theory and Technology*, 2nd Ed., Newnes.
2. Chaudhury D. Roy, *Networks and Synthesis*, New Age International.
3. Edminister J.A., *Electric Circuits*, 4th Edition, Tata McGraw Hill, 2002.
4. Iyer T.S.K.V., *Circuit Theory*, Tata McGraw Hill, 2006.
5. Network Synthesis by IVS Iyer
6. Mohan, Sudhakar Sham, *Circuits and Networks Analysis and Synthesis*, 2NdEdition, Tata McGraw Hill, 2005.
7. Van Valkenberg, M.E., *Network Analysis and Synthesis*, PHI learning, 2009.

DAV UNIVERSITY, JALANDHAR

Course Title: Analog Communication System

Paper Code: ECE207

L	T	P	Credits	Marks
3	0	0	3	75

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.

Section A

1. **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.

2. **Analog Modulation Techniques** **(5 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

Section B

3. **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.

4. **AM Reception** **(5 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 hetrodyne communication receiver.

Section C

5. **FM Transmission**   **(5 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.

6. **FM Reception**   **(5 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.

Section D

7. **SSB Transmission**   **(5 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

8. **SSB Reception**   **(5 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.

9. **Pulse Modulation Transmissions and Reception**   **(4 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.

Books Recommended

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

DAV UNIVERSITY, JALANDHAR

Course Title: Signal and Systems
Paper Code: ECE209

L	T	P	Credits	Marks
4	0	0	4	100

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**.**

Section A

1. **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.

Section B

2. **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.

3. **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.
   ## Section C

4. **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.

Section D

5. **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

Books Recommended

1. Signals and Systems by Allan V.Oppenheim, S.Wilsky and S.H.Nawab, Pearson Education.
2. Signal and Systems by Tarun Kumar Rawat, First edition 2010, Oxford Press
3. Fundamentals of Signals and Systems by Edward W Kamen& Bonnie's Heck, Pearson Education.
4. Communication Signals & System by Simon Haykins, John Wiley & Sons.
5. Signals and Systems by H P Hsu, Rakesh Ranjan, Schaum's Outlines, Tata McGraw Hill.
6. Digital Signal Processing by S Salivahanan, A. Vallavaraj, C. Gnanapriya, McGraw Hill International.

DAV UNIVERSITY, JALANDHAR

Course Title: Electromagnetic Field Theory

Paper Code: ECE210

L	T	P	Credits	Marks
4	0	0	4	100

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.

Section A

1. **Introduction** (10 Hours)

   Review of Electrostatic and Magneto statics.

2. **Time Varying Fields** (10 Hours)

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

Section B

3. **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.

4. **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.

Section C

5. **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.

Section D

6. **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.

Books recommended

1. Elements of Electromagnetic By Matthew N.O. Sadiku, Oxford Univ. Press, 4th ed., 2009

2. Electromagnetic field and waves By K.D Prasad.
3. Electromagnetic By John D. Kraus
4. Principles of Electromagnetic By R.G.Kaduskar.
5. Electromagnetic Waves and Radiating Systems By Edward C. Jordan

DAV UNIVERSITY, JALANDHAR

Course Title: Analog Electronics
Paper Code: ECE211

L	T	P	Credits	Marks
4	0	0	4	100

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.

Section A

1. **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.

2. **Tuned Amplifiers**   **(8 Hours)**
   Single tuned, double tuned and stagger tuned amplifiers and their frequency response characteristics.

Section B

3. **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.

Section C

4. **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.

5. **Oscillators**   **(8 Hours)**
   Condition for sustained oscillation, Barkhausen criterion, R-C phase shift, Hartley, Colpitts, Crystal and Wien Bridge Oscillators, Frequency stability criterion.

Section D

6. **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

7. **Regulated Power Supplies**   **(6 Hours)**
   Zener diode as Voltage Regulator, Transistor Series and Shunt Regulators, Current limiting, Line and Load Regulation.

 Books Recommended

1. BoylestadNashelsky, "Electronic Devices and Circuit Theory", 10th Ed., Pearson Education, (2009).
2. Floyd, Thomas L, "Electronic Devices", Pearson Education Inc., Delhi, Sixth Edition, (2002)
3. Sedra, Adel S and Smith, Kenneth C, "Microelectronic Circuits", Oxford University Press, New York, Sixth Edition, (2013)
4. Millman, Jacob and Halkias, Christos C, "Integrated Electronics" Tata McGraw- Hill, New Delhi.
5. Streetman Ben J, Sanjay Banerjee, "Solid State Electronic Devices", 5th Ed. PHI (2004)

DAV UNIVERSITY, JALANDHAR

Course Title: Analog Communication Systems Laboratory

Paper Code: ECE212

L	T	P	Credits	Marks
0	0	2	1	25

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 SSB 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	Marks
0	0	2	1	25

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).

DAV UNIVERSITY, JALANDHAR

Course Title: Analog Electronics Laboratory
Paper Code: ECE214

L	T	P	Credits	Marks
0	0	3	2	50

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	Marks
4	0	0	4	100

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.

Section A

1. **Introduction** (5 Hours)
   Introduction to Microprocessors, classification, recent microprocessors.
2. **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.

Section B

3. **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.

Section C

4. **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).

Section D

5. **Basic architecture of higher order microprocessor** (10 Hours)
   Basic introduction to 8086, Architecture, Segmentation & addressing modes.

6. **Microcontroller-8051** (10 Hours)
   Register Set-Architecture of 8051 microcontroller- I/O and memory addressing- Interrupts- Instruction set- Addressing modes.

Recommended Books

1. 8085 Microprocessor by Ramesh Gaonkar, PHI Publications.
2. Muhammad Ali Mazidi and Janice GillispieMazidi, "The 8051 - Microcontroller and Embedded systems", 7th Edition, Pearson Education, 2004.
3. Doughlas.V.Hall, "Microprocessor and Interfacing : Programming and Hardware", Revised 2nd edition, McGraw Hill, 1992
4. Steve Furber, "ARM System on Chip Architecture", Second Edition, Pearson Education, 2000.

DAV UNIVERSITY, JALANDHAR

Course Title: Digital Communication System

Paper Code: ECE302

L	T	P	Credits	Marks
4	0	0	4	100

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.

Section A

1. **DigitalTransmission** **(15 Hours)**
   Introduction, Advantages of DigitalTransmission, PulseCode Modulation;PCMSampling,SamplingRate,Aliasing,quantizationerror,Uniformand Non uniformquantization,DynamicRange, Codingefficiency, Alaw&µ lawcompanding, BandwidthofPCM,BlockdiagramofPCMsystem,DeltaModulation,Continuouslyvariable SlopeDeltaModulator(CVSDM)or AdaptiveDeltaModulation,DifferentialPulseCode Modulation,Inter-symbolInterference,EyePatterns,Signalpowerinbinary digitalsignals.

Section B

2. **DigitalCarrierLineEncoding&MultiplexingTechniques** **(15 Hours)**
   LineCoding&itsproperties.
   NRZ&RZtypes,signalingformatforunipolar,Polar,bipolar(AMI)&Manchestercodingand theirpowerspectra(Noderivation),HDBand B8ZSsignaling, Fundamentalsoftimedivision multiplexing

Section C

3. **Basic Digital Carrier Modulation &Demodulation Techniques (15 Hours)**Introduction, Information capacity, Shannon Limit for Information capacity, Bit Rate, Baud &M-AryEncoding, AmplitudeShift Keying(ASK),ASK Spectrum,ASKModulator,CoherentASKDetector,Non-coherentASKDetector,FrequencyShiftKeying(FSK),FSKBitRateandBaud, Bandwidth andFrequencySpectrumofFSK,FSKTransmitter, Non-coherentFSKDetector,Coherent FSKDetector,FSKDetectionUsingPLL,BinaryPhaseShiftKeying,BinaryPSKSpectrum, BPSKTransmitter, CoherentPSKDetection,

Section D

4. **Advanced Digital Carrier Modulation &Demodulation Techniques (15 Hours)**QuadraturePhaseShiftKeying(QPSK),QPSK Demodulator,OffsetQPSK, π/4QPSK,Comparisonof conventionalQPSK, OffsetQPSK and π/4QPSK,M-

AryBPSKe.g.8PSK&16PSK,QuadratureAmplitudeModulation(QAM); 8QAM &16 QAM transmitters and receivers, BandWidth efficiency, Carrier Recovery;SquaringLoop&CostasLoop,DifferentialPSK,DBPSKtransmitterandreceiver,Constant Envelop Modulation; Minimum Shift Keying (MSK) &Gaussian Minimum Shift Keying (GMSK)

RecommendedTextBooks:
1. Advanced Communication Systems - by Wayne Tomasi; Pearson.
2. Digital Communication - by Proakis; PHI
3. Modern Digital and Analog communication systems by B.P Lathi, Oxford Publications
4. A first course in Digital Communication by Ha. Nguyen, Cambridge Publications
5. Digital Communications Fundamental and Applications by Bernard Sklar, PHI
6. Priciples of Communication Systems, Taubschling, Mc Graw Hill

DAV UNIVERSITY, JALANDHAR

Course Title: DATA STRUCTURE

Course Code: CSE353

L	T	P	Credits	Marks
4	0	0	0	100

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.

PART-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

(14Hours)

PART-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**.**

(14Hours)

PART-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.

(14Hours)

PART-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**.**

(14Hours)

REFERENCES:-

1.   LipschutzSchaumseries: TataMcGrawHill.
2.   Y.Langsam, M.J.Augenstein, A.M.Tanenbaum,Data Structures using C and C++,2nd Edition, Pearson Education
3.   R.Kruse, C.L.Tondo,B.Leung,S.Mogalla,Data Structures & Program Design in C.2nd Edition, Pearson Education
4.   E.Horowitz, S.Sahni,D.Mehta:Fundamentals of Data Structures in C++, 2nd Edition, Universities Press 2. Donald E. Knuth.

DAV UNIVERSITY, JALANDHAR

Course Title: Linear Integrated Circuits

Paper Code: ECE304

L	T	P	Credits	Marks
3	0	0	3	75

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**.**

Section A

1. **Differential And Cascade Amplifiers** **(7 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.

Section B

2. **Introduction to Operational Amplifiers** **(8Hours)**

   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.

3. **Negative Feedback in Op-Amps** **(5 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.

Section C

4. **Frequency Response of an Op-Amp** **(7 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

5. **Applications of Op-Amp** **(7Hours)**

   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.

Section D

6. **Specialized IC Applications** (5 Hours)
   555 Timer: Pin configuration, Block diagram, application of 555 as Monostable and Astable Multivibrator.

7. **Phase Lock Loops** (3 Hours)
   Operating principles & applications of 565PLL

8. **Voltage Regulators** (3 Hours)
   Fixed voltage regulators, Adjustable voltage regulators, Switching Regulators.

Books Recommended
   1. Op Amps & Linear Integrated circuits by RamakantGayakwad.
   2. Op Amps & Linear Integrated circuits by Coughlin
   3. Op Amps & Linear Integrated circuits by RaviRajDudeja

DAV UNIVERSITY, JALANDHAR

Course Title: Antenna Engineering

Paper Code: ECE305

L	T	P	Credits	Marks
4	0	0	4	100

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.

Section A

1. **Introduction** (8 Hours)

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

2. **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.

Section B

3. **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.

4. **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 DolphTschebyscheff array, Scanning Array, Superdirective array.

Section C

5. **Aperture Antennas** (8 Hours)

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

6. **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.

Section D

7. **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

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

DAV UNIVERSITY, JALANDHAR

Course Title: Microprocessor and Microcontroller Laboratory
Paper Code: ECE306

L	T	P	Credits	Marks
0	0	3	2	50

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

Part-A: General Purpose Programming Exercises

Minimum six experiments to be conducted.

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

Part-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	Marks
0	0	3	2	50

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	Marks
0	0	2	1	25

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. This Laboratory can also support many experiments and new ideas which are evolved in the mind of students.

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	Marks
0	0	0	4	100

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 andCommunication 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: Microwave and Radar Engineering

L	T	P	Credits	Marks
4	0	0	4	100

Paper Code: ECE309

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.

Section A

1. **Microwave Tubes** (10 Hours):

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

2. **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)

Section B

3. **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.

Section C

4. **Microwave Measurements** (8 Hours):

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

5. **Introduction to Radar Systems** (7 Hours):

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

Section D

6. **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.

7. **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

Recommended Books

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

DAV UNIVERSITY, JALANDHAR

Course Name: Embedded Systems

Course Code: ECE310

L	T	P	Credits	Marks
3	0	0	3	75

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

Section A

1. **Introduction to Embedded systems design:** Introduction to Embedded system, Embedded System Project Management, Use of software tools for development of an ES.
2. **8051 Microcontroller:** Microprocessor V/s Micro-controller, 8051 Microcontroller: General architecture; Memory organization.

Section B

3. **8051 Instructions:** Instruction set: Data Move Operations, Logical Operations, Arithmetic Operations, Jump, Loop and Call Subroutine, Advanced Instructions.
4. **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.
5. **8051 Ports & Hardware Connections:** I/O programing, I/O bit manipulation programming, Pin-description, explaining the Hex File.

Section C

6. **8051 Timers & Counters:** Timer programing, Counter Programing, programming in C of timers and counters.
7. **8051 Serial Programming:** Basics of serial programming, serial communication; RS232 connections, Serial Port programming in Assembly & C.

Section D

8. **8051 Interrupts:** 8051 interrupts, Timer interrupts, external hardware interrupts, serial communication interrupts, Interrupt priority, Interrupt programming in C.
9. **8051 Interfacing and Applications:** Interfacing External Memory, Keyboard and Display Devices: LED, 7-segment LED display, LCD.

Recommended books:

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

DAV UNIVERSITY, JALANDHAR

Course Title: VLSI technology
Course Code: VLS402

L	T	P	Cr	Marks
3	0	0	3	75

Course Objectives:

Introduce the students to the processes and procedures involved in manufacturing silicon ICs.

Learning Outcomes:
- Acquire knowledge about crystal growth and wafer preparation techniques.
- Learn about MOSFET fabrication process.

Section - A

Integrated Circuits: Introduction and advantages, Effects of ICs on industry, Scales of integration.

Crystal growth: Wafer preparation, Processing considerations, Chemical cleaning, Getting the thermal stress factors etc.

Section – B

Epitaxy: Vapors phase epitaxy basic transport processes & reaction kinetics, Doping & Auto doping, equipment, & Safety considerations, Buried layers, Epitaxial defects, Molecular beam epitaxy, Equipment used, Film characteristics, SOI structure.

Oxidation: Growth mechanism & kinetics, Silicon oxidation model, Interface considerations, Orientation dependence of oxidation rates thin oxides, Oxides, Oxidation technique & systems dry & wet oxidation.,Masking properties of SiO2.

Section – C

Diffusion: Diffusion from a chemical source in vapor form at high temperature, Diffusion from doped oxide source, Diffusion from an ion implanted layer.

Lithography: Optical lithography, Optical resists, Contact & proximity printing, Projection printing, Electron lithography, resists, Mask generation, Electron optics, Roster scans & vector scans, Variable beam shape, X-ray lithography, Resists & printing, X-ray sources &masks, Ion lithography.

Section – D

Etching: Reactive plasma etching, AC & DC plasma excitation, Plasma properties, Chemistry & surface interactions, Feature size control & apostrophic etching, Ion enhanced & induced etching, Properties of etch processing. Reactive ion beam etching, Specific etches processes, poly/polycide, Trench etching.

Recommended Books

1. Sze, S. M., VLSI Technology, Wiley Eastern, USA (1999) 2nd ed.

2. Sze, S. M., Semiconductor Devices, Physics & Technology, (2001) 3rd ed.

3. Pucknell and Eshraghian, Basic VLSI Design, (2000) 2nd edition

4. B.G. Streetman, "Solid State Electronics Devices", Prentice Hall, 2002.

DAV UNIVERSITY, JALANDHAR

Course Title: Digital Signal Processing
Paper Code: ECE311

L	T	P	Credits	Marks
4	0	0	4	100

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.

Section A

1. **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.

2. **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.

Section B

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

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

Section C

4. **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

Section D

5. **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).

Recommended Books

1. John G. Proakis and Dimitris C. Manolakis, "Digital Signal Processing Principles, Algorithms and Applications", Pearson Education, Fourth edition, 2007.
2. Venkataramani.B, Bhaskar.M, "Digital Signal Processors, Architecture, Programming and Application", Tata McGraw Hill, New Delhi, 2003.
3. SanjitMitra, "Digital Signal Processing, A Computer based approach", Tata McGraw Hill, New Delhi, 2011.

DAV UNIVERSITY, JALANDHAR

Course Title: Microwave and Radar Engineering Laboratory

Paper Code: ECE312

L	T	P	Credits	Marks
0	0	3	2	50

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: ECE313

L	T	P	Credits	Marks
0	0	3	2	50

Course Objectives: To assist the theory content taught in ECE310 and to provide knowledge on 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

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 wih 8051.
11. Write assembly & C language program to understand and demonstrate serial communication with PC via COM port.

DAV UNIVERSITY, JALANDHAR

Course Title: Digital Signal Processing Laboratory
Paper Code: ECE314

L	T	P	Credits	Marks
0	0	3	2	50

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: Introduction To Computer Networks

Paper Code: CSE351

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: This course should provide the knowledge of various networking components, protocols and their working.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of how to implement a network and understand the functioning of the network.

PART-A

Introduction

Introduction to Computer Network and topologies, Broadcast and Point-to-point- LAN-MAN-WAN

Architecture and Reference Models

Layered architecture- OSI reference model, TCP/IP reference model –Internet Protocol Stack – Network Entities in Layers- Connection oriented and Connection less services switching techniques.

ATM

Protocol Architecture, ATM Logical Connections, ATM Cells, Transmission of ATM Cells, ATM Adaptation Layer, Traffic and Congestion Control.

(12Hours)

PART-B

Internetworking

Principles of Internetworking, Connectionless Internetworking, the Internet Protocol, Routing Protocol, IPv6 (IPng), ICMPv6 **[5]**

Distributed Applications

Abstract Syntax Notation One (ASN.l), Network Management-SNMPV2, Electronic Mail-SMTP and MIME, Uniform Resource Locators (URL) and Universal Resource Identifiers (URI), Hypertext Transfer Protocol (HTTP)

(8Hours)

PART-C

Network Layer and Routing

Network Service model – Datagram and Virtual circuit service-Routing principles-Link state routing-distant vector routing-hierarchical routing-multicast routing-IGMP Internet Protocol (IP): IPv4 addressing-routing and forwarding datagram-datagram format-datagram fragmentation- ICMP- DHCP-Network Address Translators (NATs)-IPv6 packet format-transition from IPv4 to IPv6-Mobile IP. Routing in the Internet: Intra Autonomous System Routing: RIP and OSPF-Inter Autonomous System Routing: BGP – Network layer in ATM.

(8Hours)

PART-D

Transport Layer

Introduction to Transport Layer. Connectionless Transport: UDP-Segment structure-Checksum Connection Oriented Transport: TCP-TCP connection-TCP Segment Structure-Round trip Time estimation and Time out-Reliable Data transfer-Flow control-TCP connection Management. Congestion Control: Causes and costs of congestion- Approaches to congestion control- TCP congestion control.

(8Hours)

Application Layer and Network Security: Application Layer Protocols - WWW and HTTP-File transfer Protocol: FTP Commands and Replies – Domain Name System (DNS)- SMTP - SNMP-multimedia. Remote Procedure Call. Security in Computer Networks: Principles of Cryptography-Symmetric key-Public key-authentication protocols -Digital Signatures – Firewalls. Security in different Layers: Secure E-mail- SSL – IP security.

(6Hours)

REFERENCES:

1. James F. Kurose and Keith W. Ross, Computer Networking – A Top-Down Approach Featuring the Internet, 2/e Pearson Education ,2003
2. S. Keshav, An Engineering Approach to Computer Networking, Pearson education ,2002
3. F. Halsall, Data Communication, Computer Networks and Open Systems, Addison Wesley, 1996
4. Andrew S. Tanenbaum, Computer Networks , 4/e, Pearson education, 2003
5. Behrouz A. Fourouzan ,Data Communications and Networking, 2/e Tat McGrawhill,2000

DAV UNIVERSITY, JALANDHAR

Course Title: INTRODUCTION TO COMPUTER NETWORKSLABORATORY

Paper Code: CSE361

L	T	P	Credits	Marks
0	0	3	2	50

1. Introduction to Network Simulator OPNET/NS2.
2. Evaluate Ethernet Delay and Load Statics of Switched Ethernet
3. Evaluate the comparative investigations on the performance issues of switched Ethernet with VLAN based on Email and FTP applications.
4. Evaluate Internet connection choice for PC Network on different Data Rate for WAN based on Web Browsing and Email application
5. Implementation of Firewall; in a Network.
6. Simulation of Wireless data Network with different with physical characteristics.
7. Implementation of CSMA/CD Protocol and its comparative investigation with ALOHA Protocol.
8. Design and Implementation of Simple Transfer Protocol in C/ C++.
9. Design of substitution Cipher in C/ C++.
10. Design of Transposition Cipher in C/ C++.
11. Design of Public Key Algorithm in C/ C++.

DAV UNIVERSITY, JALANDHAR

Course Name: Digital System Design

Paper Code: ECE461

L	T	P	Credits	Marks
4	0	0	4	100

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.

Section – A

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

2. **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.

Section – B

3. **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.

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

Section – C

5. **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.

6. **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.

Section – D

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

Recommended Books

- Donald P Leach, Digital Principles and Applications, TMH, Sixth Edition

- Mano, M. M., Digital Design, PHI, (2002) 2nd Ed.

- Verilog HDL: A Guide to Digital Design and Synthesis; S.Palnitkar; PH/Pearson, 1996.

DAV UNIVERSITY, JALANDHAR

Course Name: Capstone Project

Paper Code: ECE402

L	T	P	Credits	Marks
4	0	0	4	100

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 helpthe 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 Name: Digital System Design Laboratory

Paper Code: ECE462

L	T	P	Credits	Marks
0	0	3	2	50

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: Optical Fiber Communication

Paper Code: ECE401

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective:

To expose 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.

Section A

1. **Introduction** **(7 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.

2. **Optical Fibers** **(9 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

Section B

3. **Optical Transmitters** **(7 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

Section C

4. **Optical Receivers** **(8 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.

DAV UNIVERSITY, JALANDHAR

Section D

5. **Light Wave Systems**   **(7 hours)**

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

6. **Multi-channel Systems**   **(7 hours)**

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

Recommended Books

1. Fiber optic Communications Technology by Maenbaev and Scheiner, Pearson Publications
2. Senior J. Optical Fiber Communications, Principles & Practice, PHI.
3. Keiser G., Optical Fiber Communication Mc graw-hill.

DAV UNIVERSITY, JALANDHAR

Course Title: Image Processing and Pattern Recognition

Paper Code: ECE454

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective:

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

Learning Outcomes:

The students undergoing this course will be able to know.

- Fundamentals of image processing.
- Various transforms used in image processing.
- Image processing techniques like image enhancement, reconstruction, compression and segmentation.

Section A

1. **Introduction to Electronic Image Processing**   (7 hours)
   historical background, visual perception, image formation, sampling & Quantization & application of image Processing.

2. **Transforms used in Electronic Image Processing**   (6 hours)
   Review of 1-D & 2-D Fourier Transforms, Discrete Fourier transforms & other image transforms.

Section B

3. **Image Enhancement by Point operation**   (7 hours)
   An overview of point Processing, constant & non-linear operations between image & histogram techniques.

4. **Spatial Filtering & Fourier frequency Method**   (6 hours)
   Noise in image, Spatial & Special frequency filtering, image restoration.

Section C

5. **Non-Linear image processing techniques**   (5 hours)
   Non-linear Spatial/Mean/Adaptive & Homo-morphic Filters

6. **Color Image Processing**   (5 hours)
   Color Models, examples of color image processing, Pseudo-coloring & color displays.

Section D

7. **Image segmentation & Representation**   (5 hours)
   Image Thresh-holding, Edge/Line &Point direction, Region based segmentation & Image representation.

8. **Introduction to Morphological filters & Image Compression**   (4 hours)

Recommended Text Books:

1. Fundamentals of electronic image processing by Arthur R. Weeks, Jr., Eastern Economy Edition,SPIE Press, Prentice hall of India New Delhi.

2. Digital Image Processing by Rafael C. Gonzale& Richard E. Woods, Pearson Education Asia
3. Fundamentals of digital image processing by A.K.Jain, Prentice Hall Englewood Cliffs, N.J.

DAV UNIVERSITY, JALANDHAR

Course Title: Wireless and Mobile Communication

L	T	P	Credits	Marks
3	0	0	3	75

Paper Code: ECE455

Course Objective:
To introduce the students to the concepts of wireless systems, 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.

Section A

1. **Introduction** (6 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

2. **Digital Communication through fading multipath channels** (7 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.

Section B

3. **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 ALLOHA, Capacity of Cellular Systems

4. **Wireless Networking** (7 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.

Section C

5. **Wireless Systems & Standards** (8 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.

Section D

6. **Wireless Local Area Networks (WLAN)** (7 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.

7. **Future trends** (3 hours)

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

Recommended Text Books:

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

DAV UNIVERSITY, JALANDHAR

Course Title: Fundamental of MEMS

Paper Code: ECE456

L	T	P	Credits	Marks
3	0	0	3	75

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.

Section A

1. **Introduction to MEMS and Micro Fabrication** **(9 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.

2. **Electrical and Mechanical concepts of MEMS** **(9 hours)**

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

Section B

3. **Electrostatic and thermal principle sensing and actuation** **(9 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.

Section C

4. **Piezoresistive, piezoelectric and magnetic principle sensors and actuator** **(9 hours)**

   Piezoresistive sensors, Piezoresistive sensor material, stress in flexural cantilever and membrane, Application, Inertial, pressure, flow and tactile sensor, Piezoelectric sensing and actuation,

piezoelectric material properties, quartz, PZT, PVDF, ZnO, Application, Inertial, Acoustic, tactile, flow, surface elastic waves Magnetic actuation, Micro magnetic actuation principle, Deposition of magnetic materials, Design and fabrication of magnetic coil.

Section D

5. **Polymer and Optical MEMS**   **(9   hours)**

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

Recommended Books

1. Chang Liu, "Foundations of MEMS", Pearson Indian Print, 1st Edition, 2012.
2. Gaberiel M. Rebiz, "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. Julian W.Gardner and Vijay KVaradhan, "Microsensors, MEMS and Smart Devices", John Wiley & sons, 2001.

DAV UNIVERSITY, JALANDHAR

Course Title: SENSORS AND TRANSDUCERS

Paper Code: ECE457

L	T	P	Credits	Marks
3	0	0	3	75

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.

Section A

1. Introduction   **(9 hours)**

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

2. Mechanical and electromechanical sensors   **(9 hours)**

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

Section B

3. Thermal and radiation sensor   **(9 hours)**

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

Section C

4. Magnetic and electro-analytical sensor   **(9 hours)**

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

Section D

5. Sensors and their applications   **(9 hours)**

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

Recommended Books

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

DAV UNIVERSITY, JALANDHAR

Course Title: Virtual Instrumentation Using LABVIEW

Paper Code: ECE458

L	T	P	Credits	Marks
3	0	0	3	75

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.

Section A

1. **Virtual Instrumentation** (9 hours)

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

2. **VI Programming Techniques** (9 hours)

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

Section B

3. **Data acquisition basics** (9 hours)

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

Section C

4. **LabVIEW in signal processing**   **(9 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.

Section D

5. **Frequency domain processing**   **(9 hours)**

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

Recommended Books
1. Sumathi&P.Surekha, " LabVIEW based Advanced Instrumentation" Springer, 2007.
2. Jovitha Jerome, "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, 1995

DAV UNIVERSITY, JALANDHAR

Course Title: Industrial Training-II

Paper Code: ECE404

L	T	P	Credits	Marks
0	0	0	16	400

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

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

Students have to undergo six months practical training in Electronics andCommunication 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 400 and appropriate grades assigned as per the regulations