DAVUNIVERSITY JALANDHAR

SYLLABI FOR

B.Tech Electrical Engineering (Pass)
(Program ID-19)

1st to 8th Semester
Examinations 2013–2014 Session Onwards

Syllabi Applicable For Admissions in 2013

DAVUNIVERSITY JALANDHAR

Scheme of Courses B.Tech
B.Tech-Electrical Engineering

Semester 1

S. No.	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	MTH151 / MTH152	Mathematics-I (For odd Sem)/ Mathematics -II For (even semester)	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	MGT151	Fundamentals of Management	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 Laboratory	0	0	2	2	-	-	-	-	50
9	CHE152	Chemistry Laboratory	0	0	2	2	-	-	-	-	50
10	SGS104	Stenography	2	0	0						
11	SGS105	Stenography Laboratory	0	0	2	0					
			23	**1**	**10**	**27**					**675**

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

DAVUNIVERSITY JALANDHAR

Scheme of Courses B.Tech
Common For all B. Tech 1st Year

Semester 2

S. No.	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	MTH151/ MTH152	Mathematics-I (For odd Sem)/ Mathematics -II For (even semester)	4	1	0	4	25	25	25	25	100
2	PHY151	Engineering 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	MEC104	Manufacturing Practice	0	0	4	2	-	-	-	-	50
8	ELE102	Electrical & Electronics Technology -Lab	0	0	2	2	-	-	-	-	50
9	ENG152	Basic Communication Skills -Lab	0	0	2	1	-	-	-	-	25
10	PHY152	Physics-Lab	0	0	2	2	-	-	-	-	50
			20	**2**	**10**	**27**					**675**

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

DAVUNIVERSITY JALANDHAR

Scheme of Courses B.Tech
B.Tech-Electrical Engineering

Semester 3

S. No.	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	ELE201	Circuit Theory	4	0	0	4	25	25	25	25	**100**
2	ELE202	Electrical Machines-I	3	0	0	3	25	25	25	25	**75**
3	ICE201	Electrical Measurement & Instrumentation	3	0	0	3	25	25	25	25	**75**
4	MTH252	Engineering Mathematics-III	4	1	0	4	25	25	25	25	**100**
5	CSE201	Object Oriented Programming	4	0	0	4	25	25	25	25	**100**
6	ENG251	Advanced Communication Skills	4	0	0	4	25	25	25	25	**100**
7	ELE203	Electrical Machines-I Laboratory	0	0	2	1	20	80			**25**
8	ICE202	Electrical Measurement & Instrumentation Laboratory	0	0	2	1	20	80			**25**
9.	CSE202	Object Oriented Programming Laboratory	0	0	4	2	20	80			**50**
			22	**0**	**8**	**26**					**650**

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

DAVUNIVERSITY JALANDHAR

Scheme of Courses B.Tech
B.Tech-Electrical Engineering

Semester 4

S. No.	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	ELE204	Electromagnetic Field Theory	4	0	0	4	25	25	25	25	**100**
2	ELE205	Electrical Machine-II	3	0	0	3	25	25	25	25	**75**
3	ELE206	Power System-I	3	0	0	3	25	25	25	25	**75**
4	ECE209	Signal and Systems	4	0	0	4	25	25	25	25	**100**
5	ECE201	Digital Electronics	4	0	0	4	25	25	25	25	**100**
6	ECE211	Analog Electronics	4	0	0	4	25	25	25	25	**100**
7	ELE207	Electrical Machines-II Laboratory	0	0	2	1	20	80			**25**
8	ECE214	Analog Electronics Laboratory	0	0	2	2	20	80			**50**
9.	ELE208	Power System-I Laboratory	0	0	2	1	20	80			**25**
Total			**22**	**0**	**6**	**26**					**650**

Note: At the end of the examination of 4th Semester the students will undergo compulsory summer training for a period of 4 weeks. Every student will submit the Summer Training Report within two weeks from the start of teaching for 5th Semester.

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

DAVUNIVERSITY JALANDHAR

Scheme of Courses B.Tech
B.Tech-Electrical Engineering

Semester 5

S. No.	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	ELE301	Power System-II	3	0	0	3	25	25	25	25	**75**
2	ELE302	Electrical Power Generation and Utilization	4	0	0	4	25	25	25	25	**100**
3	ECE350	Microprocessors and Its Applications	4	0	0	4	25	25	25	25	**100**
4	ELE303	Switch Gear And Protection	3	0	0	3	25	25	25	25	**75**
5	ICE352	Control System Engineering	4	0	0	4	25	25	25	25	**100**
6	ELE304	MATLAB Programming Laboratory	0	0	4	2	20	80			**50**
7	ECE351	Microprocessors and Its Applications Laboratory	0	0	2	1	20	80			**25**
8	ELE350	Industrial Training-I	0	0	0	2					**50**
9	ELE305	Power System-II Laboratory	0	0	2	1	20	80			**25**
			17	**0**	**8**	**25**					**625**

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

DAVUNIVERSITY JALANDHAR

Scheme of Courses B.Tech
B.Tech-Electrical Engineering

Semester 6

S. No.	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	ELE306	Power Electronics	4	0	0	4	25	25	25	25	**100**
2	ELE307	High Voltage Engineering	3	0	0	3	25	25	25	25	**75**
3	ELE308	Electric Drives and Traction	4	0	0	4	25	25	25	25	**100**
4	ICE350	Transducers and Signal Conditioning	4	1	0	4	25	25	25	25	**100**
5	ICE351	Electronics Measurement and Instrumentation	4	0	0	4	25	25	25	25	**100**
6	ELE310	Power Electronics Laboratory	0	0	4	2	20	80			**50**
7	ELE311	Electric Drives and Traction Laboratory	0	0	4	2	20	80			**50**
8	ELE312	Electrical Estimation & Costing Laboratory	0	0	4	2	20	80			**50**
9	ELE313	High Voltage Engineering Laboratory	0	0	2	1	20	80			**25**
			19	**0**	**14**	**26**					**650**

Note: At the end of the examination of 6th Semester the students will undergo compulsory summer training for a period of 6 weeks. Every student will submit the Summer Training Report within two weeks from the start of teaching for 7th Semester.

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

DAVUNIVERSITY JALANDHAR

Scheme of Courses B.Tech
B.Tech-Electrical Engineering

Semester 7

S. No.	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	ELE401	Generalized Theory of Machines	4	0	0	4	25	25	25	25	**100**
2	ICE402	Digital and Non Linear Control System	4	1	0	4	25	25	25	25	**100**
3	ELE402	Computer Aided Power System Analysis	3	0	0	3	25	25	25	25	**75**
4	ELE403	Microcontroller and Programmable Logic Controller	3	0	0	3	25	25	25	25	**75**
5	DE-I	Departmental Elective-I	4	1	0	4	25	25	25	25	**100**
6	ELE451	Minor project	0	0	4	2	20	80			**50**
7	ELE404	Computer Aided Power System Analysis Laboratory	0	0	2	1	20	80			**25**
8	ELE405	Microcontroller and Programmable Logic Controller Laboratory	0	0	2	1	20	80			**25**
9	ELE406	Industrial Training-II	0	0	0	4					**100**
			18	**0**	**08**	**26**					**650**

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

DAVUNIVERSITY JALANDHAR

Scheme of Courses B.Tech
B.Tech-Electrical Engineering

Semester 8

S. No.	Paper Code	Course Title	L	T	P	Cr	% Weightage				E
							A	B	C	D	
1	ELE407	Power Plant Engineering	4	0	0	4	25	25	25	25	**100**
2	ELE408	Electrical Energy Auditing and Deregulation	4	0	0	4	25	25	25	25	**100**
3	DE-II	Departmental Elective-II	4	0	0	4	25	25	25	25	**100**
4	SE-I/II/III	Special Elective-I/II/III	4	0	0	4	25	25	25	25	**100**
5	ELE451	Major Project Laboratory	0	0	4	2	20	80			**50**
6	ELE452	Seminar	0	0	4	2					**50**
7	ELE409	Electrical Simulation Tool Laboratory	0	0	4	2	20	80			**50**
8	ELE453	General Fitness*	0	0	0	2					**50**
Total			**16**	**0**	**12**	**24**					**600**

**** General Fitness Viva-Voce of 8th Semester would be based on papers taught in all the Semesters.***

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D: End-Term Exam (Final): Based on Objective Type Tests
E: Total Marks
L: Lectures T: Tutorial P: Practical Cr: Credits

DEPARTMENTAL ELECTIVE SUBJECTS		
Sr. No.	**Course Code**	**Subject Name**
Departmental Elective-I (DE-I)		
1.	ELE454	Power System Optimization
2.	ELE455	Power System Operation and Control
3.	ELE456	Power System Stability
4.	ELE457	Power Quality Monitoring and Conditioning
5.	ELE458	Flexible AC Transmission Systems
Departmental Elective-II (DE-II)		
1.	ELE 459	Advanced Power Electronics and Industrial Drives
2.	ELE460	Energy Efficient Machines
3.	ELE461	H.V.D.C. and E.H.V.A.C Transmission
4.	ELE462	Non-Conventional Energy Sources
5.	ELE463	Electrical Machine Design

SPECIAL ELECTIVE SUBJECTS		
Special Elective-I (SE-I):Instrumentation and Control Engineering		
Sr. No.	**Course Code**	**Subject Name**
1.	ICE430	Biomedical Engineering
2.	ICE450	Power System Instrumentation
3.	ICE451	Industrial Process Control
4.	ICE403	Fundamental of Virtual Instrumentation
5.	ICE409	Reliability Engineering
Special Elective-II (SE-II): Electronics and Communication Engineering		
Sr. No.	**Course Code**	**Subject Name**
1.	ECE311	Digital Signal Processing
2.	ECE451	Principles of Communication Systems
3.	ECE450	IC Fabrication Technology
4.	ECE310	Embedded Systems
5.	ECE454	Digital Image Processing and Pattern Recognition
Special Elective-III (SE-III): Computer Science Engineering		
Sr. No.	**Course Code**	**Subject Name**
1.	CSE210	Multimedia Communication
2.	CSE306	Software Engineering and Project Management
3.	CSE202	Computer Architecture and Organization
4.	CSE301	Computer Networks
5.	CSE305	Operating Systems
OPEN ELECTIVE SUBJECTS (OE-I)		
Sr. No.	**Course Code**	**Subject Name**
1	MGT451	Business Strategy

2	MGT452	Organizational Behaviour
3	MGT453	Principles of Marketing
4	MGT454	Stock Market Operations
5	MGT551	Research Methodology

Subjects Offered to other Departments		
1.	ELE201	Circuit Theory
2.	ELE250	Electro Mechanical Energy Conversion
3.	ELE251	Electro Mechanical Energy Conversion Laboratory
4.	ELE351	Industrial Electronics and Electric Drives
5.	ELE352	Industrial Electronics and Electric Drives Laboratory
6.	ELE204	Electromagnetic Field Theory
7.	ELE464	Elements of Power Systems
8.	ELE455	MATLAB Programming
9.	ELE465	Optimization Techniques

DAVUNIVERSITY JALANDHAR

Instruction for candidates (Theory Paper)

- 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 test 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. 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.

* Wherever specific instructions are required these are given at the starting of that particular subject/paper

DAVUNIVERSITY JALANDHAR

Instruction for candidates (Practical Paper)

- 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 test 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. 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.

* Wherever specific instructions are required these are given at the starting of that particular subject/paper

DAVUNIVERSITY JALANDHAR

Course Title: Engineering Mathematics-I
Paper Code: MTH 151

L	T	P	Credits	Marks
4	1	0	4	100

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

UNIT-A

Rank of matrices, Inverse of Matrices, Gauss Jordan Method, reduction to normal form, Consistency and solution of linear algebraic system of equations, Gauss Elimination Method Eigen values and Eigen vectors, Diagonalisation of Matrix, Cayley Hamilton theorem. Orthogonal, Hermit ion and unitary matrices. **13 Hours**

UNIT-B

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

14 Hours

UNIT-C

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

11 Hours

UNIT-D

Solution of differential equations with constant coefficients: method of differential operators. Non–homogeneous equations of second order with constant coefficients: Solution by method of variation of parameters, Power series method of solution.

10 Hours

Suggested Books:

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

DAVUNIVERSITY JALANDHAR

Course Title: Engineering Mathematics-II
Paper Code: MTH-152

L	T	P	Credits	Marks
4	1	0	4	100

Course 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.

UNIT-A

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. **14 Hours**

UNIT-B

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.

15 Hours

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

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).

13 Hours

UNIT-D

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.

15 Hours

Suggested Books:

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.

DAVUNIVERSITY JALANDHAR

Course Title: Chemistry
Paper Code: CHE 151

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.

UNIT- A

Spectroscopy and its Applications

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

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

12 Hours

UNIT-B

Water and its treatment: Introduction, hardness of water, degree of hardness, units of hardness, boiler feed water: specification, scales and sludge formation; priming & foaming, boiler corrosion, caustic embrittlement, treatment of boiler feed water, internal treatment of water; softening of water by lime-

soda, zeolite and ion exchange methods, desalination of water; Water for domestic use: purification of water for domestic use.

7 Hours

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

7 Hours

UNIT-C

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

7 Hours

UNIT-D

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

7 Hours

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.

Course Title: Basic Computer Trends
Paper Code: CSE-101

L	T	P	Credits	Marks
4	0	0	4	100

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).

UNIT-A

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

8 Hours

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

7 Hours

UNIT-B

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

6 Hours

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

8 Hours

UNIT-C

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

8 Hours

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

8 Hours

UNIT-D

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

6 Hours

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

7 Hours

Suggested Books:

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.

DAVUNIVERSITY 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-A

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)**

(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-B

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 **(8 Hours)**

- 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-C

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 Environment **(5 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-D

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. , “Basic Ecology. Halt Saundurs”, International Edition, Japan, 1983.
2. Botkin, D.B. and Kodler, E.A., “Environmental Studies: The Earth as a living planet”, John Wiley and Sons Inc., New York, 2000.
3. Singh, J.S., Singh, S.P and Gupta S.R., “Ecology, Environment and Resource Conservation”, Anamaya Publishers, New Delhi, 2006.
4. De, A.K., “Environmental Chemistry”, Wiley Eastern Ltd. New Delhi, 1990.

5. Sharma, P.D. , "Ecology and Environment", Rastogi Publications, Meerut, 2004.
6. Uberoi, N.K., "Environmental Management", Excel Books, 2nd Edition, New Delhi.

L	T	P	Credits	Marks
2	0	0	2	50

Course Title: Human Values and Ethics
Paper Code: SGS-101

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 Hours**
4. **Value crisis and its red ressal.** **1 Hour**

UNIT-B

Being Good and Responsible

1. Self Exploration and Self Evaluation **2 Hours**
2. Acquiring Core Values for Self Development **2 Hours**
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 Hours**
2. Karma Yoga and Jnana Yoga **2 Hours**

3.	Ashta Marga 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. E. Sreedharan and Bharat Wakhlu , "Restoring Values (ed.)", Sage Publications Ltd., New Delhi 2010.
2. Nagarajan K , "Indian Ethos and Values", Tata McGraw Hill, 2011
3. A N Tripathi, "Human Values", 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. Osula, "Values and Ethics", Asian Books, 2001.
6. R. Subramanian, "Professional Ethics", Oxford University Press, New Delhi, 2013.
7. Rishabh Anand, "Human Values and Professional Ethics", Satya Prakashan, New Delhi, 2012
8. Sanjeev Bhalla, "Human Values and Professional Ethics", Satya Prakashan, New Delhi, 2012.
9. Ritu Soryan, "Human Values and Professional Ethics", Dhanpat Rai & Co. Pvt. Ltd., First Edition, 2010.
10. Suresh Jayshree, "Human Values and Professional Ethics", Raghavan B S, S Chand & Co. Ltd., 2007.
11. Dr. R K Shukla, Anuranjan Misra, "Human Values and Professional Ethics, A B Publication 2010.
12. Sharma, , "Human Values and Professional Ethics", Vayu Education of India Language publishers, 2012.
13. S. Kannan, K. Srilakshmi, "Human Values and Professional Ethics", Taxmann Publication, Pvt. Ltd., 2009
14. Smriti Srivastava, , "Human Values and Professional Ethics", S K Kataria & Sons, 2001
15. Yogendra Singh, Ankur Garg, "Human Values and Professional Ethics", Aitbs publishers, 2011.
16. Vrinder Kumar, , "Human Values and Professional Ethics", Kalyani Publishers, Ludhiana, 2013.
17. R R Gaur, R. Sangal, GP Bagaria, , "Human Values and Professional Ethics", Excel Books, New Delhi 2010.
18. Dr. Bramwell Osula, Dr. Saroj Upadhyay, "Values and Ethics", Asian Books Pvt. Ltd., 2011.
19. Complete works of Swami Vivekanand, Advaita Ashram, Calcutta, 1931.
20. S. Radhakrishnan, Indian Philosophy, George Allen & Unwin Ltd., New York: Humanities Press INC, 1929.
21. A N Dwivedi, "Essentials of Hinduism, Jainism and Buddhism", Books Today, New Delhi – 1979
22. Light of Truth : Satyarth Parkash, Maharishi Dayanand Saraswati, Arya Swadhyay Kendra, New Delhi, 1975.

23. Suraj Bhan, "Dayanand : His life and work", DAVCMC, New Delhi – 2001.
24. V. Raghavan, N Iyer, "Moral and Political Thoughts of Mahatma Gandhi", Oxford University Press India, New Delhi, 2000.
25. Narain Singh , "Guru Nanak Dev's view of life", Bhagat Puran Singh All India Pingalwara Society, Amritsar 2010.
26. Kapil Dev Dwivedi, "Esence of Vedas", Katyayan Vedic Sahitya Prakashan, Hoshiarpur, 1990.
27. Vedic Concepts, Prof. B B Chaubey, Katyayan Vedic Sahitya Prakashan, Hoshiarpur, 1990.
28. Saravapalli Radhakrishnan, "Mahatma Gandhi : Essays and Reflections on his life and work", Zaico Publication, Mumbai, 1977.
29. Lala Har Dayal, "Hints for Self Culture", Jaico Publishing House, Mumbai, 1961.
30. Maharishi Swami Dayanand Saraswati, The Light of Truth (The Satyartha Prakashan), 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

Course Title: Fundamentals of Management
Paper 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 organizations.

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 **3 Hours**

Forecasting: Meaning, process and importance, Decision-Making Process and types of decisions.

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

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

DAVUNIVERSITY JALANDHAR

Course Title: **Engineering Drawing**
Paper Code: MEC101

L	T	P	Credits	Marks
2	0	4	4	100

Total Lectures: 90

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

UNIT - A

Drawing Techniques: 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

12 Hours

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

6 Hours

UNIT - B

Projection of Points: 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

6 Hours

Projection of Lines and Planes: 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

18 Hours

UNIT - C

Projection of Solids: 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.

12 Hours

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

9 Hours

UNIT - D

Interpretation of Views: Draw orthographic views from isometric view, Missing line and missing view

9 Hours

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

18 Hours

Suggested Books:

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

Course Title: Basic Computer Trends Laboratory
Course Code: CSE102

L	T	P	Credits	Marks
0	0	2	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.

List of Experiments

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

Course Title: Chemistry Laboratory
Course Code: CHE152

L	T	P	Credits	Marks
0	0	2	2	50

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 Experiments

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).

Course Title: Stenography
Course Code: SGS104

L	T	P	Credits	Marks
2	0	0	0	0

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.

UNIT-A

I. The Consonants II. The Vowels III. Intervening Vowels and Position Grammalogues, Punctuation IV. Alternative Signs for r and h V. Diphthongs Abbreviated w. VI. Phaseography Tick the VII. Circle s and z—Left and Right Motion VIII. Stroke s and z IX. Large Circles sw and ss or sz X. Loops st and str.

12 Hours

UNIT-B

XI. Initial Hooks to Straight Strokes and Curves XII. Alternative Forms for fr, vr, etc. Intervening Vowels XIII. Circle or Loop Preceding Initial Hook XIV. n and f Hooks XV. Circles and Loops to Final Hooks.XVI The shun hook. XVII. The Aspirate. XVIII. Upward and Downward r.XIX. Upward and downward l and sh. XX. Compound consonants XXI. Vowel indication**.**

12 Hours

UNIT-C

XXII. The halving principle (section 1). XXIII. The halving principle (section 2). XXIV. The Doubling principle. XXV. Diphonic or two vowel signs. XXVI. Medial semicircle. XXVII. Prefixes negative words. XXVIII. Suffixes and terminations. XXIX. Contractions. XXX. Figures, etc .proper names.

11 Hours

UNIT-D

XXXI. Note taking, transcription, etc. XXXII. Essentials vowels. XXXIII. Special contractions. XXXIV. Advanced pharseography. XXXV. Intersections. XXXVI. Business phrases. XXXVIII. Banking and stockbroking phrases. XXXIX. Insurance and shipping phrases. XL. Technical and railway phrases. XLI. Legal phrases. XLIII. Special list of words. XLIV. Shorthand in practice.

10 Hours

Text Book:
Pitman Shorthand Instructor and Key, Pearson publisher.

Course Title: Stenography Laboratory
Course Code: SGS105

L	T	P	Credits	Marks
0	0	2	0	0

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 typing and would be able to apply them in daily life. Completion of the course will improve their speed of typing and typing skills.

UNIT-A

Beginner :
Basics-fjdk, sla, ghty,vmbn,ruei,woqp,cx.

4 Hours

UNIT-B

Shift keys, numeric pad, Digits and symbols **3 Hours**

UNIT-C

Intermediate- Syllables and words.

4 Hours

UNIT-D

Expert- Paragraphs and Stories **4 Hours**

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L	T	P	Credits	Marks
3	1	0	3	75

Course Title: Engineering Physics
Paper Code: PHY151

- 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 test will be conducted having a weightage of 25% each. Each preannounced test will consist of 20 objective type, 5 short questions/problems 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

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.

14 Hours

UNIT-B

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 fibres, numerical aperture, single mode and multimode fibres, applications

12 Hours

UNIT-C

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

9 Hours

UNIT-D

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

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

10 Hours

Suggested Books:

1. F.W. Sear , "Electricity and Magnetism", Narosa Publication
2. Resnick & Halliday , Physics Vol. 1 & 2, Wiley Eastern
3. Brij Lal and Subramanyam , "A Text Book of Optics"
4. Jenkin's and White , "Physical Optics"
5. David J. Griffiths , "Electromagnetism"
6. Arthur Beiser , "Perspective of Modern Physics", TMH Publication

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L	T	P	Credits	Marks
4	0	0	4	100

Course Title: **Fundamentals of Mechanical Engineering**
Paper Code: MEC102

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

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UNIT- A

Fundamental Concepts of Thermodynamics: 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

6 Hours

Laws of Thermodynamics: 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

6 Hours

UNIT-B

Heat Transfer: 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

5 Hours

Power Producing Devices: 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

6 Hours

UNIT-C

Power Absorbing Devices: 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.

5 Hours

Principles of Design

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.

5 Hours

UNIT-D

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

5 Hours

Machine Elements: 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

5 Hours

Suggested Books:

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

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Course Title: Electrical and Electronics Technology
Paper Code: ELE101

L	T	P	Credits	Marks
4	1	0	4	100

Course Objectives: To impart the basic knowledge of DC and AC Circuit Analysis and Network Theorems, Magnetic Circuits and various electrical devices e.g. DC Motor, DC Generator, Transformer etc. To impart the knowledge of Electronics circuits such as Op-Amp, PN Junction diode, Transistor and logic gates.

UNIT-A

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

10 Hours

UNIT-B

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

12 Hours

UNIT-C

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

Transformers: Single phase transformer, basic concepts constructional detail, type, voltage current and impedance Transformation, phasor diagram, equivalent circuit, voltage regulation, OC/SC test, losses and efficiency concept of All day efficiency , autotransformer.
Rotating Electrical Machines: Basic concepts, working principle and general construction of DC machines (motor/generators), torque and EMF expression, Introduction to AC Machines.

18 Hours

UNIT-D

Basic Electronics: P-Type and N-Type semiconductor, concept of diode, transistor and their application, Introduction to Op-Amp, application of op-amp as a subtractor, summer, differentiator, integrator, Digital logic gates: AND ,OR, NOT, NOR, NAND etc.

10 Hours

Suggested Books:

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

DAVUNIVERSITY JALANDHAR

Course Title: Basic Communication Skills
Paper Code: ENG151

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective:

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

UNIT-A

Applied Grammar (Socio-Cultural Context): Parts of Speech: Noun, Pronoun, Adjective, Verb, Adverb, Preposition, Conjunction, Interjection; Tenses (Rules and Usages in Socio-cultural contexts); Modals: Can, Could, May, Might, Will, Would, Shall, Should, Must, Ought to; Passives; Reported/Reporting Speech

19 Hours

UNIT-B

Reading (Communicative Approach to be Followed): J M Synge: Riders to the Sea (One Act Play); Anton Chekhov : Joy (Short Story); Swami Vivekanand : The Secret of Work (Prose)

14 Hours

UNIT-C

Writing: Paragraph and Essay Writing; Letter Writing: Formal and Informal; Notice and Email

12 Hours

Suggested Readings;

a. Books

1. Kumar, Sanjay and Pushp Lata. *Communication Skills*. India: OUP, 2012.
2. Vandana, R. Singh. *The Written Word* by. New Delhi: Oxford University Press, 2008.
3.

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

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
2	0	0	2	50

Course Title: General Knowledge and Current Affairs
Paper Code: SGS102

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.

3 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 Hours

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.

3 Hours

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.

3 Hours

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

3 Hours

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

3 Hours

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

2 Hours

Unit -D

Miscellaneous Information

Who is who: Books and Authors, Persons in News, Awards and Honours, Abbreviations and Sports

2 Hours

Suggested Readings :

1. R. S. Aggarwal, "Advance Objective General Knowledge", S. Chand Publisher, 2013.
2. S. Sen, "Concise General Knowledge Manual 2013", Unique Publishers, 2013
3. R P Verma, "Encyclopedia of General Knowledge and General Awareness" Penguin Books Ltd, 2010
4. Edgar Thorpe and Showick Thorpe, "General Knowledge Manual 2013-14", The Pearson, Delhi.
5. Muktikanta Mohanty, "General Knowledge Manual 2013-14", Macmillan Publishers India Ltd., Delhi.
6. India 2013, Government of India (Ministry of Information Broadcasting), Publication Division, 2013.
7. Mammen Methew, "Manorama Year Book 2013-14", Malayalam Manorama Publishers, Kottayam, 2013.
8. Spectrum's Handbook of General Studies – 2013-14, Spectrum Books (P) Ltd., New Delhi
9. Unique Quintessence of General Studies – 2013-14, Unique Publishers, New Delhi.

Current Affairs

Magazines

1. Economic and Political Weekly, Yojna, the Week, India Today, Frontline, Spectrum.
2. Competition Success Review, Competition Master, Civil Services Chronicle, Current Affairs, World Atlas Book

Newspapers

1. The Hindu
2. Times of India
3. The Hindustan Times
4. The Tribune

DAVUNIVERSITY JALANDHAR

Course Title: **Manufacturing Practice**
Paper Code: MEC-104

L	T	P	Credits	Marks
0	0	4	2	50

Course Objectives:

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

Carpentry Shop:

a) Preparation of half lap joint

b) Preparation of Mortise and Tenon Joint

c) Preparation of a Dove & Tail joint

d) To prepare a White board duster

Welding Shop:

a) Preparation of Joint by Arc Welding

b) Preparation of Joint by using Gas Welding

c) Preparation of Joint by MIG/ TIG Welding

d) Preparation of Joint by Spot/ Seam Welding

Smithy Shop:

a) To Forge the L – Hook

b) To Forge a Chisel

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

d) To forge a screw driver

Fitting Shop:

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

b) Preparation of T fitting male part

c) Preparation of U fitting Female part

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

Foundry Shop:

a) To make a Mould of solid pattern

b) To prepare a mould of sleeve fitting using gating system
c) To make a Mould of Split Pattern using Cope & Drag
d) To check the Hardness of the Mould
   To check the Moisture Content in the Molding Sand
   To check the Compressive Strength of Molding Sand

Sheet-Metal Shop:

a) Preparation of a funnel from G.I. sheet
b) Preparation of a book rack stand from G.I. Sheet
c) Preparation of a leak proof tray with inclined edges from G.I. Sheet
d) Preparation of a square pen stand from G.I. Sheet with riveting at corners

Machine Shop

a) To make a job using step turning and grooving
b) To make a job using knurling and threading
c) To make a multi operation job on a Lathe machine
d) To make V–slot by using shaper machine

Electrical Shop:

a) Layout of electrical tube light wiring
b) Layout of stair case wiring using two way switch
c) Testing and rectification of simulated faults in electrical appliances such as 'Electric Iron' Ceiling Fan, Electric kettle
d) To fabricate a circuit for the electrical wiring of, Fan with regulator and Bulb through a main switch and its testing using a series lamp

Suggested Books:

1. Johl K. C., **"Mechanical Workshop Practice"**, Prentice Hall India, 1st Edition.
2. Bawa H.S., **"Workshop Technology"**, Tata McGraw Hill, 7th Edition.

DAVUNIVERSITY JALANDHAR

Course Title: Electrical and Electronics Technology Laboratory
Paper Code: ELE-101

L	T	P	Credits	Marks
0	0	2	2	50

Course Objectives: To impart the practical knowledge of DC Circuit Analysis using Ohm's law, Kirchhoff's laws and network theorems, to understand the constructional detail of transformer and dc machines and to understand the basics of logic gates and PN junction diode

List of Experiments

1. To verify Ohm's Law
2. To Verify Kirchhoff's Current Law and Kirchhoff's Voltage Law.
3. To verify Thevenin's and Norton's theorems.
4. To verify Superposition theorem.
5. To verify Maximum Power Transfer theorem.
6. 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
7. 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.
8. To study the constructional detail and working of single phase transformer
9. To perform direct load test of a transformer and plot efficiency versus load characteristics.
10. To perform open circuit and short circuit test on transformer.
11. To study the constructional detail and working of DC Motor/Generator
12. To perform speed control of DC motor.
13. Measurement of power in a three phase system by two wattmeter method.
14. To plot the V-I characteristics of PN-junction diode.
15. To verify the truth table of logic gates.

DAVUNIVERSITY JALANDHAR

Course Title: Basic Communication Skills

Paper Code: ENG152

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.

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.

Unit–A: Speaking/Listening	
• Movie-Clippings	**10 Hours**
• Role Plays	**10 Hours**
• Group Discussions	**10 Hours**

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

DAVUNIVERSITY JALANDHAR

Course Title: Engineering Physics Laboratory
Paper Code: PHY152

L	T	P	Credits	Marks
0	0	2	2	50

Max Marks: 50

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 eighteen experiments out of following list. The experiments per formed in first semester cannot be repeated in second Semester.
- The examination for both the courses will be of 3 hours duration.
- 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.
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.

DAVUNIVERSITY JALANDHAR

SEMESTER-3rd

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.

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*, 2nd Edition, Dhanpat Rai, 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.

DAVUNIVERSITY JALANDHAR

Course Title: Electrical Machines-I
Paper Code: ELE202

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: The objective of the course is to enable the students to understand the basic concepts related Electromechanical Energy Conversion, Transformer, DC Motor and DC Generator and their applications.

Unit-A

Electromechinal Energy Conversion: Principle of electromechanical energy conversion, calculation of electrical energy input , energy stored in magnetic field ,mechanical work done, expression for force and torque for singly excited and doubly excited magnetic system

8 Hours

Unit-B

Single Phase Transformers: Principle of single-phase transformer, E.M.F. Equation, turn ratio, phasor diagram of ideal and real transformer at no load and loaded condition, equivalent circuit,oc/sc test voltage regulation, losses and efficiency, all day efficiency and its calculation. Parallel operation of single phase transformers, division of load between transformers in parallel (equal/unequal voltage ratio)

Three Phase Transformers: Three phase transformers: star/star connection, delta/delta connection, star/delta connection, delta/star connection 0^o and $+30^o$ connection .choice of star delta connection, open delta connection, three winding transformer.

12 Hours

Unit-C

D.C. Generators: Constructional detail, voltage equation, lap and wave wound machines, equalizer, connection, armature reaction and method of overcoming its detrimental effects , equivalent circuit of d.c generator, separately excited, and self excite generator , voltage equation and terminal characteristics of shunt, series, and compound d.c generator .voltage buildup in shunt generator , failure to buildup voltage in shunt generator , voltage regulation , parallel operation of d.c generators

10 Hours

Unit-D

D.C. Motors: Torque generated in particle D.C. motor, equivalent circuit of motor, various types' terminal characteristics of shunt, series and compound motors. Speed control of dc motor by shunt field method and armature voltage method. Ward –leonard speed control method, static ward leonard method and multi quadrant spped control through ward –leonard method Need of starter in dc motor, three point and four starter of dc shunt motors

12 Hours

Suggested Books:

1. Bimbhra P.S., *Electrical Machinery, Khanna Publishers*
2. Fitzgerald A.E., Kingsley C. and Umans S.D., *Electric Machinery*, 6th Edition, McGraw Hill
3. Langsdorff E.H., *Principles of A.C. Machines*, McGraw Hill
4. Nagrath I.J. and Kothari D.P., *Electrical Machines*, 4th Edition, Tata McGraw Hill,
5. Say M G, *Alternating Current Machines*, 5th edition, Sir Isaac pitman & Sons Ltd.

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
3	0	0	3	75

Course Title: Electrical Instrumentation and Measurements
Paper Code: ICE201

UNIT-A

Measurements and measurement Systems: Measurements, significance of measurements, methods of measurements, direct methods, indirect methods, instrument and measurement systems, mechanical, electrical and electronic instruments, classification of instruments, deflection and null type instruments- deflection type, null type, comparison of deflection and null type instruments, analog and digital modes of operation, functions of instruments and measurement systems, applications of measurement systems, types of instruments systems, information and signal processing,

Elements of a generalized measurement system- primary sensing element, variable conversion element, data presentation element, input-output configurations of measuring instruments and measurement systems- desired inputs, inferring inputs, modifying inputs, methods of correction for interfering and modifying inputs.

12 Hours

UNIT-B

Characteristics of instruments and measurement systems: Measurement system performance, static calibration , static characteristics, errors in measurements, true value, static error, static correction, scale range and scale span, error calibration curve, reproducibility and drift repeatability, noise –signal to noise ratio, source of noise, Johnson noise, power spectrum density, noise factor and noise figure, accuracy and precision, indications of precision, significant figures, range of doubt, possible errors and doubtful figures, static sensitivity, linearity, hysteresis, threshold, dead time, dead zone, resolution of discrimination, loading effects, input and output impedances- input impedances, input admittance, output impedance, output admittance, loading effect due to shunt connected instruments, loading effects due to series connected instruments, generalized impedance and stiffness concepts, static stiffness and static compliance, impedance matching and maximum power transfer.

Potentiometer: Introduction to basic principle, Laboratory type Crompton's potentiometer, Dual range potentiometer, Volt ratio box, application of dc potentiometer, self balancing potentiometer.

12 Hours

UNIT-C

Measurement of Resistances: Classification of resistances, measurement of medium resistance, Measurement of low resistance (Kelvin double bridge, Ammeter-Voltmeter) and Measurement of high resistance including loss of charge method and Mega ohm bridge method.

AC Bridges: General theory of ac bridge, Measurement of self inductance, Measurement of capacitance, Measurement of mutual inductance, Measurement of frequency, Sources of error in ac bridges and their minimization.

12 Hours

UNIT-D

Electromechanical Indicating Instruments: Operating forces, Constructional Details, Control System ,Torque Weight ratio, Damping System: Air friction Damping, Fluid Friction Damping, eddy Current Damping, Electromagnetic Damping.

Analog Ammeter, Voltmeter: Introduction, Types of instruments, PMMC-Construction Torque Equation, MI Instruments- Construction, general Torque Equation, Classification of MI Instruments, Attraction Type, repulsion Type, Extension of range, Advantages & Disadvantages, Applications, Electrodynamometer Type instruments.

12 Hours

Suggested Books:

1. Murty D V S, “Transducers & Instrumentation”, PHI, New Delhi, 2000.
2. Sawhney A K, “Electrical and Electronics Measurements and Instrumentation”, Dhanpat Rai and Sons, New Delhi, 2000.
3. Kalsi H S, “Electronic Instrumentation “ Tata McGraw Hill, New Delhi, 4th Ed. , 2001.
4. Patranabis D, “Sensors and Transducers”, PHI, New Delhi, 2003.
5. Doebelin Ernest O, "Measurement Systems: Application and Design”, Tata McGraw Hill Ltd., New Delhi , 2004.

DAVUNIVERSITY JALANDHAR

Course Title: Engineering Mathematics-III
Paper Code: MTH252

L	T	P	Credits	Marks
4	1	0	4	100

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

Unit-A

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.

14 Hours

Unit-B

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.

14 Hours

Unit-C

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.

14 Hours

Unit-D

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.

14 Hours

Suggested Books:

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.

DAVUNIVERSITY JALANDHAR

Course Title: Object Oriented Programming
Paper Code: CSE-201

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).

UNIT-A

Object-Oriented Programming Concepts

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.

Standard Input/Output

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

15Hours

UNIT-B

Functions and Arrays

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

Classes and Objects

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.

15Hours

UNIT-C

Operator Overloading and Type Conversion

Overloading operators, rules for overloading operators, Overloading of various operators, Type conversion.

Inheritance

Introduction, defining derived classes, Types of inheritance, virtual base class, Pure virtual functions, overriding member functions.

Polymorphism

Concept of binding - early binding and late binding, Virtual functions, abstract classes, Virtual destructors.

14Hours

UNIT-D

Exception Handling

Review of traditional error handling, basics of exception handling, Exception handling mechanism, Throwing mechanism, catching mechanism.

Files

File streams, hierarchy of file stream classes, Error handling during file operations, Reading/writing of files, updating files.

14Hours

Suggested Readings:

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.

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
4	0	0	4	100

Course Title: Advanced Communication Skills
Paper Code: ENG251

Total Lectures: 45

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 , Conditional Sentences , Subject-Verb Agreement, Transformation of Sentences , Advanced Vocabulary

12 Hours

UNIT-B

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

12 Hours

UNIT-C

Writing: Oral/PPT presentations; Letter Writing/Memos/E-mails; Report Writing/Job Application/C.V./Resume

12 Hours

UNIT-D

Speaking/Listening: Interviews; Skit Enactment (Evaluative); Panel Discussions

12 Hours

Suggested Readings/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.
4. Kumar, Sanjay and Pushp Lata. *Communication Skills*. India: OUP, 2012.
5. 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

DAVUNIVERSITY JALANDHAR

Course Title: Electrical Machines-I
Paper Code: ELE203

L	T	P	Credits	Marks
0	0	2	1	25

Course Objective: The purpose of this course is to introduce to the students the basics of single phase and three phase Transformer, DC series, shunt and Compound motor/generator and to analyse their characteristics

Learning Outcomes: At the end of this course, the students will learn

- Working of single and three phase transformers
- Working of different types of DC Motors
- Working of Series/Shunt/Compound DC Generators
- Various characteristics of DC machines

List of Experiments

1. To Load test on a single phase transformer.
2. To perform Open circuit and short circuit tests on a single phase transformer and hence find equivalent circuit, voltage regulation and efficiency.
3. To find the efficiency and voltage regulation of single phase transformer under different loading conditions.
4. To perform parallel operation of two single phase transformers.
5. To study the various connections of three phase transformer.
6. To perform Scott connections on three phase transformer to get two phase supply.
7. To study the constructional details of direct current (DC) machine and to draw sketches of different components.
8. To measure armature and field resistance of direct current (DC) shunt generator and to obtain its open circuit characteristics.
9. To obtain load characteristics of direct current (DC) shunt/series /compound generator.
10. To draw speed-torque characteristics of direct current (DC) shunt/series /compound generator.
11. To study direct current (DC) motor starters.
12. To perform Swinburne's test (no load test) to determine losses of direct current (DC) shunt motor.

DAVUNIVERSITY JALANDHAR

Course Title: Electrical Measurement & Instrumentation Laboratory
Paper Code: ICE202

L	T	P	Credits	Marks
0	0	2	1	25

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

List of Experiments

1. Study of principle of operation of various types of electromechanical measuring instruments.
2. Determination of frequency, Amplitude, RMS Value, Average Value and phase angle using Cathode Ray Oscilloscope.
3. Measurement of unknown voltage using Crompton's potentiometer.
4. To calibrate and use the Induction Energy Meter.
5. Measurement of resistance using Wheatstone Bridge.
6. Measurement of resistance using Kelvin's Bridge.
7. Measurement of self inductance using Anderson's Bridge.
8. Measurement of capacitance using Schering Bridge.
9. Measurement of frequency using Wien's Bridge.
10. To find 'Q' of an inductance coil and verify its value using Q- meter.
11. To measure the unknown resistance with the help of Voltmeter and Ammeter.
12. To study the connections and use of Current and potential transformers and to find out ratio error.

DAVUNIVERSITY JALANDHAR

Course Title: Object Oriented Programming Laboratory
Paper 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

DAVUNIVERSITY JALANDHAR

SEMESTER-4th

L	T	P	Credits	Marks
4	0	0	4	100

Course Title: Electromagnetic Field Theory
Paper Code: ELE204

Course Objective: This course provides a comprehensive understanding of electrostatics, Magnetostatics and development of Maxwell's equation and EM wave equations and their applications in transmission lines. It enables the the students to 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 electrostatics and magnetostatics.
- 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 transmission lines.

After the completion of this course the participants would gain the knowledge of the vector analysis, Electrostatics and Magnetostaics phenomenon, Maxwell's and EM wave equations and transmission lines.

Unit-A

Review of Vector Analysis: Vector analysis, Physical interpretation of gradient, divergence and curl; vector relations in other coordinate systems, integral theorems: divergence theorem, stoke's theorem, green's theorem and Helmholtz theorem, numerical problems.

06 Hours

Unit-B

Electrostatics: Introduction to fundamental relations of electrostatic field; Gauss's law and its applications; potential function; Field due to continuous distribution of charges; Equipotential surfaces; Divergence theorem; Poisson's equation and Laplace's equation, capacitance, electrostatic energy, Conditions at Boundary between dielectrics, Uniqueness theorem.

Magneostatics: Magnetic induction and Faraday's laws; magnetic Flux Density; magnetic field strength and magnetomotive force; Ampere's work Law in the differential vector form; permeability; energy stored in a magnetic field ; ampere's force law; magnetic vector potential, Analogies between electric and magnetic fields.

16 Hours

Unit-C

Maxwell's Equations and Time Varying Fields: Equation of continuity for time varying fields, Inconsistency of ampere's law, Maxwell's equations in integral and differential form for static and time varying fields, conditions at a Boundary surface, Concept of Poynting vector, Poynting Theorem, Interpretation of ExH

10 Hours

Unit-D

Electromagnetic Waves Propagation: Solutions for free-space conditions; Uniform plane Wave Propagation; Wave equations for a conducting medium; Sinusoidal time variations; Polarization; Conductors and Dielectrics; Direction Cosines; Reflection by Perfect Conductor-normal and oblique incidence, Perfect Dielectric-normal incidence, Perfect Insulator–Oblique incidence; Brewster angle, Reflection at a surface of Conductive medium, Surface impedance, wave impedance, velocities of propagation

Transmission Lines: 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, Introduction to waveguides.

16 Hours

Suggested Books:

1. Matthew N.O.Sadiku, Elements of Electromagnetic,, Oxford Univ. Press, 4th ed., 2009
2. Edward C. Jordan and Keith G Balmain, *Electromagnetic Waves and Radiating Systems*, Prentice-Hall Inc.
3. Kraus John D. *Electromagnetics, McGraw-Hill Publishers*
4. Edminister Joseph A., *Schaum's Theory and Problems of Electromagnetics, McGraw-Hill*
5. Rao N. Narayana, *Elements of Engineering Electromagnetics, Pearson Education*
6. K.D Prasad., "Electromagnetic field and waves"
7. R.G.Kaduskar., "Principles of Electromagnetic"

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
3	0	0	3	75

Course Title: Electrical Machines-II
Paper Code: ELE205

Course objective: Understand the basic principles of operation of rotating electric machines, their classification, and basic efficiency and performance characteristics.

Learning Outcomes: After the completion of this course the participants would gain the knowledge to distinguish working procedure of induction motor and generator and their constructional feature.

Unit-A

Polyphase Induction Machines: Analogy between induction motor and transformer, production of rotating field in space distributed three-phase winding, constructional features, concept of slip and operation, rotor frequency, current and power, equivalent circuit, phasor diagram, torque-slip characteristics, effect of rotor circuit resistance, starting torque, crawling and cogging, cage motors(double cage and deep bar motor).

12 Hours

Unit-B

Starting Methods And Speed Control: Starting methods, speed control: (i) control of speed of rotating field, (ii) control of slip speed. Effect of voltage injection in rotor circuit of slip ring induction motor. Motor tests for estimation of equivalent circuit parameters.

Fundamentals Of Synchroneous Motor: principle of operation, phasor diagram, operation of constant load with variable excitation. V curve, two reaction theory.

10 Hours

Unit-C

Synchronous Generator: principal of operation of alternators , construction feature of turbo generators, distribution and coil span factor. Emf equation , armature reaction , synchronous impedance , regulation of alternators and its determination by synchronous impedance method, load characteristics and input and output power of alternator.

Single –Phase Motors: Double revolving field theory, types of single phase motors, characteristics and equivalent circuit. Shaded pole motor: working principle and characteristics.

10 Hours

Unit-D

Special Purpose Motors: Stepper Motors: construction, principle of operation and applications, Linear Induction Machines: construction, principle of operation and applications. Universal Motor:

construction, principle of operation and applications.

8 Hours

Suggested Books:

1. Fitzgerald A.E., Kingsley C. and Umans S.D., *Electric Machinery*, 6th Edition, McGraw Hill
2. Langsdorff E.H., *Principles of A.C. Machines*, McGraw Hill
3. Nagrath I.J. and Kothari D.P., *Electrical Machines*, 4th Edition, Tata McGraw Hill,
4. Bimbhra P.S., *Electrical Machinery, Khanna Publishers*
5. Say M G, *Alternating Current Machines*, 5th edition, Sir Isaac pitman & Sons Ltd.

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
3	0	0	3	75

Course Title: Power System-I
Paper Code: ELE206

Course objective: This course provides a comprehensive understanding of the origin and development of power system and basics of transmission line, its construction and economic design.

Learning Outcomes: After the completion of this course the participants would be able to basics of overhead and underground transmission line.

Unit-A

Supply System: Introduction to Transmission and Distribution systems, Comparison between DC and AC systems for Transmission and Distribution, comparison of cost of conductors, choice of working voltage for transmission and distribution, economic size of conductors-Kelvin's law, Radial and mesh distribution networks, Voltage regulation.

Conductors And Transmission Line Construction: Conductor materials; solid, stranded, ACSR, hollow and bundle conductors. Different types of supporting structures for overhead lines. Elementary ideas about transmission line construction and erection. Stringing of conductors, spacing, sag and clearance from ground, overhead line insulators, Concept of string efficiency.

14 Hours

Unit-B

Transmission Line Parameters: Introduction to line parameters, Resistance of transmission line, inductance of single phase two wire line, concept of G.M.D., Inductance of three phase line, Use of bundled conductor, transposition of power lines, capacitance of 1-phase and 3-phase lines, effect of earth on capacitance of conductors.

PERFORMANCE OF TRANSMISSION LINES: Representation of short transmission line, medium length line (nominal T & II circuits), long length line by hyperbolic equations and equivalent T & II circuits. Power flow through transmission lines, ABCD constants, Voltage regulation.

10 Hours

Unit-C

Circle Diagram And Line Compensation: Receiving end circle diagram for long transmission lines based on ABCD constants, equivalent T circuits, power loci, surge impedance loading, reactive power requirement of system series and shunt compensation, Synchronous phase modifiers , rating of phase modifiers.

8 Hours

Unit-D

Underground Cables: Classification of cables based upon voltage and dielectric material, insulation resistance and capacitance of single core cable, dielectric stress, Capacitance of 3 core cables, methods of laying, heating effect, Maximum current carrying capacity, cause of failure, comparison with overhead transmission lines.

12 Hours

Suggested Books:

1. Elgerd O.L., Electrical Energy System Theory - An introduction, Tata McGraw-Hill Publication
2. Gupta B.R., Power System Analysis & Design, Wheeler Publishing
3. Nagrath I.J. and Kothari D.P., Power System Analysis Tata McGraw-Hill Publication
4. Stevenson Jr. W.D., Elements of Power System Analysis, Tata McGraw-Hill Publication
5. Wadhwa C.L., Course in Electrical Power, New Age International Pvt. Ltd.

DAVUNIVERSITY JALANDHAR

Course Title: Signal and Systems
Course 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**.**

Unit-A

Classification of Signals And Systems: 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.

(13 Hours)

Unit-B

Analysis of Continuous Time Signals: 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.

(13 Hours)

LTI Continuous Time System: 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.

(13 Hours)

Unit-C

Analysis Of Discrete Time Signals And Systems: 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.

(11 ours)

Unit-D

LTI DT System Characterization And Realization: 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

(13 Hours)

Suggested Books:

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

DAVUNIVERSITY 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.

Unit-A

Number System and Binary Code : 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.

(15 Hours)

Unit-B

Minimization of logic function : 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.

(12 Hours)

Unit-C

Combinational Circuits : 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.

(10 Hours)

Sequential Circuits : 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.

(7 Hours)

Unit-D

D/A and A/D Converters: 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.

(4 Hours)

Semiconductor Memories

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

(5 Hours)

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

(4 Hours)

Suggested Books:

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

Course Title: Analog Electronics
Course 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.

Unit-A

High Frequency Transistor: 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.

(10 Hours)

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

(8 Hours)

Unit-B

Large Signal Amplifiers: 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.

(10 Hours)

Unit-C

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

(10 Hours)

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

(8 Hours)

Unit-D

Wave shaping circuits: 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

(10 Hours)

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

(6 Hours)

Suggested Books:

1. Boylestad Nashelsky, "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.

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
0	0	2	1	25

Course Title: Electrical Machines-II Laboratory
Paper Code: ELE207

Course Objective: This course provides a practical understanding of the rotating machines, e.g. Single Phase and Three Phase Induction Motors, Significance of slip, concept of armature reaction and its detrimental effects.

Learning Objectives: After completing this laboratory course students would be able to understand significance of slip and how torque is varied with slip and practical concept of AC machines.

List of Experiments

1. To perform load-test on three-phase Induction motor and to plot torque versus speed characteristics.
2. To perform no-load and blocked–rotor tests on three-phase Induction motor to obtain equivalent circuit. Parameters and to draw circle diagram.
3. To study the speed control of three-phase Induction motor by Kramer's Concept.
4. To study the speed control of three-phase Induction motor by cascading of two induction motors, i.e. by feeding the slip power of one motor into the other motor.
5. To study star- delta starters physically and
   a) To draw electrical connection diagram
   b) To start the three-phase Induction motor using it.
   c) To reverse the direction of three-phase Induction motor
6. To start a three-phase slip–ring induction motor by inserting different levels of resistance in the rotor Circuit and to plot torque–speed characteristics.
7. To perform no-load and blocked–rotor test on single-phase Induction motor and to determine the parameters of equivalent circuit. Drawn on the basis of double revolving field theory.
8. To perform load–test on single-phase. Induction motor and plot torque–speed characteristics.
9. To perform no load and short circuit. Test on three-phase alternator and draw open and short circuit characteristics.
10. To find voltage regulation of an alternator by zero power factor (ZPF.) method.
11. To study effect of variation of field current upon the stator current and power factor with synchronous motor running at no load and draw Voltage and inverted Voltage curves of motor.

12. To measure negative sequence and zero sequence reactance of Synchronous Machines.
13. Parallel operation of three phase alternators using
    - Dark lamp method
    - Two-Bright and one dark lamp method
14. To study synchroscope physically and parallel operation of three-phase alternators using synchroscope.
15. Starting of synchronous motors using
    - Auxiliary motor
    - Using Damper windings

DAVUNIVERSITY JALANDHAR

Course Title: Analog Electronics Laboratory
Paper Code: ECE214

L	T	P	Credits	Marks
0	0	2	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

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
0	0	2	1	25

Course Title: Power System-I Laboratory
Paper Code: ELE208

Course Objective: This course provides a practical understanding of transmission line design and various transmission line parameter and power flow.

Learning Outcomes: After the completion of this course the students would learn the practical use of PowerWorld Simulator and MATLAB Simulink environment for designing and analysis of transmission lines.

List of Experiments

1. Visit to a Local Substation or a Generating Plant and to study the generation, transmission and distribution system
2. Familiarization with PowerWorld Simulator
3. Familiarization with MATLAB Simulink environment
4. To analyse Power Flow using PowerWorld Simulator
5. To study the performance of a transmission line. Also compute its ABCD parameters.
6. To Study the Power flow through transmission lines using PowerWorld Simulator
7. To calculate transient stability in a 3-bus example power system using PowerWorld Simulator
8. Obtaining Parameters of a 11 kV Transmission Line and Modelling it in PowerWorld Simulator
9. Obtaining Parameters of a 33 kV Transmission Line and Modelling it in MATLAB Simulink
10. To study the radial feeder performance when
    a. Fed at one end
    b. Fed at both ends
11. Including Transformers in Power Flow using PowerWorld and Confirmation by MATLAB
12. Including an HVDC Transmission Line for Power Flow Calculations in PowerWorld
13. To Study the power Flow in contour 6-bus system
14. To study the effect of short-circuit faults and overloading of transmission lines
15. To study over-voltages resulting from switching of transmission lines and limiting them by using ZnO arresters.
16. Study the dynamic interaction between two control areas using Simulink modeling and economic dispatch using Power World

DAVUNIVERSITY JALANDHAR

SEMESTER-5th

Course Title: Power System-II
Paper Code: ELE301

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This course provides a comprehensive understanding of the origin and development of ideas in power system.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the system modelling and power flow analysis. The participants will learn how the symmetrical and un symmetrical fault occurs and how its detrimental effect seen on power system.

Unit-A

System Modelling: System modelling of synchronous machines, transformers, loads etc,per unit system, single line diagram of electrical networks, single phase impedance diagrams. Formulation of impedance and admittance matrices for the electrical networks.

8 Hours

Unit-B

Load Flow Studies: Data for the load flow studies, Swing Bus, Formulation of simultaneous equations, Iterative solutions by the Gauss-Seidal method and Newton Raphson Method.

8 Hours

Unit-C

Fault Analysis: Transients on transmission line, short circuit of synchronous machine,selection of circuit breakers, Algorithm for short circuit studies, Symmetrical Component transformation, construction of sequence networks of power systems. Symmetrical Analysis of Unsymmetrical Line-to-ground (LG), Line-to line (LL), double line to ground (LLG) faults using symmetrical components.

Unit-D

Power System Stability: Steady state stability, Dynamics of a synchronous machine ,Power angle equations , Transient stability, equal area criterion, Numerical solution of swing equation, factors effecting transient stability.

12 Hours

Suggested Books:

1. Elgerd O.I., *Electric Energy Systems Theory,* Tata McGraw Hill
2. Nagrath I.J., Kolthari D.P., *Modern Power System Analysis,* Tata McGraw Hill
3. Stevenson W.D., *Elements of Power System* Analysis, McGraw Hill
4. Nagrath I.J. and Kothari D.P., *Power System Engineering, Tata McGraw Hill*
5. Arrillaga J. and Arnold C.P., *Computer Analysis of Power Systems, John Wiley & Sons*
6. Stagg Glenn W. and Ei-Abiad Ahmed H., *Computer Methods in Power System Analysis, Tata* McGraw Hill
7. Kusic G.L., *Computer Aided Power System analysis, Prentice Hall, India*

DAVUNIVERSITY JALANDHAR

Course Title: Electric Power Generation and Utilization
Paper Code: ELE302

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: This course provides a comprehensive understanding of various power plant. Its selection criteria.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the various power plant and its economic aspect.. The participants will learn how the load factors and diversity factors are important to design any power system. The course will equip them with the understanding of the concepts of hydroelectric coordination.

Unit-A

Introduction: Electrical energy sources, organization of power sector in India, single line diagram of thermal, hydro and nuclear power stations. Classification of power plants in base load and peak load plants

Power Plant Economics: Capital cost of plants, annual fixed cost, operating costs and effect of load factor on cost of energy, depreciation.

12 Hours

Unit-B

Selection of plant: Plant location, plant size, number and size of units in plants, economic comparison of alternatives based on annual cost, rate of return, present worth and capitalized cost methods.

Loads and Load curves: Types of load (fixed voltage loads, resistive loads, Inductive motor loads, Mechanical load), effect of load on supply voltage, Maximum demand, Group diversity factor, Peak diversity factor, Types of load, chronological load curves, load-duration Curve, mass curves, load factor, capacity factor, utilization factor, base load and peak load plants, load forecasting.

12 Hours

Unit-C

Tariffs and power factor improvement: Objectives of tariff making, different types of tariff (domestic, commercial, agricultural and industrial loads). Need for power factor (p.f.) improvement, power factor improvement using capacitors, determination of economic power factor.

Economic operation of steam plants: Methods of loading turbo-generators, input- output curve, heat rate, incremental cost, method of Lagrangian multiplier, effect of transmission losses, co-ordination equations, and iterative procedure to solve co-ordination equations.

12 Hours

Unit-D

Hydro-thermal co-ordination: Advantages of combined working of Run-off River plant andsteam plant, reservoir hydro plants and thermal plants, long-term operational aspects, scheduling methods.

Pollution and environmental problems: Energy and environment, Air pollution, Aquatic impacts, nuclear plant and hydro plant impacts.

Cogeneration: Definition and scope, Topping and Bottoming Cycles, Benefits, cogeneration technologies.

12 Hours

Suggested Books:

1. Deshpande M.V., *Power Plant Engineering,* Tata McGraw Hill, 2004.
2. EI-Wakit M.M., *Power Plant Engineering*, McGraw Hill, USA
3. Rajput R.K., *Power Plant Engineering*, Luxmi Publications
4. Sharma P.C., *Power Plant Engineering*, Kataria and Sons
5. Skrotzki B.G.A. and Vapot W.A., *Power Station Engineering and Economy*, Tata McGraw-Hill
6. Arora S.C. and Dom Kundwar S., A course in *Power Plant Engineering,* DhanpatRai.
7. Nag, P.K., *Power Plant Engineering,* Tata McGraw Hill
8. Gupta B.R., *Generation of Electrical Energy,* S. Chand, 1998.
9. Nagrath I.J. and Kothari D.P., Power System Analysis Tata McGraw-Hill Publication

DAVUNIVERSITY JALANDHAR

Course Title: Microprocessors and its Applications
Paper Code: ECE350

L	T	P	Credits	Marks
4	0	0	4	100

Course Objectives:

The purpose of this course is to teach students the fundamentals, internal architectural details and functioning of microprocessors 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 implementation.

Learning Outcomes:

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.
- Appreciate the advantages in using microprocessors in engineering applications.
- Design microprocessor based solutions to problems.
- Understand low-level programming.
- Apply this knowledge to more advanced structures.

UNIT-A

1. **Introduction** **(4 Hours)**

   Introduction to Microprocessors, classification, recent microprocessors.

2. **Microprocessor Architecture** **(7 Hours)**

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

UNIT-B

3. **I/O memory interface** **(10 Hours)**

   Data transfer modes: Programmable, interrupt initiated and DMA 8257, Serial & parallel interface, study of 8251 & 8255 programmable peripheral interfaces.

UNIT-C

4. **Instruction set & Assembly Languages Programming** **(10 Hours)**

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

UNIT-D

5. **Case structure & Microprocessor application (10 Hours)**
   Interfacing of keyboards and seven segment LED display, Microprocessor controlled temperature system (MCTS), Study of traffic light system, stepper motor controller.
6. **Basic architecture of higher order microprocessor (4 Hours)**
   Basic introduction to 8086, Architecture, Segmentation & addressing modes.

Suggested Books:

1. Ramesh Gaonkar, , 8085 Microprocessor, PHI Publications.
2. Daniel Tabak, Advanced Microprocessors, McGraw- Hill, Inc., Second Edition 1995.
3. Douglas V. Hall, Microprocessors and Interfacing: Programming and Hardware, Tata
4. McGraw Hill, Edition, 1986.
5. Charles M.Gilmore, Microprocessors: Principles and Applications, McGraw Hill.
6. B. Ram, “Microprocessor”, Dhanpat Rai Publications.

DAVUNIVERSITY JALANDHAR

Course Title: Switch Gear and Protection
Paper Code: ELE303

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This course provides a comprehensive understanding of the basics of substation and development of ideas in circuit braker. It traces the protection of feeder and transformer.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the isolator, fuses. Working knowledge of circuit breakers. The participants will learn various types of circuit breaker. The participants of this course will also learn about the protection against overvoltage and earthing.

Unit-A

Sub-Station: Types, Main equipment in Substation, substation layout, Busbar-arrangements.

Isolators and Fuses: Isolating switches functions, Types, Rating and operation. Fuse-types, Rating, Selection, theory and characteristics, applications.

8 Hours

Unit-B

Circuit Breakers: Need for Circuit Breakers, Arc phenomenon, Theory of Arc Interruption, Recovery Voltage and Restriking Voltage, Various Types of Circuit Breakers. Principles and Constructional Details of Air Blast, Minimum Oil, SF6, Vacuum Circuit Breakers etc.

Protective Relays: Introduction, classification, constructional features; and Characteristics of Electromagnetic, Induction, Thermal, Overcurrent relays, Directional relays, Distance relays, Differential, Translay, Negative sequence relay, introduction to static and up-based relays.

12 Hours

Unit-C

Protection of Feeders: Time graded protection, Differential and Distance protection of feeders,choice between Impedance, Reactance and Mho relays, Elementary idea about carrier current protection of lines.

Protection of Generators and Transformers: Types of faults on alternator, Stator and rotorprotection, Negative sequence protection, Loss of excitation and overload protection. Types of fault on transformers, percentage differential protection, Gas relays.

10 Hours

Unit-D

Protection against over voltage and earthing: Ground wires, Rod gap, Impulse gap, Valve typeand Metal Oxide Arresters, Line Arrester/Surge Absorber. Ungrounded neutral system, Grounded neutral system and Selection of Neutral Grounding.

10 Hours

Suggested Books:

1. Rao S., *Switchgear and Protection,* Khanna Publishers
2. Chakrabarti A., Soni, M.L. Gupta P.V. and Bhatanagar U.S., *A Textbook on Power System Engineering,* DhanpatRai and Co.
3. Wadhawa C.L. , *A Course in Electrical Power*, New Age international Pvt. Ltd
4. Badri Ram and Vishwakarma D.N.*, Power system Protection and Switchgear*, Tata McGraw Hill
5. Deshpande M.V.*, Switchgears and Protection*, Tata McGraw Hill

DAVUNIVERSITY JALANDHAR

Course Title: Control System Engineering
Paper Code: ICE352

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: This course provides a comprehensive understanding of the introductory concept of control systems. and. It traces the evolution of controller thought from its earliest days to the present, by examining the backgrounds, ideas and influences of its major contributors.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the servomechanism, regulating systems, open and close loop control systems . The course will equip them with the understanding of the concepts of time domain, and frequency domain analysis. The participants of this course will also learn about the various type of compensation network.

Unit-A

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

Modeling of Control System: 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 Hours

Unit-B

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

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.

12 Hours

Unit-C

Frequency Domain Analysis: Closed loop frequency response, Bode plots, stability and loop transfer function. Frequency response specifications, Relative stability, Relation between time and frequency response for second order systems. Log. Magnitude versus Phase angle plot, Nyquist criterion for stability.

12 Hours

Unit-D

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

Control System Components: Error detectors–potentiometers and synchros, servo motors, A.C. and D.C. techno generators, Magnetic amplifiers.

12 Hours

Suggested Book:

1. Nagrath I.J. and Gopal M., *Control System Engineering*, Wiley Eastern Ltd
2. Ogata K., *Modern Control Engineering*", Prentice Hall
3. Kuo B. C., *Automatic Control System*", Prentice Hall
4. Dorf Richard C. and Bishop Robert H., *Modern Control System*, Addison –Wesley, Pearson New Delhi

DAVUNIVERSITY JALANDHAR

Course Title: MATLAB Programming Laboratory
Paper Code: ELE304

L	T	P	Credits	Marks
0	0	4	2	50

Course Objective: The major objectives of this course to import the practical knowledge about MATLAB Software and to analyze various types of Control System using MATLAB software.

List of Experiments

To perform exercises related to the following using Control System Toolbox by writing computer programs and functions in MATLAB:

1.To study the various toolboxes and environment of MATLAB.

2. To Draw the Point, Line, Circle and Ellipse using MATLAB

3. Write a MATLAB Program to define the Transfer Function of a control system and find its poles and zeros.

4.Write a MATLAB program to define the Characteristics equation and determine its roots.

5. Write the transfer function of a 1^{st} order system using MATLAB and find the transient response.

6. Write the transfer function of a 2^{nd} order system and find the transient response.

7. Find the Frequency response of 2^{nd} order control systems

8. Design of Lead, Lag, Lead- Lag compensators using frequency domain analysis.
9. Solving steady state Ricatti Equation.
10. Solving an optimal control problem using Ricatti equation.
11. Implementation of Preliminary Transformations:
    (a) Transfer function to State space models vice- versa.
    (b) Conversion of Continuous to Discrete time systems vice-versa.
12. Draw the Root Locus Plot of a 2^{nd} order control system.
13. To Plot the Polar and Nyquist plot for 1^{st} and 2^{nd} order control system.
14. Design of Control Systems using MATLAB and SIMULINK.
15. Implementation of Least squares error method.
16. Implementation of PID controller and its effects on a given system.

DAVUNIVERSITY JALANDHAR

Course Title: Microprocessor its Applications Laboratory
Paper Code: ECE351

L	T	P	Credits	Marks
0	0	2	2	50

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

Learning Outcome:

After successful completion of this course, student will be able:

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

List of Experiments

1. Introduction to 8085 kit.
2. Addition of two 8 bit numbers, sum 8 bit.
3. Subtraction of two 8 bit numbers.
4. Find 1's complement of 8 bit number.
5. Find 2's complement of 8 bit number.
6. Shift an 8 bit no. by one bit.
7. Find Largest of two 8 bit numbers.
8. Find Largest among an array of ten numbers (8 bit).
9. Sum of series of 8 bit numbers.
10. 8255 PPI.
11. Seven segment display
12. Traffic light.
13. Stepper motor control

DAVUNIVERSITY JALANDHAR

Course Title: Industrial Training-I
Paper Code: ELE350

L	T	P	Credits	Marks
0	0	0	2	50

Note: At the end of the examination of 4th Semester the students will undergo compulsory summer training for a period of 4 weeks. Every student will submit the Summer Training Report within two weeks from the start of teaching for 5th Semester.

DAVUNIVERSITY JALANDHAR

Course Title: Power System-II Laboratory
Paper Code: ELE305

L	T	P	Credits	Marks
0	0	2	1	25

Course Objective: This course provides a practical understanding of the design of transmission line and substation.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of load flow analysis. The participants will learn how the transmission line is designed.

List of Experiments

1. Visit to a Local Substation or a Generating Plant and to study the generation and distribution system
2. To Study the Characteristics of over current and earth fault protection.
3. To compute the ABCD parameters of a transmission line and study the performance of transmission line.
4. To study the operating characteristics of HRC or open type fuse.
5. To find the earth resistance using three spikes
6. To study over current static relay.
7. To study the different types of faults on transmission line demostration panel/model.
8. To study the performance of under voltage and over voltage relay.
9. To study the characteristics of bimetal mini circuit breakers.
10. To study the characteristics of Distance Relay.
11. To find the breakdown strength of transformer oil.
17. To obtain the effect of sudden short-circuit on a synchronous generator
18. To study the radial feeder performance when (i) Fed at one end (ii) Fed at both ends

DAVUNIVERSITY JALANDHAR

SEMESTER-6th

L	T	P	Credits	Marks
4	0	0	4	100

Course Title: Power Electronics
Paper Code: ELE306

Course Objective: This course provides a comprehensive understanding of the Thyristor family. its turning on and off technique.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of power electronic switch like thysistor, chopper phase controlled rectifier. The participants will learn working mechanism of frequency changer devices.

Unit-A

Thyristors and their characteristics: Introduction to Thyristor family, V-I characteristics of silicon-controlled rectifier (SCR), gate turn-off thyristor (GTO), Bidirectional diode for alternating current (DIAC) and Bidirectional, Triode for Alternating Current (TRIAC). Principle of operation of silicon-controlled rectifier (SCR). Two transistor analogy. Turn on methods of a thyristor Switching characteristics of thyristors during tum-on and turn-off. Gate characteristics. Firing of thyristors. Gate triggering circuits. Series and parallel operation of silicon-controlled rectifiers (SCR) and their triggering circuits. Thyristor specifications; such as latching current and holding current, critical rate of rise of off-state voltage (dv/dt) and critical rate of rise of on-state current (di/dt) etc. Protection of SCR from over voltage and over current. Snubber circuits. Power dissipation.

10 Hours

Unit-B

Thyristor commutation techniques: Self commutation by resonating the load (Class A), Self commutation by LC circuit (class B), Complementary commutation (class C), Auxiliary commutation (class D), External pulse commutation (class E), AC Line commutation (class F).

Phase controlled techniques: Introduction to phase angle control. Single phase half wave controlled rectifiers. Single phase half controlled and full controlled bridge rectifiers. Three phase full controlled bridge rectifiers. Effect of resistive, inductive and resistive cum inductive loads. Basic circuit and principle of operation of Dual Converter, circulating current mode and non-circulating current mode of operation. Applications of rectifiers and dual converters to speed control of DC motor drives.

10 Hours

Unit-C

Choppers: Introduction of chopper, Basic chopper classification, Basic chopper operations. Control strategies, Chopper configuration, voltage commutated chopper, Current commutated

chopper, Load commutated chopper.

Cyclo-converters: Basic principle of operation, Single phase to. single phase cyclo converter. Three phase half wave cyclo converter. Advantages disadvantages of cyclo converters.

14 Hours

Unit-D

Inverters: Introduction & Classification of inverter. Operating principle, Single phase half bridge voltagesource inverters, Single phase full bridge inverter. Modified McMurray half-bridge and full-bridge inverter. Three-phase bridge inverter. Voltage control (Pulse-width modulation (PWM) control etc.) and reduction of harmonics in the inverter output voltage. Series inverter.

Symbols and V-I characteristics of Silicon Unilateral Switch (SUS), Silicon Controlled Switch (SCS),Silicon Bilateral Switch (SBS), Unijunction Transistor (UJT), Programmable Unijunction Transistor (PUT), Light-activated silicon-controlled rectifier (LASCR), Reverse conducting Thyristors (RCT), Static Induction Thyristor (SITH), N- Metal Oxide Semiconductor Controlled Thyristor (N-MCT), Field Controlled Thyristors (FCT).

14 Hours

Suggested Books:

1. Bimbhra, P.S., *Power Electronics*, Khanna Publishers.
2. Singh M.D. and Khanchandani K.B., *Power Electronics*, Tata McGraw Hill Publishing company limited.
3. Rashid M.H., *Power Electronics*, Circuits Devices and Applications, Prentice Hall, India.
4. Sen, P.C., *Power Electronics*, Tata McGraw Hill Publishing Company limited.
5. Bhattacharya S.K. and Chatterji, S., "*Industrial Electronics and Control",* New Age international Publications (P) Ltd, New Delhi.

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
3	0	0	3	75

Course Title: High Voltage Engineering
Paper Code: ELE307

Course Objective: This course provides a comprehensive understanding of the EHVAC and HVDC transmission and its significance.and development of ideas of corona.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the various insulating materials for high voltage. The participants will learn how the solid, liquid, and gaseous dielectrics are distinguished.

Unit-A

Extra High Voltage (EHV) Transmission and Corona Loss: Need for EHV Transmission. Useof bundled conductors, corona characteristics of smooth bundled conductors with different configurations, Corona loss. Factors affecting the corona loss. Radio interference due to corona. Shunt and series compensation in EHV lines. Tuned power lines. Insulation Co-ordination.

10 Hours

Unit-B

High Voltage Direct Current (HVDC) Transmission: Advantages, disadvantages and economics of HVDC Transmission system. Types of Direct Current (DC) links, converter station equipment, their characteristics.

Insulating materials for High Voltage Applications of insulating materials used in power transformers rotating machines, circuit breakers, cables, power capacitors.

Generation of high voltage : measurement of R.M.S., and peak value of voltage

10 Hours

Unit-C

Conduction and breakdown in Gases, Liquids and Solid Dielectrics:

Solids: Intrinsic, electromechanical and thermal breakdown composite dielectrics, solid dielectrics used in practice.

Liquids: Conduction and breakdown in pure and commercial liquids, suspended particle theory, cavitation and bubble theory, stressed oil volume theory, Liquids used in practice.

Gases: Ionization process, Townsend's current growth equations, Ist and 2nd ionization coefficients. Townsend's criterion for breakdown, Streamer theory of breakdown, Pashen's law of Gases. Gases used in practice.

12 Hours

Unit-D

Generation of High Voltages: High Voltage Direct Current (HVDC), High Voltage Alternating Current (HVAC), Power frequency and High frequency: Impulse voltage and impulse current Generation, Tripping and contact of Impulse Generator. Measurement of voltage and current: High voltage direct current, Alternating current and Impulse voltage and currents. **12 Hours**

Suggested Books:

1. Bagamudre, Rakesh Das, "*Extra High Voltage A.C. Transmission Engineering"*, New Age International Publishers.
2. Kimbark E.W., "*High Voltage Direct Current Transmission"*, Wiley-Interscience
3. Kamaraju V. and Naidu M.S., "*High Voltage Engineering",* Tata McGraw-Hill Education
4. Jha R.S., "*High Voltage Engineering", DhanpatRai*
5. Kuffel, E. and Abdullah, M., "*High Voltage Engineering"*, Pergamon Press
6. Wadhwa C. L., "*High Voltage Engineering",* New Age Publications.
7. Padiyar, K.R., "*HVDC Power Transmission Systems: Technology and System Interactions"*, New Age International

DAVUNIVERSITY JALANDHAR

Course Title: Electric Drives and Traction
Paper Code: ELE308

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: This course provides a comprehensive understanding of the origin and development of ideas in motion control. Significance of dc series motor in traction.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the system employed for motion control. The participants will learn the process of electrical heating and welding.

Unit-A

Electric Drives: Electrical drives & Mechanical drives, Concept of electrical drives, Basic features of industrial drives, review of operating and starting characteristics of different types of electric motors for various drives (AC and DC motors). Estimation of rating and heating of motors, Load equalization (Fly wheel effect), Drives for particular services.

10 Hours

Unit-B

Electric Traction: Introduction to Indian railways system, Electric Locomotive Classes, Various types of Traction system, single phase feeding arrangement prevalent in India. Substation. Arrangements, Different Types of Catenary construction and line insulation, Span and dropper design Calculations.

Electrolysis: Laws of Electrolysis, Process voltage, current, energy, efficiency, Applications of electrolysis.

12 Hours

Unit-C

Electric Heating and Welding: Methods of electric heating, types of electric heating, constructional details and performance of resistance heating furnace. Dielectric heating, Alternating current (AC).and Direct current (DC) Welding, Resistance and Arc Welding. Electric Beam Welding, Laser Welding. Typical construction of electrical welding AC and DC set.

10 Hours

Unit-D

Illumination: Production of light by different methods, terms used, laws of illumination, Different Artificial light sources, their construction and operating principles, Design of lighting schemes and equipment used for indoor, industrial and flood lighting.

Refrigeration and Air conditioning: Refrigeration system, Domestic refrigeration, Air conditioner, Comfort Air conditioning, Effective temperature.

12 Hours

Suggested Books:

1. Partab H., *Modern Electric Traction,* Dhanpat Rai
2. De N.K. and Sen P.K., *Electric Drives*, PHI publication
3. Berde M.S., *Electric Motor Drives*, Khanna Publishers
4 Gupta J.B., *Utilization of Electric Power and Electric Traction*, S.K. Kataria and Sons
5. Tripathy S. C., *Electric Energy Utilization and Conservation*, Tata McGraw Hill
6. Taylor E.O., *Utilization of Electric Energy,* Orient Blackswan
7. Hughes Austin, *Electric Motors and Drives: Fundamentals, Types and Applications*, Newnes, 2005.

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
4	1	0	4	4

Course Title: Transducer and Signal Conditioning
Paper Code: ICE350

Course Objective: This course provides a comprehensive understanding of the Transducers and Signals Conditions and their applications for various measurements in Electrical Engineering

UNIT-A

TRANSDUCERS:

Introduction: Measurement systems, Basic electronic measuring system, advantage of electric transducers Transduction principles, Classification of transducers, General transducers characteristics, Criteria for transducer selection, characteristics of transducers: input characteristics, transfer characteristics, output characteristics

Resistive Transducers: Principles of operation, construction, theory, advantages and disadvantages, applications of Potentiometers, strain gauges, (metallic and semi-conductor type), Resistance Thermometer, Thermistors.

Inductive Transducers: Types of Inductive transducer, Principles of operation, construction, Advantages & disadvantages and applications. Various variable Inductive Transducers: LVDT Linear variable differential transformer(LVDT), advantages & disadvantages of LVDT. Uses of LVDT, Rotary Variable Differential Transformer (RVDT), applications.

Capacitive Transducers: Types of capacitive transducer, Principles of operation, construction, theory, advantages and disadvantages and applications, of capacitive transducers based upon familiar equation of capacitance.

Elastic Transducers: Spring bellows, diaphragm, bourdon tube – their special features and application. **20 Hours**

UNIT-B

Active Transducers: Principle of operation, construction, theory, advantages and disadvantages and applications of following transducers: Thermocouple, Piezo-electric transducer, Magneto-strictive transducer, Hall effect transducer, Photo-voltaic transducer and Electrochemical transducer.

Other Transducers: Optical transducers: photo-emissive, photo-conductive and Photo-voltaic cells, Digital

Opto–Electronic Transducers: photo conductive cells, semiconductor photo diode , photo transistors, Optical encoder, Shaft encoder. Feedback fundamentals, introduction to Inverse transducer. **12 Hours**

UNIT-C

Measurement Using Transducers: Motion, Force and Torque measurement, fundamental standards, standard, relative displacement, transnational and rotational relative; velocity transducers: rotational relative, transnational and rotational relative; acceleration measurements: seismic and absolute display, Accelerometers: Standards and Calibration, Basic methods of force measurement, Characteristics of elastic force Iran lucers, Torque Measurement of rotating Shafts, dynamometers, Pressure measurement: standards and Calibration, Basic Methods of Pressure measurement, Thermocouple Vacuum Gauge, PiraniGauge, Ionization Type, Vacuum Gauges, Elastic Transducers, High Pressure Measurement, Low Pressure (Vacuum) measurement, Flow measurement Local flow velocity, Magnitude and direction Gross volume flow rate, Gross Mass flow rate, Turbine Meters Effect.

10 Hours

UNIT-D

SIGNAL CONSITIONING:

Signal Conditioning: Concept of signal conditioning, Introduction to AC/DC Bridges. Op-amp circuits used in instrumentation, Instrumentation amplifiers, analogue-digital sampling, introduction to A/D and D/A conversion, signal filtering, averaging, correlation, Interference, grounding , and shielding.

10 Hours

Suggested Books:

6. Murty D V S, “Transducers & Instrumentation”, PHI, New Delhi, 2000.
7. Sawhney A K, “Electrical and Electronics Measurements and Instrumentation”, Dhanpat Rai and Sons, New Delhi, 2000.
8. Kalsi H S, “Electronic Instrumentation “ Tata McGraw Hill, New Delhi, 4th Ed. , 2001.
9. Patranabis D, “Sensors and Transducers”, PHI, New Delhi, 2003.
10. Doebelin Ernest O, "Measurement Systems: Application and Design”, Tata McGraw Hill Ltd., New Delhi , 2004.

DAVUNIVERSITY JALANDHAR

Course Title: Electronics Measurement and Instrumentation
Paper Code: ICE351

L	T	P	Credits	Marks
4	0	0	4	4

Course Objective: To enhance the participant's knowledge, skills, and abilities necessary to understand the types, selection, constituting elements, dynamic performance and calibration of measuring devices and systems.

Learning Objective:

- Determine elements of the instrument system.
- Select errors and calibrate measuring instruments.
- Apply different types of measurements

UNIT-A

Electronic Instruments: Introduction, Instruments for measurement of voltage, current & other circuit parameters, Multirange voltmeter, Extending voltmeter ranges, Loading, AC voltmeter using Rectifiers – Half wave and full wave, Peak responding and True RMS voltmeters, Q-meters, R.F. power measurements, , chopper amplifier type voltmeter, true RMS voltmeter, electronic multimeter, Bolometer and RF power measurement using Bolometer

12 Hours

UNIT-B

Digital Instruments

Introduction to digital meter , Digital Voltmeters – Introduction, DVM's based on V–T, V–F and Successive approximation principles, Resolution and sensitivity, General specifications, Digital Multi-meters, Digital frequency meters, Digital measurement of time

Display devices: Digital display system, classification of display, Display devices, LEDs, LCD displays, troduction to Signal conditioning, DC signal conditioning system, AC signal conditioning system, data acquisition and conversion system

12 Hours

UNIT-C

OSCILLOSCOPES:
Introduction, Basic principles, CRT features, Block diagram and working of each block, Typical CRT connections, study of various stages in brief, high frequency CRO considerations, measurement of phase &frequency, electrostatic deflection, dual trace & dual beam oscilloscope, Sampling and storage oscilloscope

Special Oscilloscopes
Delayed time-base oscilloscopes, Analog storage, Sampling and Digital storage oscilloscopes

UNIT-D

Signal Generators: Introduction, Fixed and variable AF oscillator, Standard signal generator, Laboratory type signal generator, AF sine and Square wave generator, Function generator, Square and Pulse generator, Sweep frequency generator, Frequency synthesizer, Block diagram

of pulse generators, signal generators, function generators, wave analysers, distortion analysers, spectrum analyser, Harmonic analyser, FFT analyser, Introduction to FREQUENCY & TIME MEASUREMENT, Study of decade counting Assembly (DCA), frequency measurements, period measurements, universal counter

12 Hours

1. Murty D V S, “Transducers & Instrumentation”, PHI, New Delhi, 2000.
2. Sawhney A K, “Electrical and Electronics Measurements and Instrumentation”, Dhanpat Rai and Sons, New Delhi, 2000.
3. Kalsi H S, “Electronic Instrumentation “ Tata McGraw Hill, New Delhi, 4th Ed., 2001.
4. Patranabis D, “Sensors and Transducers”, PHI, New Delhi, 2003.
5. Doebelin Ernest O, "Measurement Systems: Application and Design”, Tata McGraw Hill Ltd., New Delhi, 2004.

DAVUNIVERSITY JALANDHAR

Course Title: Power Electronics Laboratory
Paper Code: ELE310

L	T	P	Credits	Marks
0	0	4	2	50

ourse Objective: This course provides a practical aspect of the SCR, UJT, and other semiconductor switches.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of thyristor family, chopper, UJT etc

List of Experiments

1. To study principle of operation of SCR, plot V-I characteristics and study the effect of gate triggering on turning on of SCR.
2. To draw V-I characteristics of an UJT and to use UJT as relaxation oscillator.
3. To study the effect of free-wheeling diode on power factor for single phase half-wave rectifier with R-L load.
4. To plot waveforms for output voltage and current, for single phase full-wave, fully controlled bridge rectifier, for resistive and resistive cum inductive loads.
5. Study of the microprocessor based firing control of a bridge converter.
6. To study three phase fully controlled bridge converter and plot waveforms of output voltage, for different firing angles.
7. Study of Jones chopper or any chopper circuit to check the performance.
8. Thyristorised speed control of a D.C. Motor.
9. Speed Control of induction motor using thyristors.
10. Study of series inverter circuit and to check its performance.
11. Study of a single-phase cycloconverter.
12. To check the performance of a McMurray half-bridge inverter
13. To obtain the current harmonics drawn by power electronics interface using MATLAB Simulink

DAVUNIVERSITY JALANDHAR

Course Title: Electric Drives and Traction Laboratory
Paper Code: ELE311

L	T	P	Credits	Marks
0	0	4	2	50

Course Objective: This course provides a practical aspect of the Electric traction Systems and Regenerative Breaking

1. Development of permanent magnet synchronous and brush less dc motor controllers
2. Performance, testing and control of induction motors
3. Microcomputer-controlled power system monitoring and protection
4. Power quality assessment and Improvement in Cycloconverter fed systems with Frequency Selective Sub-harmonic Feedback. Software based transducer linearization
5. Electromagnetic Field Computation
6. Intelligent control strategies for electric drives
7. Application of artificial neural nets in interconnected power systems
8. Design of controllers for MIMO systems
9. Piecewise fast decoupled & Adjusted fast decoupled Load Flow Motors
10. Expert System to Power System Security Analysis
11. Condition Monitoring of Power Transformers and Induction Motors
12. Analysis and Design of Robust Voltage Stabilizers for Thermal Power Station
13. Development of concepts of global Voltage and Security Indicators in Longitudinal Power supply (LPS) System
14. Study on Efficient Voltage Control on Induction Motor Drive
15. Study on the Dynamics of Motor during System Disturbances & Development of a Flexible Auto Changeover Circuit
16. Low cost Sensorless Switched reluctance drive
17. Development of energy efficient battery charger and inverter
18. Control and Performance Improvement of a Brush-less DC machine Drive (An Inverter fed Self-synchronous permanent Magnet AC Motor).

DAVUNIVERSITY JALANDHAR

Course Title: Electrical Estimation and Costing Laboratory
Paper Code: ELE312

L	T	P	Credits	Marks
0	0	4	2	50

List of Experiments

1. To study Indian electricity rules
2. To carryout wiring diagram of residential building, Educational institute and Industry. Giving selection of appropriate wiring, list materials and accessories for given project.
3. To study the design consideration of Panel Boards.
4. To study the design consideration of various electrical systems:
    a. 3 phase four wire distribution systems
    b. Earthing
5. To estimate the cost of a domestic installation (Residential building, laboratory room or Drawing hall etc) with concept of illumination design. TERI (The Energy Research Institute) recommendations on lighting schemes
6. To estimate the cost of industrial installation (Work shop, agriculture, flour mill etc).
7. To estimate the cost of overhead service connection (Single phase and three phase).
8. To estimate the cost of underground service connection (single phase and three phase).
9. To estimate the cost of overhead, 440 V, 3-phase, 4 wire or 3 wire distribution line.
10. To estimate the cost of underground, distribution line.
11. To estimate the cost of any one electrical appliance.
12. To estimate the cost of repairs and maintenance of any one domestic appliance.
13. To study various types of light sources and lighting schemes.
14. To make wiring diagrams of motor control circuits for starting of
    a. 3 phase induction motor
    b. Wound Motor
    c. Synchronous motor

Suggested Books:

1. Raina K.B. and Bhattacharya S.K., *Electrical Design, Estimating and Costing*, Tata McGraw Hill, New Delhi
2. Gupta J.B., *A course in Electrical Installation, Estimating and Costing*, SK Kataria and Sons, N.Delhi
3. Sharma B.R. and Rai H.M., *Electrical Estimating and Costing*
4. Uppal S.L., *Electrical Wiring, Estimating and Costing*
5. Singh Surjeet, *Estimating and Costing*, DhanpatRai and Co., New Delhi

DAVUNIVERSITY JALANDHAR

Course Title: High Voltage Engineering Laboratory
Course Code: ELE313

L	T	P	Credits	Marks
0	0	2	1	25

List of Experiments

1. Measurement of High Voltage
2. High Voltage Testing: Intrinsic Breakdown, Thermal Breakdown, Erosion Breakdown
3. HV Impulse testing
4. HV Dry / Wet Power frequency testing
5. Capacitance Measurement
6. Tan delta measurement
7. Partial discharge measurement
8. Insulation Resistance
9. RIV Measurement
10. Corona measurement
11. HV Calibration,
12. Calibration of Current Transformer and Potential Transformer.

DAVUNIVERSITY JALANDHAR

SEMESTER-7th

L	T	P	Credits	Marks
4	0	0	4	100

Course Title: Generalised Theory of Machines
Paper Code: ELE401

Course Objectives : To impart knowledge on:

- The key principles in Analysis of electrical machines
- The Generalized Representation and steady state analysis of Synchronous Machines
- The generator and motor operation in steady state and transient conditions
- The analysis of harmonics in Ac machines
- The generalized representation of special machines

Unit-A

Generalised Theory: Conversions, Basic two pole machines, Transformer with movable secondary, Transformer voltage and speed voltage, Kron's primitive machine, Analysis of electrical machines.

10 Hours

Unit-B

Linear Transformations: Invariance of Power: Transformations from displaced brush axis, three phases to two phase, Rotating axes to stationary axes, Transformed impedance matrix, Torque calculations.

10 Hours

Unit-B

DC Machines: Generalized Representation: Generator and motor operation, Operation with displaced brushes, Steady state and transient analysis, Sudden short circuit, Sudden application of inertia load, Electric braking of DC motors.

10 Hours

Unit-D

AC Machines: Synchronous Machines: Generalized Representation , Steady state analysis, Transient analysis, Electromechanical transients, Induction Machines: Generalized representation performance equation, steady state analysis, Transient analysis, Double cage Machine, Harmonics, Electric braking, Special Machines: Generalized Representation and steady state analysis of Reluctance Motor-Brushless DC Motor, Variable Reluctance Motor, Single phase series motor.

10 Hours

Suggested Books:

1. Gupta J B.” Theory & Performance Of Electrical Machines”, S. K. Kataria & Sons, New Delhi, 2010
2. Bimbhra P.S., “Generalized Circuit Theory of Electrical Machines”, Khanna Publishers Limited, 5thEdition, 4th Reprint, New Delhi, 2000.

3. John Salmon “Applications of General Theories to Electrical Machines Contributions to their Design and Performance”, Troubador Publishing Ltd, Leicester, 2008.
4. Bandyopadhyay M. N., “Electrical Machines: Theory And Practice”

DAVUNIVERSITY JALANDHAR

Course Title: Digital and Non-Linear Control System
Paper Code: ICE402

L	T	P	Credits	Marks
4	1	0	4	100

Course Objective:

- To strengthen the knowledge of Digital control
- To inculcate the controller design concepts
- To introduce the concept of Mathematical Modeling of Non-Linear Control System

Learning Objective:

- Basic elements of a discrete data control system
- Different types of non-linearities
- State Space models

UNIT-A

State Space Analysis & Design: Invariance of eigen values, Digonalisation of system matrices having distinct & repeated eigen values, Vander monde & modified Vander monde matrix. Definition of controllability & observability, derivation of controllability & observability matrix, effect of pole zero cancellation on the controllability & observability of the system, pole placement design through state feedback, state feedback with integral control, luenberger observer.

12 Hours

UNIT-B

Non-Linear Control Systems: Different types of non-linearities. Peculiarities of non-linear systems. Definition of describing function. (D.F.) derivation on D.F.'s for various non-linearities, D.F. analysis of non-linear control systems, Limit cycles, Merit and limitations of D.F. analysis. Phase-plane method. Singular points, Construction of phase-plane plots for non - linear systems by isocline method, Obtaining time- domain response from the phase-plane plots, Stable, semistable and unstable limit cycles.

12 Hours

UNIT-C

Discrete Time Control Systems (Part-I) : Basic elements of a discrete data control system & its advantages over the continuous time systems A/D and D/A conversions, Sample and hold device, Pulse transfer function, starred Laplace transforms, Pulse transfer functions of cascaded elements, Pulse transfer function of close loop system Modified Z-transform, Stability analysis of close loop systems in Z-domain, Stability criterion by Jury's test, Stability analysis by bilinear transformation and Routh's stability criterion.

12 Hours

UNIT-D

Discrete Time Control Systems (Part-II) : Discrete time equivalent of continuous time filters, State space representations of discrete time systems, State Space models from pulse transfer functions, Solution of discrete time state space equations, Design of digital control system, PID controller and frequency domain compensation design, State variable method.

12 Hours

Suggested Books:

1. Katsuhiko Ogata, Modern Control Engineering, Prentice Hall of India Pvt Ltd
2. Benjamin C. Kuo, Digital Control Systems, Pearson Education
3. M. Gopal, Digital Control Engineering, Wiley Eastern
4. Benjamin C. Kuo, Automatic Control system, Prentice Hall of India Pvt Ltd

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
3	0	0	3	75

Course Title: Computer Aided Power Systems Analysis
Paper Code: ELE402

Course Objective: This course provides a comprehensive understanding of power flow analysis and development of ideas in power systems. It traces the fault analysis and power system robustness.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of load flow from different buses, concept of slack bus, significance of x/r ratio and stability considerations.

Unit: A

System Modelling: System modelling of synchronous machines, transformers, loads etc, per unit system, single line diagram of electrical networks, single phase impedance diagrams. Formulation of impedance and admittance matrices for the electrical networks.

11 Hours

Unit-B

Load Flow Studies: Data for the load flow studies, Types of bys, Formulation of simultaneous equations, Iterative solutions by the Gauss method, Gauss-Seidal method and Newton Rap son Method and Fast decoupled method. Comparative analysis of all methods.

11 Hours

Unit-C

Fault Analysis: Transients on transmission line, short circuit of synchronous machine, selection of circuit breakers, Algorithm for short circuit studies, Symmetrical Component transformation, construction of sequence networks of power systems. Symmetrical Analysis of Unsymmetrical Line-to-ground (LG), Line-to line (LL), double line to ground (LLG) faults using symmetrical components.

12 Hours

Unit-D

Power System Stability: Steady state stability, Dynamics of a synchronous machine, Power angle equations , Transient stability, equal area criterion, Numerical solution of swing equation , factors effecting transient stability.

10 Hours

Suggested Books:

1. Elgerd O.I., *Electric Energy Systems Theory,* Tata McGraw Hill
2. Nagrath I.J., Kolthari D.P., *Modern Power System Analysis,* Tata McGraw Hill
3. Stevenson W.D., *Elements of Power System* Analysis, McGraw Hill
4. Nagrath I.J. and Kothari D.P., *Power System Engineering, Tata McGraw Hill*
5. Arrillaga J. and Arnold C.P., *Computer Analysis of Power Systems, John Wiley & Sons*
6. Stagg Glenn W. and Ei-Abiad Ahmed H., *Computer Methods in Power System Analysis, Tata* McGraw Hill
7. Kusic G.L., *Computer Aided Power System analysis, Prentice Hall, India*

DAVUNIVERSITY JALANDHAR

Course Title: Microcontroller and Programmable Logic Controller
Paper Code: ELE403

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This course provides a comprehensive understanding of the origin and development of microcontroller.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the microcontroller 8051 design and its various applications.

Unit-A

Introduction: Microprocessor, Micro-controllers and their comparison. The 8051 Architecture: Introduction, 8051 micro-controller hardware, input/ output, pins, ports and circuits, external memory, counters and timers, serial data input/ output, interrupts

8051 Assembly Language Programming: The mechanics of programming, assembly language programming process, programming tools and techniques, instruction set (data moving, logical operations, arithmetic operations, jump and call instructions)

12 Hours

Unit-B

8051 Microcontroller Design: Micro-controller specification, external memory and memory space decoding, reset and clock circuits, expanding input and output (I/O), memory mapped I/O, memory address decoding, memory access times, testing the design, timing subroutines, lookup tables for the 8051, serial data transmission

10 Hours

Unit-C

Microcontroller Applications: Interfacing keyboards, displays, Digital-to-Analog (D/A) and Analog-to-Digital (A/D), multiple interrupts, serial data communications, introduction to the use of assemblers and simulators Embedded Systems: Introduction to PLDs and FPGA-architecture, technology and design issues, implementation of 8051 core.

12 Hours

Unit-D

Programmable Logic Controllers (PLC): Introduction, operation of PLC, difference between PLC and Hardwired system, difference between PLC and Computer, relay logic and ladder logic, ladder commands and examples of PLC ladder diagram realization, PLC timers, PLC counters, PLC classification.

12 Hours

Suggested Books:

1. Kenneth J Ayola, *The 8051 Micro Controller- Architecture, Programming and Application*, Penram International Publication
2. John B Peatman, *Design with Micro Controller,* Tata McGraw Hill
3. Ray A. K. and Bhurchandi K. M., *Advanced Microprocessors and Peripherals; Architecture,Programming and Interfacing*, Tata McGraw Hill

4. Mazidi M. A. and Mazidi J. G., *The 8051 Micro-controller and Embedded System,* Pearson Education.
5. Udayashankara V. and Mallikarjunaswamy M.S., *8051 Microcontroller Hardware, Software andApplications*, TataMcGraw Hill Education Pvt. Ltd., 2010.
6. SurekhaBhanot, *Process Control,* Oxford Higher Education.
7. Otter, Job Dan, *Programmable Logic Controlle*r, P.H. International, Inc, USA
8. Dunning Gary, *Introduction to PLCs*, Tata McGraw Hill
9. Kumar Rajesh, *Module on PLCs and their Applications*, NITTTR Chandigarh

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
0	0	4	2	50

Course Title: Minor Project Laboratory
Paper Code: ELE451

Course Objective: This course provides a comprehensive understanding of the origin and development of ideas in management. It traces the evolution of management thought from its earliest days to the present, by examining the backgrounds, ideas and influences of its major contributors.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the world's foremost thinkers of management. The participants will learn how the evolution of management took place. The course will equip them with the understanding of the concepts of management and the people who changed the business world with their work. The participants of this course will also learn about the contemporary management thinkers of India.

Design, Fabrication, Simulation, Evaluation, Testing etc. related to Electrical Engineering is to be carried out under the supervision of guide(s).

DAVUNIVERSITY JALANDHAR

Course Title: Computer Aided Power System Analysis Laboratory
Paper Code: ELE404

L	T	P	Credits	Marks
0	0	2	1	25

Course Objective: This course provides a comprehensive understanding of microprocessors control of power system.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of design aspect of distribution system and substation. The participants will learn how the transmission line is erected. The course will equip them with the understanding of the concepts of Y and Z bus formation.

List of Experiments

1. Visit to Thermal/Hydro Power Plant
2. Design of transmission systems for given power and distance using PSCAD
3. Short circuit calculations and calculations of circuit breaker ratings for a power system network.
4. Design of substations using PSCAD
5. Design of distribution systems using PSCAD
6. Y-bus formation using PSCAD
7. Z-bus formulation
8. Load flow analysis by Gauss Seidal method
9. Load flow analysis by Newton Raphson method
10. Load flow analysis by R-K Method
11. Fault analysis for line-to-line (L-L), Line-to-Ground (L-G) etc.
12. Design of underground cabling system for substation.
13. To obtain power system stability on High Voltage Alternating current (HVAC) system with the help of Flexible Alternating Current Transmission Systems (FACTS) devices.
14. Optimal Capacitor placement on a system having variable reactive power and low voltage profile.
15. To obtain relay co-ordination on a power system.
16. To obtain optimal generator pricing on hydro-thermal and renewable energy systems.
17. To find synchronous reactances (Transient, sub-transient) during fault analysis.

DAVUNIVERSITY JALANDHAR

Course Title: Microcontroller and PLC Laboratory
Paper Code: ELE405

L	T	P	Credits	Marks
0	0	2	1	25

Course Objective: This course provides a practical understanding of the programmable logic console. Its ladder logic and its various application..

Learning Outcomes: After the completion of this course the participants would gain the knowledge of NO/NC switch, ladder programming of PLC.

List of Experiments

1. Study of 8051/8031 Micro-controller kits.
2. Write a program to add two numbers lying at two memory locations and display the result.
3. Write a program for multiplication of two numbers lying at memory location and display the result.
4. Write a program to check a number for being ODD or EVEN and show the result on display.
5. Write a program to split a byte in two nibbles and show the two nibbles on display.
6. Write a program to arrange TEN numbers stored in memory location in ascending and descending order.
7. Write a program to find a factorial of a given number.
8. Study of interrupt structure of 8051/8031 micro-controllers.
9. Write a program to show the use of INT0 and INT1.
10. Write a program of flashing LED connected to port 1 of the micro-controller.
11. Write a program to control a stepper motor in direction, speed and number of steps.
12. Write a program to control the speed of DC motor.
13. Implementation of different gates using PLC.
14. Implementation of DOL and star delta starter using PLC.
15. Implement basic logic operations, motor start and stop operation using
    (i) Timers
    (ii) Counters
16. Motor forward and reverse direction control using PLC.
17. Write and implement the LD control program for rack feeder.
18. Make a PLC based system for separating and fetching work pieces.
19. Make a PLC based control system for conveyor belt.
20. Implement a PLC based traffic light control.

Course Title: Industrial Training-II
Paper Code: ELE406

L	T	P	Credits	Marks
0	0	0	4	100

Note: the end of the examination of 6th Semester the students will undergo compulsory summer training for a period of 6 weeks. Every student will submit the Summer Training Report within two weeks from the start of teaching for 7th Semester.

In this training, Students may also learn the programming language/application softwares. All the applications software should be related to the Electrical Engineering. The following are the suggested software tools:

- Any high level procedure oriented or object oriented programming language.
- MATLAB
- LabView
- Mi-Power
- PSpice
- PSCAD
- ERACS
- TRACE ELEC CALC
- ETAP

Students will undertake one project related to the Electrical components and systems based on the software training imparted during the semester in a group of three students. All the group will select different projects. Students will be required to prepare a report on the Project undertaken and deliver a seminar on the project undertaken. The students will be evaluated based on Project undertaken, project report, seminar and viva-voce examination.

DAVUNIVERSITY JALANDHAR

SEMESTER-8th

Course Title: Power Plant Engineering
Paper Code: ELE407

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: This course provides a comprehensive understanding of operation and control of power plant. It traces the evolution of power plant thought from its earliest days to the present, by examining the backgrounds, ideas and influences of its major contributors.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of various power plant con. The course will equip them with the understanding of the concepts of base load plant and peak load plant.

Unit-A

Steam Generators, Condensers And Turbines: Classification of steam generators, selection, operation of locomotive, Babcock Wilcox, Cochran boilers, Types of condensers, effect of air in condensers, Dalton's law of partial pressure, cooling water calculations, steam nozzles, types of steam turbine efficiencies, compounding, governing and control.

Steam Power Plant: Classification, Operation, Description of Rankin cycle, Regenerative cycle, Reheat-Regenerative Cycle, Binary Vapour Cycle, Selection of plant site and its layout, coal handling system, combustion system, Fluidised bed combustion, Ash handling, Feed pumps, Heat exchangers, Economizers, Super heaters, Reheaters, Air preheaters, Feed water heaters, Evaporators.

10 Hours

Unit-B

Hydro-Electric Power Plants: Hydrological Cycle, Hydrograph, Flow duration curve, Selection of site, Essential features, Classification of hydro plants, base and peak load plant, pumped storage plant. Run of river with and without pondage. Selection of water turbines for hydro power plant, Automatic and remote control of hydro-station, layout of hydro power plant.

Nuclear Power Plants: Nuclear physics, Binding energy, Radioactive decay. Fertile material, Mass defect, Nuclear reactions type and application, Generation of nuclear energy by fission, Nuclear reactors. Site selections, safety measures, plant layout, Fusion reaction, Future of nuclear power.

12 Hours

Unit-C

Gas Turbine: Elements of gas turbines, Open and closed cycles for gas turbines, Performance terms, Thermal refinement to gas turbines cycle, Plant layout, applications, gas turbines Cycle calculations.

Diesel Power Plants: Classifications of IC Engines and their performance, Four stroke and two stroke diesel engines, combustion phenomenon; Essential components, Celane number, knocking, super charging, operation and layout of diesel power plant.

14 Hours

Unit-D

Combined Operation Of Different Power Plants: Advantages of combined operation of plants, load division between power stations, coordination of different types of Power Plants.

Pollution Control: Pollution from thermal & nuclear plants, Particulate emission and control, electrostatic precipitator, solid waste disposal.

12 Hours

Text Book:

1. Chakrabarti A., Soni, M.L. Gupta P.V. and Bhatanagar U.S., *A Textbook on Power System Engineering,* Dhanpat Rai & Co.

Reference Books:

1. EI-Wakit M.M., *Power Plant Engineering*, McGraw Hill, USA
2. Rajput R.K., *Power Plant Engineering*, Luxmi Publications
3. Sharma P.C., *Power Plant Engineering*, Kataria& Sons
4. Skrotzki B.G.A. and Vapot W.A., *Power Station Engineering and Economy*, Tata McGraw-Hill

DAVUNIVERSITY JALANDHAR

Course Title: Electrical Energy Auditing and Deregulation
Paper Code: ELE408

L	T	P	Credits	Marks
4	0	0	4	100

Course Objective: This course provides a comprehensive understanding of the origin and development of electrical de regulation policies framed by government of India.

Learning Outcomes: After the completion of this course the participants would gain the concept of independent power producers. The participants will learn how the evolution of price biding.

Unit-A

Energy Management & Audit: Definition, Energy audit-need, Types of energy audit, Energy management (audit) approach-understanding energy costs, Bench marking, Energy performance, Matching energy use to requirement, Maximizing system efficiencies, Optimizing the input energy requirements, Fuel and energy substitution, Energy audit instruments

12 Hours

Unit-B

Deregulation: Introduction, Reconfiguring Power systems, unbundling of electric utilities, Background to deregulation and the current situation around the world, benefits from a competitive electricity market after effects of deregulation, Role of the independent system operator, Operational planning activities of ISO: ISO in Pool markets, ISO in Bilateral markets, Operational planning activities of a GENCO: Genco in Pool and Bilateral markets, market participation issues, competitive bidding

12 Hours

Unit-C

Power wheeling, Transmission open access, pricing of power transactions, security management in deregulated environment, and congestion management in deregulation, General description of some ancillary services, ancillary services management in various countries, reactive power management in some deregulated electricity markets

12 Hours

Unit-D

Reliability analysis: interruption criterion, stochastic components, component models, Calculation methods, Network model: stochastic networks, series and parallel connections, minimum cut sets, reliability cost, Generation, transmission and distribution reliability, Reliability and deregulation: conflict, reliability analysis, effects on the actual reliability, regulation of the market

12 Hours

Suggested Books:

1. K. Bhattacharya, MHT Bollen and J.C Doolder, "Operation of Restructured Power Systems", Kluwer Academic Publishers, USA, 2001.
2. Lei Lee Lai, "Power System restructuring and deregulation", John Wiley and Sons, UK. 2001.
3. Fred I Denny and David E. Dismukes "Power System Operations and Electricity Markets", CRC Press, LLC, 2002.

DAVUNIVERSITY JALANDHAR

Course Title: Seminar
Paper Code: ELE452

L	T	P	Credits	Marks
0	0	4	2	50

Course Objectives: To assess the debating capability of the student to present a technical topic. Also to impart training to a student to face audience and present his ideas and thus creating in him self esteem and courage that are essential for an engineer.

Individual students are required to choose a topic of their interest from energy related engineering topics preferably from outside the B.Tech syllabus and give a seminar on that topic about 30 minutes followed by a 10 minutes session for discussion/question and answers. A committee consisting of at least three faculty members (preferably specialized in Electrical Engineering) shall assess the presentation of the seminar and award marks to the students. Each student shall submit two copies of a write up of his / her seminar topic. One copy shall be returned to the student after duly certifying it by the Chairman of the assessing committee and the other will be kept in the departmental library. Internal continuous assessment marks are awarded based on the relevance of the topic, presentation skill, quality of the report and participation.

Note: (i) The seminar topic selected by the student must be approved by the authorized faculty of the department at least two weeks in advance.
(ii) Each student has to submit to the department a seminar report at least three days before the day of seminar.
(iii) Each student has to make the Power Point presentation with multi-media projector.

DAWUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
0	0	4	2	50

Course Title: Major Project Laboratory
Paper Code: ELE451

Course Objective: This course provides a comprehensive understanding of fresh issue and immerging trend in the field of electrical engineering.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of the Design, Fabrication, Simulation, Evaluation, Testing etc. related to Electrical Engineering.

Design, Fabrication, Simulation, Evaluation, Testing etc. related to Electrical Engineering is to be carried out under the supervision of guide(s).

DAVUNIVERSITY JALANDHAR

Course Title: Electrical Simulation Tool Laboratory
Paper Code: ELE409

L	T	P	Credits	Marks
0	0	4	2	50

Course Objectives: The major objectives of this course to import the practical knowledge about Fuzzy Logic, Neural Network and PID Controllers using MATLAB software.

The following experiments may be implemented using MATLAB/SIMULINK environment in Electrical Simulation Tool Laboratory.

1. Construction of Simulink model for single area and multi area Power system.
2. To implement fuzzy set operations
3. To implement fuzzy relational operations.
4. To design and implement fuzzy temperature controller
5. To design and implement Fuzzy Traffic light controller
6. To write and illustrate the concept of Fuzzy C – means Clustering
7. To design a self executable fuzzy logic controller
8. Write programs to test the learning rules of Hebb, Perceptron, Delta, and Widrow Hoff in MATLAB learning rule.
9. To implement the Back propagation algorithm
10. To write and test a program for the linear separability of the input domain
11. To write and implement a Hopfield algorithm.
12. To write a program for pattern recognition
13. To design a self executable neural classifier
14. Implementation of Full order and minimum order Observer.
15. Implementation of Back-Propagation Algorithm.
16. Implementation of simple Fuzzy controller.
17. Implementation of storage and recall algorithm of Hopfield network model.
18. Implementation of Kalman Filter.
19. Implementation of Least squares error method.
20. Implementation of PID controller and its effects on a given system.
21. Design of Lead, Lag, Lead- Lag compensators using frequency domain analysis.
22. Construction of Simulink model for an Induction motor.
23. Solving steady state Ricatti Equation.
24. Solving an optimal control problem using Ricatti equation.
25. Implementation of Preliminary Transformations:
    (a) Transfer function to State space models vice- versa.
    (b) Conversion of Continuous to Discrete time systems vice-versa.
    (c) Verification of controllability and observability of a given system.

DAVUNIVERSITY JALANDHAR

Departmental Elective-I
Departmental Elective-II
Special Elective-I

Course Title: Power System Instrumentation
Paper Code: ICE450

L	T	P	Credits	Marks
3	1	0	3	75

Course Objectives: The major objectives of this course to import the practical knowledge about applications of Instrumentation in various types of Power Systems.

UNIT-A

Introduction: Measurement of electrical quantities, Active and reactive power in power plants, Energy meters, Instrument transformers and their transient response.

Instrumentation Techniques: Telemetry, Remote Control, remote signaling and supervisory control and data acquisition (SCADA), signal formation, conversion and transmission.

12 Hours

UNIT-B

Signal Transmission Techniques: Analog pulse and digital modulation, Amplitude modulation(AM) and Frequency modulation (FM), AM and FM Transmitter and Receiver, Phase Modulation, Pulse modulation, Digital transmission techniques, error detection and correction.

Telemetry: Telemetry errors, DC, pulse and digital telemetry methods and systems.

12 Hours

UNIT-C

Supervisory Control and Data Acquisition: Function of SCADA system remote terminal unit (RTU) details, Control center details, Communication between control centers, control center and remote terminal unit

12 Hours

UNIT-D

Power Plant Instrumentation: Hydroelectric power plant instrumentation, Thermal power plant instrumentation, Nuclear Power plant Instrumentation. Applications of SCADA system to Indian Power Systems.

12 Hours

Suggested Books:

1. Ned Mohan, Power Electronics, Wiley publication
2. Dubey, Power Electronics Drives, Wiley Eastern
3. W.Shephered, L N Hulley, Power Electronics & Control of Motor, Cambride University Press
4. G.K. Dubey & C.R. Kasaravada, Power Electronics & Drives, TMH

DAVUNIVERSITY JALANDHAR

Course Title: Industrial Process Control

L	T	P	Credits	Marks
4	1	0	4	100

Paper Code: ICE451

Course Objectives: The major objectives of this course to import the practical knowledge about various types of classical and Intelligent controllers for Industrial Process Control

UNIT-A

Description And Modeling Of Various Industrial Processes: Model Classification, Mathematical Models, Physical Models, Analog Models, Estimation of Model Parameters, System Identification, Experimental Nature of Simulation, Steps Involved in Simulation Studies, Validation of Simulation Models, Computer Simulation of Continuous and Discrete Systems.

12 Hours

UNIT-B

Process Control: Types and Description of Processes, Blending, batch processes, compressor & chiller controls, distillation control, steam turbine & water treatment controls, boiler controls, reactor controls

12 Hours

UNIT-C

Conventional Controllers: On-off Controllers, Cascade and Feed forward Controllers, Split Range Controllers, ratio controls, Single loop, multi loop &self tuning controllers, set point control (SPC), discrete digital control (DDC)

12 Hours

UNIT-D

Intelligent Controllers: Fuzzy logic control, programmable logic controllers, PC based system, conventional and widows NT based DCS systems, artificial intelligence & neural networks, smart & intelligent transmitters.

12 Hours

Suggested Books:

1. Padmanabhan, ndustrial Process Instrumentation and control, Springer Publishing
2. W.G. Andrew & H.B. Williams, Applied Instrumentation in the Process Industries, Gulf Publishing,Houston
3. B.E. Nolting, Instrumentation Reference Book, Elsevier India Pvt ,New Delhi
4. B.G. Liptak, Instrument Engineer's Handbook (Process Control), Elsevier India Pvt ,New Delhi

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
3	1	0	3	25

Course Title: Fundamental of Virtual Instrumentation
Paper Code: ICE451

Course Objective: To make the students familiar with current scenario of industry
Learning Objective:

- Instrumentation system
- Graphical programming in data flow
- RS 232, RS485, GBIP

UNIT-A

Introduction to Virtual Instrumentation: Historical perspective, Classification of different instruments / instrumentation system, Definition and architecture of virtual instrumentation system, salient features and application area of virtual instrumentation.

12 Hours

UNIT-B

Data Flow Programming Techniques: Graphical programming in data flow, comparison with conventional programming, popular data flow and VI software packages. Building a VI front panel and block diagram, sub VI, for and while loops, case and sequence structure, formula nodes, local and global, string and file I/O, array and clusters, charts and graphs, attributes nodes.

12 Hours

UNIT-C

Data Acquisition Basics: ADC, DAC, D/O, counters and timer, PC hardware structure, timing, interrupts, DMA, software and hardware installation, Configuring data acquisition hardware using the drives in application software, use of DAQ library functions for different analog and digital input/output operations.
Common Instrument Interfaces: Current loop, RS 232, RS485, GBIP. Use of library functions to communicate with different instruments.

12 Hours

UNIT-D

Use of Measurement Analysis Tools: Measurement of Max, Min, Peak-Peak voltage, Mathematical tools, time period of a signal, power spectrum and logging Fourier transform, Correlation methods, windowing and filtering.
Building a web based virtual instrument: Networking basics for office and industry application.

12 Hours

Suggested Books:

1. S.Gupta, Virtual Instrumentation Using Labview, TMH publication
2. S. Gupta & J Gupta, PC Inerfacing for data acquisition, SA publication
3. Wells Lisa K,Travis Jeffry, LabVIEW for everyone, PHI publication
4. Johnson Gary W, Lab view Graphical Programming, McGraw Hill

DAVUNIVERSITY JALANDHAR

Course Title: System Safety and Reliability
Paper Code: ICE452

L	T	P	Credits	Marks
4	1	0	4	100

Course Objective:

- To strengthen the knowledge of causes of failure and importance of reliability
- To introduce the concept of Redundancy

UNIT-A

Reliability Fundamentals: Introduction, Importance of reliability, Reliability functions, Failure and Failure Modes, causes of failure, Instantaneous failure rate, General reliability Function

Component Reliability and Hazard Model: Component reliability from Test data, failure data (Failure density, failure rate, reliability, probability of failure) mean failure rate MTTF,MTBF. Hazard Models (Time dependent Hazard models, Constant Hazard model, Linear Hazard model, on-linear hazard model

12 Hours

UNIT-B

System Reliability: Reliability evaluation of non-maintained systems, series, parallel, series-parallel, non-series, standby configuration, k out of n configuration, complex system, Markov's Method, Fault tree technique, Event space, path Tracing methods, cut-set and tie set method

12 Hours

UNIT-C

Reliability Improvement: Introduction, Improvement of components, redundancy: standby with perfect and imperfect switching. Comparison of component redundancy to system/unit redundancy, mixed redundancy, stand by redundancy

Reliability Allocation: Introduction, Redundancy allocation and techniques for reliability allocation

12 Hours

UNIT-D

Availability and Maintainability: Concepts of reliability ,availability and maintainability, types of availability, objectives of maintenance, classification and factor effecting maintenance, maintenance levels, Inventory control of spare parts, Preventive maintenance of some electrical appliances.

12 Hours

Suggested Books:

1. L.S. Srinath, Reliability Engineering, Affiliated East –West Press
2. E. Balagurusamy, Reliability Engineering, Tata McGraw Hill
3. R. Billinton & Ronald N. Allan, Reliability Evaluation of Engg. Systems: Concepts & Techniques, Plenum Press
4. K K Aggarwal, Reliability Engineering, Academic Press

DAVUNIVERSITY JALANDHAR

Course Title: Biomedical Engineering
Paper Code: ICE430

L	T	P	Credits	Marks
3	1	0	3	75

Course Objective To teach students that medical field is based on instrumentation and to enhance their skills in different biomedical instruments.

Learning Objective:

- Origin of bio-electric signals
- Physiological parameters adaptable to bio-telemetry
- security in medical methods

UNIT-A

Physiological Transducers: Introduction to physiological systems, Pressure transducers, Transducer for body temperature measurement. Pulse sensors, Respiration sensors.
Bio-Electric Signals and Electrodes: Origin of bio-electric signals, Recording electrodes, Polarization Skin contact impendence, Electrodes for ECG, EEG, Electrical conductivity of electrode jellies and creams, Microelectrodes.

12 Hours

UNIT-B

Measurement and Analysis Techniques: Blood flow meters, Cardiac Output measurement, Pulmonary function analyzers, Spiro-meter, Respiratory gas analyzers, Blood gas analyzers Blood pH, PCO2, PO2 measurement, Blood cell counters, Audio meter, Pure tone audio meters, Speech audiometers Evoked response audio-metric systems, Oxy-meters.
X-Ray and Ultrasonic Diagnosis: Soft & Hard X-Rays. X-Ray generators for diagnosis. Radiography, Angiography, Fluoroscopy, X-Ray computed tomography, Ultrasonic principles, Application of ultrasonic for diagnosis.

12 Hours

UNIT-C

Physical Medicine and Assist Devices: Diathermy-Short wave, ultrasonic and Microwave, Range and area of irritation of each type, Nerve and muscle simulators, Pace makers external and implantable pacemakers, DC defibrillators, Defibrillator with synchronizer, Implantable defibrillators.
Radiotherapy: X-Raytherapy, Radio nuclide therapy, Units for radiation and radiation dose.

12 Hours

UNIT-D

Bio-Telemetry: Physiological parameters adaptable to bio-telemetry, Components of a biotelemetry system, Implantable units, Application of telemetry in patient care.
Introduction to Telemedicine: Telemedicine System's classification, input and output peripherals, Characteristic of available transmission media, introduction to communication system for telemedicine. Medical image format standards, introduction to DICOM and PACs technologies various image compression techniques, loss less and lossy image compression for biomedical application. Telemedicine and law, confidentiality of telemedicine records, security in medical methods.

12 Hours

Suggested Books:

1. R. S Khandpur, Handbook of Biomedical Instrumentation, TMH Publication
2. Cromwell Pratt, Biomedical Instrumentation, Prentice Hall
3. John G Webster , Medical Instrumentation, Applications &Design, John Wiley
4. Geddes, Baker Principles of Applied Biomedical Instrumentation, John Wiley

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

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
4	0	0	4	100

Course Title: Digital Signal Processing
Paper Code: ECE311

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.

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

DAVUNIVERSITY 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. Arthur R. Weeks, "Fundamentals of electronic image processing", Jr., Eastern Economy Edition, SPIE Press, Prentice hall of India, New Delhi.
2. Rafael C. Gonzale & Richard E. Woods, Digital Image Processing, Pearson Education, Asia
3. A.K.Jain, Fundamentals of digital image processing, Prentice Hall Englewood Cliffs, N.J.

DAVUNIVERSITY JALANDHAR

Special Elective-III

Course Title: MULTIMEDIA COMMUNICATION
Paper Code: CSE-210

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This Course introduces the multimedia systems and their applications to students. This course covers the different compression standards used in multimedia, some current technology and related issues.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of the various multimedia technologies and their uses.

PART-A

Introduction
Multimedia Elements; Multimedia Applications; Multimedia Systems Architecture; Evolving Technologies for Multimedia Systems; Defining Objects for Multimedia Systems; Multimedia Data Interface Standards; The need for Data Compression; Multimedia Databases

Media and Data Streams
Media : Perception Media, Representation Media, Presentation Media, Storage Media, Transmission Media, Information Exchange Media, Presentation spaces & Values, and Presentation Dimensions; Key Properties of a Multimedia System : Discrete & Continuous Media Independence Media, Computer Controlled Systems, Integration; Characterizing Data Streams: Asynchronous Transmission Mode, Synchronous Transmission Mode, Isochronous Transmission Mode; Characterizing Continuous Media Data Streams.

(10Hours)

PART-B

Audio Technology
Sound: Frequency, Amplitude, Sound Perception and Psychoacoustics; Audio Representation on Computers; Three Dimensional Sound Projection; Music and MIDI Standards; Speech Signals; Speech Output; Speech Input; Speech Transmission.
Graphics and Images
Capturing Graphics and Images Computer Assisted Graphics and Image Processing; Reconstructing Image; Graphics and Image Output Options.
Video Technology & Computer-Based Animation
Basics; Television Systems; Digitalization of Video Signals; Digital Television; Basic Concepts; Specification of Animations; Methods of Controlling Animation; Display of Animation; Transmission of Animation; Virtual Reality Modeling Language.

(13Hours)

PART-C

Data Compression
Storage Space; Coding Requirements; Source, Entropy, and Hybrid Coding; Basic Compression Techniques; JPEG: Image Preparation, Lossy Sequential DCT-based Mode, Expanded Lossy DCT-based Mode, Lossless Mode, Hierarchical Mode; H.261 (Px64) and H.263+ and H.263L; MPEG : Video Encoding, Audio Coding, Data Stream, MPEG-2, MPEG: Video Encoding, Audio Coding, Data Stream, MPEG-2, MPEG-4, MPEG-7; Fractal Compression.
Optical Storage Media

History of Optical Storage; Basic Technology; video Discs and other WORMs; Compact Disc Digital Audio; Compact Disc Read Only Memory; CD-ROM Extended Architecture; Further CD-ROM-Based Developments; compact Disc Recordable; Compact Disc Magneto-Optical; Compact Disc Read/Write; digital Versatile Disc.

(10Hours)

PART-D

Content Analysis

Simple vs. Complex Features; Analysis of Individual Images; Analysis of Image Sequences; Audio Analysis; Applications.

Data and File Format Standard

Rich-Text Format; TIFF file Format; Resource Interchange File Format (RIFF); MIDI File Format; JPEG DIB File Format for Still and Motion Images; AVI Indeo File Format; MPEG Standards; TWAIN.

Multimedia Application Design

Multimedia Application Classes; Types of Multimedia Systems; Virtual Reality Design; Components of Multimedia Systems; Organizing Multimedia Databases; Application Workflow Design Issues; Distributed Application Design Issues.

(10Hours)

REFERENCES:-

1. Ralf Steinmetz, KlaraNarstedt, “Multimedia Fundamentals : Vol 1- Media Coding and Content Processing”, PHI, 2ND Edition, 2003.
2. Prabhat K. Andleigh, KiranThakrar, “Multimedia Systems Design”, PHI,2003
3. K.R Rao, Zoran S. Bojkovic and Dragorad A. Milovanovic , “Multimedia Communication Systems: Techniques, Standards, and Networks”, Pearson 2002.
4. Nalin K Sharad, “Multimedia information networking”, PHI, 2002.
5. Iain E.G. Richardson, “H.264 and MPEG-4 Video Compression”, John Wiley

DAVUNIVERSITY JALANDHAR

Course Title: Software Engineering & Project Management
Course Code: CSE-306

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: To understand the basic concepts of software engineering and software development life cycle.
Learning Outcomes: Students will learn about the different activities of software development and about the risk management. They will get aware about the different case tools.

Unit – A

Introduction to Software Engineering:
Software Problem, Software Engineering, Approach, Software process, Characteristics of Software Engineering Process.
Process models:
The waterfall model, Incremental process models, Evolutionary process models, The Unified process.
Software Requirements:
Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document

(12Hours)

Unit –B
Software Project Planning:
Cost estimation, cost estimation models, Project scheduling, Software Configuration management, Team Structure, Risk Management.
Requirements engineering process:
Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.
System models:
Context Models, Behavioural models, Data models, Object models, structured methods
Design Engineering:
Design process and Design quality, Design concepts, the design model.

(12Hours)

Unit–C

Creating an architectural design:
Software architecture, Data design, Architectural styles and patterns, Architectural Design
Object-Oriented Design:
Objects and object classes, An Object-Oriented design process, Design evolution.
Performing User interface design:
Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation
Testing Strategies:
A strategic approach to software testing, teststrategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging
Product metrics:
Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.
Metrics for Process and Products:
Software Measurement, Metrics for software quality.

(12Hours)

Unit–D

Risk management:
Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management:
Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

CASE Tools:
Types of CASE tools, advantages and components of CASE tools, Unified Modelling Language (UML)

(12Hours)

Suggested Books:

1. K.K. Agarwal & Yogesh Singh, Software Engineering, New Age International Publishers
2. James F. Peters, WitoldPedrycz, Software Engineering, an Engineering approach, John Wiely.
3. Waman S Jawadekar, Software Engineering principles and practice, The McGraw-Hill Companies.
4. R. S Pressman, Software Engineering Approach,
5. Roger S. Pressman, Software Engineering, A practitioner's Approach, 6th edition. McGrawHill International Edition.
6. Sommerville, Software Engineering, 7th edition, Pearson education.
7. PankajJalote
8. Pankaj Jalote, An Integrated Approach to software Engineering.

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
3	0	0	3	75

Course Title: Computer Architecture &Organization
Paper Code: CSE-202

Course Objective: This course offers a good understanding of the various functional units of a computer system and prepares the student to be in a position to design a basic computer system.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of the working of the each functional and finally the student will be exposed to the recent trends in parallel and distributed computing and multithreaded application.

Unit-A

Introduction
Basic organization of computers, Block level description of the functional units as related to the execution of a program; Fetch, decode and execute cycle.
Register Transfer and Micro operations
Register transfer language, Inter-Register Transfer, Arithmetic Micro-operations, Logic and Shift micro-operations Language, Control functions.
Arithmetic Logic Unit
Arithmetic, logic and shift micro operations. Constructing an arithmetic logic shift unit.

(10Hours)

Unit-B

Basic Computer Architecture and Design
Computer registers, Computer Instructions-Instruction Set Completeness. Classifying Instruction Set Architecture. Basic steps of Instruction Execution. Hardwired Control. Micro programmed Control. Horizontal and Vertical Microprogramming. Interrupts.
Central Processing Unit
General Register Organization. Stack Organized CPU. Instruction Formats, Addressing Modes. Data Transfer and Manipulation.RISCVs CISC.

(11Hours)

Unit-C

Pipelining
Parallel and pipeline Processing, Pipeline Control, Pipeline Implementations, Conflicts Resolution, and Pipeline Hazards. Vector Processing, and Array Processors.
Memory Organization
Memory Systems: principle of locality, principles of memory hierarchy Caches, associative memory, main memory, Virtual memory, Paging and Segmentation, Memory Interleaving.

(10Hours)

Unit-D

Input Output Organization
I/O performance measures, types and characteristics of I/O devices, I/O Modes-Programmed I/O, Interrupt Initiated I/O and DMA. Buses: connecting I/O devices to processor and memory, interfacing I/O devices to memory, processor, and operating system.
Parallel Computers
Classification, SIMD, MIMD Organizations, Instruction and Arithmetic Pipeline, Parallel Processing.

(15Hours)

Suggested Books:

1. M Moris Mano, "Computer System Architecture", Pearson Education, 3rd Edition 1993.
2. David A. Patterson and John L. Hennessy, "Computer Organization & Design-The Hardware/Software Interface", Morgan Kaufmann, 2nd Edition 1997.
3. William Stallings, "Computer Organisation and Architecture, Designing for Performance", Pearson Education Asia, 6th Edition 2003.
4. Harry F. Jordan and Gita Alaghband, "Fundamentals of Parallel Processing", Pearson Education, 1st Edition 2003.
5. J.P. Hayes, "Computer System Architecture", Prentice Hall of India, New Delhi.

DAVUNIVERSITY JALANDHAR

Course Title: COMPUTER NETWORKS
Paper Code: CSE-301

L	T	P	Credits	Marks
3	1	0	3	75

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.

Unit-A

Introduction
Introduction to Computer Network and Physical Layer, Broadcast and Point-to-point- LAN-MAN-WAN- Wireless networks
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
ATM
Protocol Architecture, ATM Logical Connections, ATM Cells, Transmission of ATM Cells, ATM Adaptation Layer, Traffic and Congestion Control, ATM LAN Emulation

(12Hours)

Unit-B

Internetworking
Principles of Internetworking, Connectionless Internetworking, the Internet Protocol, Routing Protocol, IPv6 (IPng), ICMPv6
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)

Unit-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)

Unit-D

Transport Layer

Transport Layer Services-Relationship between Transport Layer and Network Layer-Transport Layer in Internet-Multiplexing and De multiplexing. 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: Fairness-TCP delay modeling. ATM ABR congestion control.ATM AAL Layer protocols.

(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)

Suggested Books:

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

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
3	1	0	3	75

Course Title: OPERATING SYSTEMS
Paper Code: CSE-305

Course Objective: This course should provide the students with good understanding of Operating System including its architecture and all its components.
Learning Outcomes: After the completion of this course the participants would understand the overall architecture of the operating system and its main components, Functions of Kernel, file system architecture and implementation, concurrent programming and concurrency.

Unit-A

Introduction
What is an O.S., O.S. Functions; Different types of O.S.: batch, multi-programmed, time sharing, real-time, distributed, parallel; General structure of operating system, O/S services, system calls.
Process Management
Introduction to processes - Concept of processes, process scheduling, operations on processes; Inter Process Communication, Critical Sections, Mutual Exclusion with Busy Waiting, Sleep and Wakeup, Semaphores, Message passing; CPU scheduling- scheduling criteria, preemptive & non-preemptive scheduling, Scheduling Algorithms: FCFS, SJF, RR and priority.

(14Hours)

Unit-B

Memory Management
background, logical vs. physical address space, memory management without swapping; swapping; contiguous memory allocation, paging, segmentation, segmentation with paging; Virtual Memory, demand paging, performance, page replacement, page replacement algorithms (FIFO, Optimal ,LRU); Thrashing.

(6Hours)

Unit-C

File Systems
Files - file concept, file structure, file types, access methods, File attributes, file operations; directory structure, allocation methods (contiguous, linked, indexed), free-space management (bit vector, linked list, grouping),Protection mechanisms.
Secondary Storage
Disk Structure, Disk Scheduling (FCFS, SSTF, SCAN, C-SCAN, and LOOK), Disk Management (Disk Formatting, Boot Blocks, and Bad Blocks), Swap Space Management (Swap Space use, Swap Space Location, Swap Space Management)

(12Hours)

Unit-D

Deadlocks
Introduction to deadlocks, Conditions for deadlock, Resource allocation graphs, Deadlock Detection and Recovery, Deadlock Avoidance, Deadlock Prevention
Case Studies
Brief introduction of MS-DOS, Windows, UNIX and LINUX

(12Hours)

REFERENCES:

1. Peterson and Silberschatz, "Operating System Concepts", Addison-Wesley 4th Edition 1994.
2. Milenkoviac, "Operating Systems Concepts and Design", Tata McGraw-Hill 1992.
3. Charles Crowley, "Operating Systems a Design Oriented Approach", Tata McGraw-Hill 1996.
4. Andrews S. Tanenbaum, "Modern Operating Systems", Pearson Education, 2nd edition 2001.
5. W Richard Stevens, "Linux Network Programming" PHI, Ist Edition 2003

DAVUNIVERSITY JALANDHAR

OPEN-ELECTIVE COURSES

Course Title: Business Strategy
Paper Code: MGT451

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: To develop an understanding of fundamental concepts in strategic management: the role of the general manager, the levels and components of strategy, competitive analysis, and organizational evolution.

Learning Outcomes: The participants will develop essential skills and knowledge peculiar to general management. They will appreciate the inter functional issues in organisation better after undergoing this course.

UNIT-A

Nature of Strategic Management. Dimensions, benefits and risks. The strategic management process, Strategy formulation. Business Vision and Mission, Importance, Characteristics, and Components. Evaluating Mission statements. **11 hours**

UNIT-B

The External Assessment, Porters five Force Analysis. Industry and competitive analysis The Global Environment: Development of a Global Corporation. Complexity of Global Environment , Competitive Strategies for Firms in Global Markets. The Internal Assessment: SWOT Analysis, Strategy and Culture. Value Chain Analysis. Resource Based view of the Firm. Benchmarking. Strategies in Action: The Balanced scorecard, Types of strategies, Integrative, Intensive, Diversification strategies, Defensive Strategies, Porters Generic Strategies. **11 hours**

UNIT-C

Strategy Analysis and Choice: Business level strategies. Cost leadership, Differentiation, Speed and Market Focus. Multi business Strategy: BCG Matrix, GE Nine Cell matrix. Limitations of Portfolio Approaches. The Parenting Framework. Strategy Implementation: Short Term Objectives, Functional Tactics. Empowering Operating personnel. Allocation of Resources, Managing Resource Conflict. **11 hours**

UNIT-D

Structure and Strategy: Improving effectiveness of Traditional Organisational Structures. Creating Agile Virtual Organisations, Modular Organisation. Towards Boundary less Structures. Leadership and Culture: Strategic Intent. Shaping Organisational Culture. Role of Leader in Organisational Culture. Strategy Evaluation :Strategic Evaluation Process **12 hours**

45 hours

Text Book:

1. Pearce, Robinson & Mittal, Strategic Management: Formulation, Implementation and Control, TATA Mc Graw Hill Special Indian Edition

Reference Books:

1. Fred David , Strategic Management: Concepts and Cases, Prentice Hall India
2. Hill & Jones, Strategic Management: an Integrated Approach, Cengage

DAVUNIVERSITY JALANDHAR

L	T	P	Credits	Marks
3	0	0	3	75

Course Title: Organisational Behaviour
Paper Code: MGT452

Course Objective: The course aims at studying the individual and group behavior in the context of organization.

Learning Outcomes: After the completion of the course the participant will be able to better comprehend the personalities of others. The participant will also learn about designing the structure of organizations, how to handle situations of conflict as well as learn about his/her own self. It will make the participant more empathetic towards others.

UNIT-A

- Introduction to human behavior, perception, attitudes and job satisfaction. 2 hours
- Concepts of Personality, Self-awareness, Perception and Attribution, Learning, Values and Attitudes and their determinants, theories 2 hours
- MBIT and big five model, Hofstede's cultural dimensions theory 2 hours
- Concept of teams, Foundations of Team Dynamics, types of teams, teams in modern workplace 2 hours
- Group process: group and intergroup behavior, group decision making 3 hours
- Interpersonal group dynamics 2 hours
- Skills for Managing Teams: Communication, Conflicts and negotiation, Power & Influence, Group Development and Cohesiveness, Team Performance and Decision Making. 2 hours

UNIT-B

- Concept of Leadership Theories and Perspectives on Effective Leadership-Power and Influence, Charismatic and Transformational Leadership power distribution in organization, organizational politics: concept, consequences, reasons and management of political behavior, 3 hours
- Work stress: causes, organizational and extra organizational stressor, individual and group stressor, effect of stress, stress coping strategies. 2 hours
- Conflict and inter-group behavior: sources of conflict, types of conflict, functional and dysfunctional aspects of conflict, approaches to conflict management 2 hours

UNIT-C

- Organizational culture: functions of OC, creating and sustaining of OC, development and implications of OC 4 hours
- Organizational effectiveness: concept and approaches to OE, factors in OE, effectiveness through adaptive coping cycle 2 hours
- 0rganizational health development 2 hours
- Emotional intelligence. 2 hours

UNIT-D

• Organization Design, Determinants of Organizational Design, Parameters of Organizational Design	3 hours
• Organizational Failure and Pathology	2 hours
• Organizational Change and Development, Organizational Learning and Transformation.	2 hours
• Do "Organizations" Have a Future? Designing Organizations' for Uncertain Environment.	2 hours
• Building Learning Organizations	2 hours
• Transactional Analysis	2 hours
	45 hours

Text Book:

1. Robbins, S.P., Judge, T. and Sanghi, S., Organizational Behavior, Pearson Education

Reference Books:

1. Luthans, F., Organizational Behavior, McGraw –Hill Inc.
2. Newstrom, J.W. and Davis, K., Organizational Behavior - Human Behavior at Work, McGraw Hill
3. Weiss, P., Organizational Behavior and Change, West Group Publication
4. Harold Koontz and Weihrich Koontz , Essentials of management

DAVUNIVERSITY JALANDHAR

Course Title: Principles of Marketing
Paper Code: MGT453

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This course will enable the students to understand the theories and practices behind the marketing mix variables, to appreciate the holistic role of marketing in a firm, and develop knowledge of and skill in the operating techniques of the marketing management

Learning Outcomes: Students will be able to design the marketing mix for the customers as per their needs and will learn to create product package which sells itself.

UNIT-A

Understanding Marketing Management: Defining Marketing for the 21st Century, Developing Marketing Strategies and Plans, Assessing Market Opportunities and Customer Value: Scanning the Marketing Environment, Forecasting Demand, and Conducting Marketing Research, Creating Customer Value and Customer Relationships, Analyzing Consumer Markets, Analyzing Business Markets **12 hours**

UNIT-B

Choosing Value: Identifying Market Segments and Targets, Competitive Dynamics, Crafting the Brand Positioning, Creating Brand Equity **10 hours**

UNIT-C

Designing and Delivering Value: Setting Product Strategy, Designing and Managing Services, Developing Pricing Strategies and Programs, Designing and Managing Integrated Marketing Channels, Managing Retailing, Wholesaling, and Logistics **12 hours**

UNIT-D

Communicating Value and Sustaining Growth: Designing and Managing Integrated Marketing Communications, Managing Mass Communications, Managing Personal Communications, Introducing New Market Offerings, Tapping into Global Markets, Managing a Holistic Marketing Organization for the Long Run **11 hours**

45 hours

Reference Books:

1. Kotler, Keller, Koshy & Jha. *Marketing Management: A South Asian Perspective,14th Edition,* Pearson Education
2. Saxena, R. *Marketing Management,* Tata McGraw-Hill Education, 4th Edition
3. Baines, P. *Marketing: Asian Edition*, Oxford University Press, 1st Edition
4. Czinkota Michael R, *Marketing Management*, Cengage Learning, 2nd Edition
5. Chopra, P.K. and Mehra, B. *Marketing Management*, Wiley

DAVUNIVERSITY JALANDHAR

Course Title: Stock Market Operations
Paper Code: MGT454

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This course aims at orienting the students for understanding the nuances of how stock markets operate and how trading happens in Indian Stock Markets.

Learning Outcomes: The participants will be able to effectively make investment decisions and handle the stock market operations**.**

UNIT-A

- An Overview of the Indian Securities Market - Market Segments, Key Indicators of Securities Market, Products and Participants — 2 hours
- Trading Membership - Stock Brokers, NSE Membership — 3 hours

UNIT-B

- Trading- NEAT System, Market Types, Order Management, Trade Management, Auction, Internet Broking — 5 hours
- Clearing and Settlement - Transaction Cycle, Settlement Agencies, Clearing and Settlement Process, Risk Management — 5 hours

UNIT-C

- Legal Framework for Stock Markets — 5 hours
- Fundamental Valuation Concepts- Time Value of Money, Understanding Financial Statements — 5 hours
- Introduction to Derivatives : Types of Derivative Contracts- Forwards Contracts, Futures Contracts, Options Contracts, Swaps, Participants in a Derivative Market — 5 hours

UNIT-D

- Understanding Interest Rates and Stock Indices , Economic Significance of Index Movements, Index Construction Issues, Desirable Attributes of an Index, Index derivatives — 5 hours
- Futures Contracts, Mechanism and Pricing — 5 hours
- Application of Futures Contracts- Understanding Beta, Applications of Stock Futures, Hedging using Stock Index futures — 5 hours

45 hours

Text Book:
Course Material of NCFM available at
http://www.nseindia.com/education/content/module_ncfm.htm