UNIVERSITY OF JAMMU, JAMMU
FOR EXAMINATIONS TO BE HELD FOR BATCH 2014 & ONWARDS

COURSE OF STUDY FOR BE IST SEMESTER ENGINEERING
BRANCH: COMMON TO ALL BRANCHES

Course No.	Course Name	Lecture	Tutorial	Pract.	**Marks**			
					Theory	Sessional	Practical	Total
MTH -101	Engg. Math-1	3	2	-	100	25	-	125
PHY -102	Engg. Phy-I	3	1		100	25	-	125
CHM -103	Engg. Chem-I	3	1		100	25	-	125
M -104	Engg. Mech	3	1		100	25	-	125
HUM -105	Comm. Skills	3	1	-	100	25	-	125
M-106	Engg. Graphics	1	-	3	100	-	50	150
PHY -107	Engg. Physics Lab.	-	-	2	-	-	50	50
CHM -108	Engg. Chemistry Lab	-	-	2	-	-	50	50
M -109	Engg. Mech. Lab.	-	-	2	-	-	50	50
M -110	WS Technology	1	-	3	-	-	75	75
Total		17	6	12	600	125	275	1000

CLASS : B.E. IST SEMESTER
BRANCH: COMMON TO ALL
COURSE TITLE: ENGINEERING MATHEMATICS-I
COURSE NO.MTH-101
DURATION OF EXAM: 3 HOURS

L	T	MARKS	
		Theory	Sessional
3	2	100	25

SECTION-A

1. **Differential Calculus:** Successive differentiation, Leibnitz theorem (without proof), Partial differentiation with errors and approximations, Eular's theorem on homogeneous functions, Taylor's and Maclaurin's series of two variables, Maxima and Minima of functions of two variables, Asymptotes, Double points, curvature, Curve tracing in Cartesian, polar and parametric forms**.**

2. **Integral Calculus: -** Definite integrals with important properties, differentiation under the integral sign, Gamma, Beta and error functions with simple problems, applications of definite integrals to find length, area, volume and surface area of revolutions, transformation of coordinates, double and triple integrals with simple problems.

SECTION-B

1. **Complex Trigonometry:** Hyperbolic functions of a complex variable, Inverse Hyperbolic functions, Logarithmic function of a complex variable, Summation of series by C+ iS method.

2. **Ordinary Differential Equations:** Differential equations of first order and first degree: Exact and non-exact differential equations, Linear and Bernoulli's differential equations. Higher order linear differential equations: Complementary solution, particular integral and general solution of these equations, variation of parameters technique to find particular integral of second order differential equations, Cauchy's and Lagrange's differential equations. Applications of Ordinary Differential Equations to simple Electrical and Mechanical Engg. problems.

3. **Solid Geometry:** Sphere, Intersection of sphere and plane, tangent plane property, cone and cylinder, related problems to right circular cone and cylinder.

BOOKS RECOMMENDED:

1. Engineering Mathematics — B.S. Grewal, Khanna Publications, New Delhi
2. Calculus and Analytic Geometry — Thomas and Finney, Addision Weslay, Narosa.
3. Differential Calculus — S. Narayan, New Delhi
4. Integral Calculus — S. Narayan, New Delhi.

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

COURSE OUTCOMES

COURSE NAME- ENGG. MATHEMATICS – I
COURSE CODE-MTH – 101

After learning this course students will be able to:

CO101.1	Learn the rules of nth derivative, to find maximum and minimum value of any function, to trace the curves.
CO101.2	Understand the concept of definite integrals and find arc length, area, surface area and volume of various curves.
CO101.3	Solve the differential equations of first order and higher order.
CO101.4	Differentiate the concept of finding the equations of sphere, cone and cylinderand evaluate the complex no. in polar form and understand the idea of hyperbolic functions.

B.E IST SEMESTER

BRANCH: COMMON TO ALL				**MAXIMUM MARKS:125**	
SUBJECT: ENGINEERING PHYSICS-I	**L**	**T**	**P**	**THEORY**	**SESSIONAL**
COURSE NO.PHY-102	**3**	**1**	**2**	**100**	**25**
DURATION OF EXAM: 03 HOURS					

SECTION-A

UNIT-I: MATHEMATICAL PHYSICS

Review of Vector Algebra, Scalar and Vector fields, Gradient of a Scalar field, Divergence and curl of a vector field and their physical significance, solenoidal fields, Guass Divergence theorem, Stokes theorem and their applications, Vector Identities

No of Lectures – 10, Weightage = 25%

UNIT-II: ELECTROMAGNETIC FIELDS AND WAVES

Guass's law in vector notation (differential and integral forms), Applications of Guass's law to find electric fields due to a long straight charged wire, Cylindrical and Spherical charge distributions.

Derivation of Ampere's Circuital law, Application of Ampere's circuital law to find magnetic intensity due to long cylindrical wire, due to a long solenoid. Differential & Integral form of Faraday's law of electromagnetic induction, Equation of continuity, Displacement current and its significance, Maxwell's field equations (differential and integral forms), Betaron,

Electromagnetic wave propagation in free space (e.m wave equations for $\xrightarrow[E]{}$ & $\xrightarrow[B]{}$ fields for free space and their solutions (plane wave solution), velocity of e.m. waves, Relation between E_o& B_o . Definition of Poynting Vetor, Poynting theorem.

No of Lectures – 16, Weightage = 25%

SECTION-B

UNIT-III: APPLIED OPTICS

Interference in thin films (by reflection and transmission of light), Theory of Newton's rings by reflected light, Determination of wave length and refractive index of monochromatic light by Newton's theory.

Fraunhoffer & Fresnel's diffractions Fresnel's half period zones and rectilinear propagation of light, Fraunhoffer diffraction due to a single slit, plane diffraction grating & its theory for secondary maxima and minima.

Unpolarized and polarized light, Nicol Prism, Mathematical representation of polarization of different types, Quarter & half wave plates.

No of Lectures – 12, Weightage = 20%

UNIT-IV: OSCILLATIONS

Free damped and forced oscillations and their differential equations, Logarithmic decrement, power dissipation & Quality factor, ultrasonic waves and their production by Piezoelectric method and applications (General)

No of Lectures – 05, Weightage = 15%

UNIT-V: FIBRE OPTICS

Propagation of light in fibres, numerical aperture, Single mode and multimode fibres, General applications*No of Lectures – 05, Weightage = 15%*

TUTORIALS

S.NO.	TOPICS	UNIT NO.
T-1	Numerical problems based on vector analysis	I
T-2	Numerical problems on Gradient of Scalar fields	I
T-3	Numerical problems on Divergence of Vector fields	I
T-4	Numerical problems on Curl of vector fields	I
T-5	Numerical problems based on Guass divergence theorem and Stokes Theorem	I
T-6	Numerical problems based on the applications of Guass's Law	II
T-7	Numerical problems based on the applications of Ampere's law	II
T-8	Numerical problems pertaining to the applications of Faraday's law	II
T-9	Numerical problems pertaining to the applications of Interference phenomenon, Formation of Newton's rings	III
T-10	Numerical problems pertaining to the applications of diffraction and polarization phenomenon	III
T-11	Numerical problems based on the applications of SHM, damped and forced motion of bodies and applications of ultrasonic	IV
T-12	Numerical problems based on the applications of Fibre optics	V

NOTE: SETTING OF QUESTION PAPER (Instructions for examiners)

i) The question paper will consist of two sections\
   a) Section-1
   &
   b) Section-II

ii) Section-I Comprises of Unit-I and Unit-II
Section-II Comprises of Unit-III, Unit-IV and Unit-V

iii) Number of questions to be set in the paper =8 (eight)
(Four from each section) as per weightage

iv) Number of questions to be attempted =5 (five)
(Selecting at least two from each section)

BOOKS RECOMMENDED:

S.NO.	TITLE	AUTHOR
1.	Vector Analysis	Spiegal
2.	Mathematical Physics	Rajput & Gupta
3.	Physics	Reisnick & Hatliday
4.	Optics	Brijlal & Subramaniam
5.	Sound	Subramaniam
6.	Sound	Khanna & Bedi
7.	Fibre Optics	Ghatak, Tyagrajan

COURSE OUTCOMES

COURSE NAME- ENGG. PHYSICS I
COURSE CODE- PHY-102

After learning this course students will be able to:

CO102.1	Students should be able to understand the mathematical concepts required to understand physics.
CO102.2	Students should be able to derive the Maxwell's equations and understand the basis electromagnetic theory.
CO102.3	Students should be able to assimilate the basic concepts of interference in thin films, diffraction, polarisation and the characteristics of different types of waves.
CO102.4	Students should be able to gain the knowledge about lasers, their characteristic's & properties and the basics of optical fibres

CLASS: B.E. IST SEMESTER
BRANCH: COMMON TO ALL
COURSE TITLE: ENGG. CHEMISTRY
COURSE NO.:CHM-103
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS		
3	1	2	Theory	Sessional	Practical
			100	25	50

SECTION - A

1. **SPECTROSCOPY:** UV Spectroscopy –Electronic transitions, spectrum, shift of bonds with solvents for double bonds, carbonyl compounds and aromatic compounds.

IR-Spectroscopy –Introduction, brief idea about instrumentation, applications and interpretation of IR Spectra, characterization of functional groups and frequency shift associated with structural changes.

'H-NMR Spectroscopy –Theory of 'H-NMR Spectroscopy, equivalent and non-equivalent protons, chemical shift, spin-spin coupling, spin-spin splitting, H'-NMR spectrum of a few organic compounds.

2. **EXPLOSIVES:** Introduction, classification and types of explosives, requirement for good explosives, preparation and uses of following explosives – Nitrocellulose, TNT, Dinitrobenzene, Picric Acid, Nitroglycerine and Dynamite, Gun Power, RDX, Tetracene.

SECTION - B

1. **STEREOCHEMISTRY:** Optical isomerism, recemization, asymmetric synthesis, methods for resolution of racemic mixture, enantiomerism and diasteroisomerism.

2. **ALLOYS:** Introduction, purpose of making alloys, preparation of alloys, classification of alloys. (Ferrous and non-ferrous alloys), alloy steels & copper alloys.

3. **LUBRICANTS: DEFINITIONS**, functions of lubricants, mechanism of lubrication, classification of lubricants (Lubricating oils, semi solid lubricants and solid lubricants) synthetic lubricants, flash and fire points, oiliness, cloud and pour points.

4. **DYES AND DRUGS:** Classification of dyes and its applications. Define drug and give the applications of following drugs**.**

a) Narcotics b) Tranquilizers c) Antipyretics d) Antibiotics

FORMAT OF QUESTION PAPER

Total No. of Questions = 08

Questions to be attempted = 05

(Minimum Two from Each Section A & B)

BOOKS RECOMMENDED:

1.	Engineering Chemistry	Jain & Jain
2.	Engineering Chemistry	Sharma, B.K.
3.	Engineering Chemistry	Dara, S.S.
4.	Organic Chemistry	Bahl, B.S.
5.	Organic Chemistry	Soni, P.L.
6.	Organic Chemistry	Jain, M.K.
7.	Spectroscopy of Organic Compounds	Silverstain
8.	Spectroscopy of Organic Compounds	Kalsi, P.S.
9.	Engineering Chemistry	Dr. Rajinder Kumar

COURSE OUTCOMES

COURSE NAME: ENGG. CHEMISTRY
COURSE NO: CHM-103
After learning this course students will be able to:

CO103.1	One could acquire Knowledge about the identification of newly synthesized products.
CO103.2	Know the New drug development process.
CO103.3	Ability to design and perform in – vitro dissolution studies for various drugs as per the standards of official monographs Combine Dyeing Process and Colorants design – quality systems, develop manufacturing procedures.
CO103.4	know how to approach the problem of choosing an alloy for a particular application,
CO103.5	Know the importance of stereochemistry in organic compound and apply the knowledge gain in this course to the variety of chemical compounds.

CLASS: B.E. IST SEMESTER

BRANCH: COMMON TO ALL
COURSE TITLE: ENGINEERING MECHANICS
COURSE NO.M-104
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS		
3	1	2	Theory	Sessional	Practical
			100	25	50

SECTION-A (STATICS)

Scope and basic concepts (Rigid body, force, units, etc.), concept of free body diagram, Resultant of Co-planar concurrent forces in a plane and space, moment of force, Principle of Moments, Coplanar and spatial applications. Virtual work method and its applications.

Equilibrium and its equations for a planar and spatial systems, Analysis of trusses, Method of joints and sections.

Theory of friction, its laws and applications (inclined plane). Square threaded screws, Bolt friction, Centroids and center of gravity, centroids of lines and composite areas, centroids determined by integration.

Moment of inertia, Area M.O.I, Transfer theorems, Polar M.O.I, Product of inertia, Principal M.O.I, Mohr's circle for area M.O.I, Transfer theorems and axes M.O.I of composite bodies.

SECTION-B (DYNAMICS)

Kinematics of a particle rectilinear motion, motion curves, Rectangular components of curvilinear motion, Flight of Projectile, Normal and tangential components of acceleration, Radial and transverse components, Newton's Laws. D'Alembert's Principle.

Kinematics of rigid bodies: Types of rigid body motion, Angular motion, fixed axis rotation, Analysis of plane motion and its applications, Instantaneous center and Instantaneous axis of rotation.

Kinetics of Particle: Translation, Analysis of a particle as a rigid body.

Kinetics of rigid bodies: Equations of plane motion, fixed axis rotation, Rolling bodies, General plane motion, Impulse and momentum in plane motion, Angular momentum.

RECOMMENDED BOOKS:

1.	Engineering Mechanics (Statics & Dynamics)	Beer and Johnson
2.	Engineering Mechanics (Statics & Dynamics)	Mariam and Kraige
3.	Engineering Mechanics (Statics and Dynamics)	Timoshenko and Young
4.	Engineering Mechanics (Statics and Dynamics)	Ferdinand L Singer.

NOTE: There shall be total eight questions, four from each section. Five questions will have to be attempted selecting at least two from each section. Use of calculator is allowed.

COURSE OUTCOMES

COURSE NAME: ENGINEERING MECHANICS
COURSE NO: M-104
After learning this course students will be able to:

CO104.1	Analyze the system of units and the conversion of units from one to another.
CO104.2	Demonstrate knowledge on basic calculation of forces and their resultant and resolution.
CO104.3	Approach to a conclusion of forces causing equilibrium.
CO104.4	Be proficient in the use of integral and moment methods for calculating centre of gravity.
CO104.5	Develop a stable, environment friendly structure for various engineering purpose using various modern tools.

B.E IST SEMESTER
BRANCH: COMMON TO ALL
TITLE: COMMUNICATION SKILLS
COURSE NO: HUM-105
DURATION: 3 HOURS

L	T	P	MARKS	
			Theory	Sessionals
3	1	-	100	25

Exercises in comprehension, grammar vocabulary, usage, pronunciation, spelling and composition based on the following texts:

i. Contemporary English Prose
Edited by Menon
Oxford University Press

ii. Developing English Skills
Edited by Thanker, Desai and Purani
Oxford University Press
Or
English through Reading-II
Edited by Bhasker and Prabhu

Note: Test-I carries 50% weightage in the question paper and Text-II carries 50% weightage

Question Paper:

1.	Six short answer questions on comprehension to be set from Text-I. Students expected to answer any three in about 150 words each	(30 marks)
2.	Phrases and idioms from text I to be used in sentences. Hundred percent choices to be given	(20 marks)
3.	Completing a paragraph of which the first two or three short Sentences are given	(10 marks)
4.	Exercise on tenses from Text II	(5 marks)
5.	Exercises on active/passive transformation from Text-II	(5 marks)
6.	Forming verbs or adjectives or nouns from the given words-text-II	(5 marks)
7.	Propositions from text-II	(5 marks)
8.	Matching words and their meanings Text-II	(5 marks)
9.	Forming words ending in-ify,-ize,-tion, ec. From Text-II	(5 marks)
10.	Filling in the blanks with a given set of words in Brackets-Text-II	(5 marks)
11.	Questions on miscellaneous exercises from Text-II such as Question tags - articles etc. or Marking Stress or Syllable in given words.	(5 marks)

COURSE OUTCOMES

COURSE NAME- COMMUNICATION SKILLS
COURSE CODE- HUM-105
After learning this course students will be able to:

CO105.1	Prepare, organize, and deliver engaging oral presentations and thus increase confidence in speaking publicly.
CO105.2	Write effectively for a variety of professional and social settings.
CO105.3	Become active readers who can articulate their thoughts, views etc. and built curiosity for other perspectives and shall be able to understand the importance of communication with others.
CO105.4	Interpret texts with an awareness of and curiosity for other viewpoints.
CO105.5	Enhance his/her vocabulary.

CLASS: B.E. IST SEMESTER
BRANCH: COMMON TO ALL
COURSE TITLE: ENGINEERING GRAPHICS
COURSE NO. Eng-106
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS		
			Theory	Sessional	Practical
1	0	3	100	0	50

UNIT-1

Introduction: Conventional lines and signs used in Engineering Drawing, Printing and Lettering, Curves used in Engineering Practice: Cycloidals, Involutes, Spirals and Hellices, Locus of a point on simple mechanisms.

Theory and practice of Orthographic projections.

Projection of points and Lines: Projections of points and lines in different quadrants w.r.t principle reference planes, Finding of true length, True inclinations and traces of lines.

Projection of Planes: Projections of a plane w.r.t. the principle planes in simple and inclined positions. Rotation method and the Auxiliary plane method. Space relation of a plane and a line. To locate a point on a plane given its projections. Parallel relation of lines and planes. Shortest distance between a line and a plane.

UNIT-2

Projection of Solids: Classification and main features -Prisms and Pyramids. Projection of solids inclined to both the reference planes by (1) Rotation Method, and (II) Auxiliary plane method. Projection of solids in combination (Co-axial) in simple and inclined positions.

Sectioning of Solids: Object of sectioning, Types of cutting planes, True shape of section, Auxiliary views of sections of multiple co-axial solids in simple and titled conditions.

UNIT-3

Interpenetration of Solids and Intersection of Surface: Intersection of geometrical solids/hollow sections, Tracing of lines of intersection by line method and by section method.

Development of Surfaces: Classification of surfaces, Methods of development-Straight line method and Radial line method, Development of solids and hollow sections in full or part development of transition pieces. To draw projections from given development.

UNIT-4

Isometric Projection: Isometric scale, Isometric axes and Isometric planes, Isometric projection of solids and simple machine blocks**.**

Orthographic Projections: Orthographic projection of simple blocks (First & Third angles), to draw the third view from given two views. Missing lines in projection.

RECOMMENDED BOOKS:

1.	Engineering Drawing	N.D Bhatt
2.	Practical Geometry	V. Laxminarayan & GEV
3.	Engineering Graphics	K.L. Narayanan & P. Kamaish
4.	Principles of Engineering Graphics	P.E Giesecks
5.	Engineering Graphics	Frederic & Michelle.

NOTE: At least two questions to be attempted from Unit-I and at least one question from each of the Units-II, III and IV in the theory examination paper.

COURSE OUTCOMES

COURSE NAME- ENGINEERING GRAPHICS
COURSE CODE- M-106
After learning this course students will be able to:

CO106.1	Draw orthographic projections of sections
CO106.2	Use architectural and engineering scales with accuracy.
CO106.3	Work with zeal of office practices and standards.
CO106.4	Convert sketches to engineered drawing.
CO106.5	Perform auto cad two dimensional drawing.

B.E IST SEMESTER	**P**	**MAXIMUM MARKS**
SUBJECT: ENGINEERING PHYSICS LAB-I	**2**	**SESSIONAL**
COURSE NO.: PHY-107		**50**

S.No.	**Experiment No.**	**Title of Experiment**
1.	Exp-I	To plot a graph between the distance of the knife edges from the center of gravity and the time period of a compound pendulum. From the graph, find a) Acceleration due to gravity b) Radius of gyration and the moment of inertia of the bar about an axis through the center of gravity.
2.	Exp-II	To find the dispersive power of a given prism using a spectrometer.
3.	Exp-III	To find the refractive index of a given liquid using a hollow prism
4.	Exp-IV	To find the focal lengths of a convex mirror and a concave lens using a convex lens and a concave mirror respectively.
5.	Exp-V	To find the frequency of A.C mains using an electrical vibrator.
6.	Exp-VI	To draw the V-I characteristics of a forward and reverse bias P-N junction diode.
7.	Exp-VII	To study the common base characteristics of PNP junction transistor.
8.	Exp-VIII	To study the common emitter characteristics of PNP junction transistor.
9.	Exp-IX	To study the common base characteristics of NPN junction transistor.
10.	Exp-X	To study the common Emitter characteristics of NPN junction transistor.
11.	Exp-XI	To evaluate the value of Planck's constant.
12	Exp-XII	To study the characteristics of a Solar Cell.

NOTE: A minimum of six experiments is to be performed in a semester.

BOOKS RECOMMENDED:

	TITLE	AUTHOR
1.	Practical Physics	Warsnop & Flint
2.	Practical Physics	Chauhan & Singh (Vol. I & Vol. II)
3.	B.Sc. Practical Physics	C.L Arora

COURSE OUTCOMES **COURSE NAME- ENGINEERING GRAPHICS** **COURSE CODE- M-106** After learning this course students will be able to:	
CO106.1	calculate the value of Plank's constant by using Photoelectric effect and thereby verify the Einstein's photoelectric equation
CO106.2	Understand the concepts of semiconductor diodes by studying their characteristics in forward and reverse bias modes.
CO106.3	Understand the concepts of stationary waves and hence find the value for frequency of A.C Mains by using Sonometer.
CO106.4	Equip themselves with concepts of acceleration due to gravity, moment of inertia & radius of gyration and verify the same by using compound pendulum.
CO106.5	Calculate the angle of prism by using spectrometer and thereby verify the laws of reflection &refraction. To verify the laws of dispersion of light and calculate the minimum deviation and hence find the Refractive Index of a Prism by using Spectrometer

"Practical performance pertaining to the above topics will be useful for the students to acquaint them with handling of instruments and experimentation".

B.E IST SEMESTER	**P**	**MAXIMUM MARKS**
SUBJECT: ENGINEERING CHEMISTRY LAB	**2**	**SESSIONAL**
COURSE NO.: CHM – 108		**50**

CHEMISTRY PRACTICAL:

1. Determine the percentage of $CaCO_3$ in precipitated chalk. You are provided with IN HCl and 0.IN NaOH.
2. To analyse the given antacid tablets.
3. Determine Volumetrically the %age purity of given sample of Ferrous sulphate, x gms of which have been dissolved per litre provided N/10 $KMnO_4$
4. Determine Volumetrically the number of molecules of water of crystallization present in the given sample of Mohr's salt, x gms. of which have been dissolved per litre provided N/10 $K_2Cr_2O_7$ (using an external indicator).
5. Determine Volumetrically the percentage of Cu in a sample of $CuSO_4$ crystals, Z gms of which have been dissolved per litre, provided 0.IN $Na_2S_20_3$.
6. To determine the coefficient of viscosity of an unknown liquid using Ostwald Viscometer.
7. Determine the surface tension of a unknown liquid using Stalagmometer.
8. To prepare a pure and dry sample of Aspirin
9. To prepare a pure and dry sample of Glucosazone
10. Determine the method of purification of organic compounds by coloumn chromatography.
11. Determine the aniline point of a given lubricating oil.

BOOKS RECOMMENDED:

1. Experimental Engineering Chemistry — Shashi Chawla
2. Lab. Manual on Engg. Chemistry — Basin, S K & Sudha Rani
3. A Manual of Practical Engineering Chemistry — Dr. Rajinder Kumar

COURSE OUTCOMES

COURSE NAME: ENGINEERING CHEMISTRY LAB-I
COURSE CODE: **CHM-108**
After learning this course students will be able to:

CO108.1	Capability to visualize and understand chemical engineering unit, operations related to fluid and practical mechanics and mass transfer.
CO108.2	To provide an overview of preparation and identification of organic compound.
CO108.3	This course relies on quantitative analysis and makes use of simple equation to illustrate the concept involved.
CO108.4	Handling different types of instruments for analysis of materials, using small quantity of material involved for quick and accurate results.

B.E IST SEMESTER	**P**	**MAXIMUM MARKS**
SUBJECT: ENGG. MECHANICS LAB	**2**	**SESSIONAL**
COURSE NO.: M – 109		**50**

Lab work shall be based on theory course of Engineering Mechanics Paper

COURSE OUTCOMES

COURSE NAME: ENGINEERINGMECHANICS LAB
COURSE CODE:**M-109**
After learning this course students will be able to:

CO109.1	Apply the fundamentals of statics and motion principles of various engineering problems related to statics and motion.
CO109.2	Have the knowledge of finding the stable structures of various engineering purposes and bending of beams by using bending moment apparatus.
CO109.3	Solve engineering problems related to motion.
CO109.4	Demonstrate the knowledge on basic calculation of forces and their resultant and resolution.
CO109.5	Solve the engineering problems related to friction and analyze it in real life situation.

CLASS: B.E. IST SEMESTER
BRANCH: COMPUTER ENGG., CIVIL ENGG., MECH. ENGG., ELECTRICAL ENGG., ELECTRONICS & COMM. ENGG.
COURSE TITLE: WORKSHOP TECHNOLOGY
COURSE NO.WS-110

L	T	P	MARKS		
			Theory	Sessional	Practical
1	0	3	0	0	75

COURSE CONTENT:

Introduction to workshop as a fabrication unit. Information regarding various material of construction i.e Ferrous and Non-Ferrous, wood, plastics, etc. Basic fabrication process i.e. castings, Mechanical working, welding and machining.

Wood working and pattern making practice, Information about working hand and wood working machines, various methods of joining of wooden parts for the fabrication of patterns, Pattern materials and allowances, pattern construction procedures, preservation of patterns.

Moulding and casting practice. Sand Moulding, Natural foundry sands and synthetic sands, preparation of moulding sands, mould making procedure, cast iron and aluminum and pouring, melting crucible process, Extraction of Castings.

Cold and hot working processes, basic tools and equipment used in mechanical working. Forging furnace operation, Smith forgoing operations.

BOOKS:

1. Manufacturing process and materials by Campbell.
2. Manufacturing Process by P.N. Rao
3. Workshop Technology by Hajra and Chowdhary Vol.I

SHOP PRACTICE:

Unit-1 Pattern Making:

i) Baring block pattern
ii) Split pattern of "bench Vice" (Sliding Jaw).

Unit-II Moulding and Casting

Moulding and Castings of Patterns at Unit I.

Unit-III Hand forging of:

i) Haxagonal headed bolt from a cylindrical rod.
ii) Cubical Block from a Cylindrical section.

COURSE OUTCOMES

COURSE TITLE: WORKSHOP TECHNOLOGY
COURSE NO.WS-110
After learning this course students will be able to:

CO110.1	Prepare pattern making of open bearing block
CO110.2	Prepare pattern making of bench vice (Sliding Jaw).
CO110.3	Perform moulding and casting of open bearing block and bench vice .
CO110.4	Perform forging of hexagonal headed bolt from a cylindrical rod.
CO110.5	Perform forging of cubical block from a cylindrical section.

UNIVERSITY OF JAMMU, JAMMU
FOR EXAMINATIONS TO BE HELD FOR BATCH 2014 & ONWARDS

COURSE OF STUDY FOR BE 2ND SEMESTER ENGINEERING
BRANCH: COMMON TO ALL BRANCHES

Course No.	Course Name	Lecture	Tutorial	Pract	**Marks**			
					Theory	Sess.	Pract	Total
MTH –201	Engineering Math-1I	4	2	-	100	25	-	125
PHY -202	Engineering Phy-II	3	1	-	100	25	-	125
CHM -203	Engineering Chem-II	3	1	-	100	25	-	125
COM -204	Computer Programming	3	1	-	100	25	-	125
HUM-205	Engineering Economics	3	1	-	100	25	-	125
M -206	Machine Drawing-I	1	-	3	100	25	-	125
M -207	Workshop Technology-II	1	-	3	-	-	75	75
PHY –208	Engineering Physics II Lab	-	-	2	-	-	50	50
CHM –209	Engineering Chemistry II Lab	-	-	2	-	-	50	50
COM –210	Computer Programming Lab	-	-	2	-	-	75	75
Total		18	6	12	600	150	250	1000

B.E 2ND SEMESTER			**MAXIMUM MARKS:125**	
COURSE NO: MTH-201	**L**	**T**	**THEORY**	**SESSIONAL**
COURSE TITLE: ENGG. MATH-II	**4**	**2**	**100**	**25**
BRANCH : COMMON TO ALL				
DURATION OF EXAM: 3 HOURS				

SECTION-A

1. **Introduction to infinite series & sequences: -** Convergence and divergence of a series, Leibnitz test, p-test, comparison test, Cauchy's root test, D' Alembert Ratio Test, Raabe's Test, Logarithmic test, alternating series.
2. **Fourier Series:** Introduction, Euler's formulae, sufficient conditions for a Fourier expansion, functions having points of discontinuity, change of intervals. Odd and even functions, Fourier expansion of Odd and even periodic functions, half range series, typical wave forms, Parseval's formula, complex form of Fourier -series.
3. **Power Series Solutions of Second order O.d.e:** Analytic function, ordinary point, singular point, regular and irregular singular points of o.d.e. Y " +P(x)Y' + Q(x)Y=0, Series solution of such differential equations about an ordinary point, Frobenius series solution about a regular singular point.

SECTION-B

2. **First Order partial differential equations: -**

   Formation of p.d.e, First order linear p.d.e, Non-Linear p.d.e. of Ist order, solution by Charpit's method, Four Standard forms of non-linear p.d.e with reference to Charpit's technique.

3. **Higher Order Linear p.d.e:** Homogenous and Non-homogenous higher order linear partial differential with constant coefficient inverse operator I/f (D,D'), Rules for finding P.I and C.F, Non-Linear equations of 2nd order. Application of p.d.e, method of separation of variables to solve equations of vibrations of strings (or one dim wave equation), one dim and two dim heat flow equations, Laplace equations, transmission line).
4. **Matrices & determinants:** Introduction, Rank of matrix, Elementary transformations, Elementary matrices, Inverse using elementary transformation, Normal form of a matrix, Vector spaces, Linear dependence and independence of vectors, consistency of linear system of equations, linear and orthogonal transformations, Eigen values and Eigen vector, Properties of Eigen value, Cayley Hamilton Theorem, Reduction to diagonal form, Reduction of quadratic form to canonical form, complex matrices.

BOOKS RECOMMENDED:

1. Advanced Engineering Mathematics by R.K. Jain, S.R.K Iyenger, 2nd edition, Narosa, New Delhi.
2. Higher Engineering Mathematics — Dr. B.S. Grewal
3. Engineering Mathematics — Dr. Bhopinder Singh
4. Engineering Mathematics — B.S. Grewal Khanna Publication, New Delhi.
5. Partial differential equations — Singhania

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

COURSE OUTCOMES

COURSE NAME- ENGG. MATHEMATICS – II
COURSE CODE-MTH – 201
After learning this course students will be able to:

CO201.1	Learn the concept of linear and non- linear partial differential equations.
CO201.2	Understand the concept of Fourier series of any function
CO201.3	Apply the concept of analyticity of functions for the expansions of second order differential equations.
CO201.4	Find the rank, Eigen values/ vectors of matrices, solve simultaneous linear equations, find inverse of matrices using normal forms and evaluate the convergence and divergence of a given sequence of series

B.E IIND SEMESTER (COMMON COURSE) **MAXIMUM MARKS:125**

COURSE NO. PHY-202	**L**	**T**	**THEORY**	**SESSIONAL**
COURSE TITLE : ENGINEERING PHYSICS-II	**3**	**1**	**100**	**25**

BRANCH : COMMON TO ALL

DURATION OF EXAM: 3 HOURS

UNIT-1	**RELATIVISTIC DYNAMICS**	**NO. OF LECTURES**	**WEIGHTAGE**
	Concept of Relativity, Frames of reference, Galilean Transformations, Michelson and Morley's experiment, Postulates of Special Theory of relativity, lorentz transformations, Length Contraction, Time dilation, variation of mass with velocity (Velocity addition), mass energy equivalence ($E^2=P^2c^2+m_o^2c^{4)}$.	10	25%
UNIT-II	**WAVE-PARTICLE DUALITY**		
	Black Body radiation spectrum (Characteristics & Energy distribution), Wien's laws, Rayleigh Jeans Law excluding mathematical derivations, ultraviolet Catastrophe, Planck's hypothesis and Planck's radiation law, Explanation of black body radiation characteristics on the basis of Planck's law, photon concept. Compton effect, derivation of the direction of emission and the change in wavelength of scattered photons, direction of recoil electron and discussion of observed results. Debroglie's hypothesis, concept of matter waves, Davisson & Germer's experiment, wavepacket, Phase and Group velocity, Heisenberg's uncertainty principle. Experimental illustration of uncertainty principle using single slit.	12	25%
UNIT –III	**QUANTUM MECHANICS**		
	Wave function definition, interpretation and significance of wave function, Schrodinger's wave equations (Steady-State and time dependent) for 1-dim case, concept of operators and expectation values, Applications of Schrodinger's equation (Time independent) to a) Particle in a 1-dimensional box of infinite height, b) single step potential barrier, c) Tunnel effect, d) Quantum Mechanical harmonic oscillator with concept of Zero point energy.	14	25%
UNIT-IV	**SOLID STATE PHYSICS**		
	Intrinsic & extrinsic semi-conductors, Fermi & impurity levels, Impurity compensation, charge neutrality equation and semi-conductor conductivity. Einstein's relation, drift and diffusion current. Introductory concepts of advanced materials viz; conducting polymers dielectric materials, Nanomaterials, Smart materials and High T_c materials.	7	15%

UNIT-V	**LASERS**		
	Principle of Laser action, population Inversion, Einstein's Coefficients, He-Ne & Ruby Lasers, Holography	5	10%

TUTORIALS

B.E IIND SEMESTER
SUBJECT: ENGG: PHYSICS-II
COURSE NO.PHY-202

S.NO.	TOPICS	UNIT NO.
T-1	Numerical problems based on Length contraction & time dilation	I
T-2	Numerical problems based on variation of mass, energy mass equivalence etc.	I
T-3	Numerical problems pertaining to energy spectrum of Black body radiations, Wien's displacement/R-J laws, Planck's law	II
T-4	Numerical problems based on photo-electric effect, work functions	II
T-5	Numerical problems based on Compton effect, recoil energy of electron etc.	II
T-6	Numerical problems based on the characteristics of De-broglie waves, Davisson-Germer's Expt.	II
T-7	Numerical problems related to Heisenberg's uncertainty principle	II
T-8	Numerical problems based on Schrodinger's wave equation, expectation values of certain physical quantities and operators	III
T-9	Numerical problems to find the Eigen function and Eigen values for particle in a box	III
T-10	Numerical problems to find the reflection and transmission co-efficients for a particle penetrating a potential barrier	III
T-11	Simple numerical problems based on finding the bandgaps in semi-conductor materials etc.	IV
T-12	Simple numerical problems based on finding the energy level difference in Lasers etc.	V

NOTE: SETTING OF QUESTION PAPER (Instructions for Examiners)

i) The question paper will consist of two sections

a) Section-I
&
b) Section-II

ii) Section-I Comprises of Unit-I and Unit-II
Section-II Comprises of Unit-III, Unit-IV and Unit-V

iii) Number of questions to be set in the paper =8 (eight)
(Four from each section as per weightage)

iv) Number of questions to be attempted =5 (five)
(Selecting at least two from each section)

BOOKS RECOMMENDED:

TITLE	AUTHOR

1) Modern Physics — Beiser
2) Modern Physics — Blatt
3) Modern Physics — Gupta & Gupta
4) Basic Electronics — Millman & Halkias

COURSE OUTCOMES

COURSE NAME: PHYSICS-II
COURSE NO: PHY-202
After learning this course students will be able to:

CO202.1	Understand the mathematical concepts required to understand physics.
CO202.2	Derive the Maxwell's equations and understand the basis electromagnetic theory.
CO202.3	Assimilate the basic concepts of interference in thin films, diffraction, polarization and the characteristics of different types of waves.
CO202.4	Gain the knowledge about lasers, their characteristic's & properties and the basics of optical fibers.

5) Material Science — S.L. Kakani, Amit Kakani

B.E 2ND SEMESTER			**MAXIMUM MARKS:125**	
COURSE NO: CHM-203	**L**	**T**	**THEORY**	**SESSIONAL**
COURSE TITLE: ENGG. CHEM-II	**3**	**1**	**100**	**25**
BRANCH : COMMON TO ALL				
DURATION OF EXAM: 3 HOURS				

SECTION-A

1. **ENVIRONMENTAL CHEMISTRY:**

Concept of Environmental chemistry, segments of environment (a brief idea about atmosphere, hydrosphere and lithosphere)

AIR POLLUTION –Introduction, Types of air pollution and control of air pollution.

WATER POLLUTION: Introduction, Sources of water pollution and methods of controlling water pollution.

CHEMICALS AND METAL TOXICOLOGY (Biochemical effects of Pb, Hg, As, Zn, Cd, Ni, Se, CN, O_3 and pesticides in brief on man).

2. **INORGANIC CEMENTING MATERIALS**:

Cement and Lime – Introduction, classification of lime, manufacture and properties of lime, setting and hardening of lime.
Cement, types of cement, manufacture of Portland cement, setting and hardening of cement.

3. **WATER TREATMENT**

Introduction, types of water, softening of water by different processes, chemical

methods and sterilization, priming and foaming, sludge and scale formation, determination of hardness of water by soap titration method and EDTA method. Radioactivity of water, numericals on hardness and softening of water.

SECTION-B

1. **PLASTICS:**
Introduction, importance of plastics and uses, classification of plastics, moulding constituents of a plastic, moulding of plastics into articles (compression moulding, injection moulding, transfer moulding and extrusion moulding) Preparation, properties and uses of following plastic materials:
a) Polymethyl methacrylate b) Epoxy resins c) Alkyd resins.

2. **RUBBER**
Introduction, types of rubber, treatment of latex, vulcanization of rubber, preparation, properties and uses of following synthetic rubber: Buna-S, Buna-N & Butyl rubber.

3. **PAINTS**
Introduction, requisites of a good paint, constituents of a paint, manufacture of a paint, properties and uses of important white pigments such as white lead, Zinc oxide and Lithophone.

BOOKS RECOMMENDED:

1.	Engineering Chemistry	Jain & Jain
2.	Engineering Chemistry	Sharma, B.K.
3.	Engineering Chemistry	Dara, S.S.
4.	Engineering Chemistry	Shashi, Chawla
5.	Organic Chemistry	Bahl, B.S.
6.	Environmental Chemistry	De, A.K.
7.	Textbook of Environmental Chemistry	Tyagi & Mehra
8.	Polymer Science	Gowrikar, V.R. etal.
9.	Engineering Chemistry	Dr. Rajinder Kumar

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

COURSE OUTCOMES

COURSE NAME: ENGG. CHEM II
COURSE CODE: CHM-203
After learning this course students will be able to:

CO203.1	Explain the air quality, emission, pollution control and Environmental. Health.
CO203.2	Analyze different polymerization processes used to make thermoplastic and thermosetting plastics.
CO203.3	Recognize the common physical, chemical process encountered in treatment process of water.
CO203.4	Define basic knowledge on cement, its production, characteristics, properties etc.
CO203.5	Summarize the chemical structure, molecular properties, vulcanization process and application of major type of rubber.

CLASS: B.E 2nd SEMESTER
BRANCH: COMMON FOR ALL
COURSE TITLE: COMPUTER PROGRAMMING USING C
COURSE NO: COM –204
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			Theory	Sessionals
3	1	-	100	25

SECTION-A

1. Basic structure of Computer, Stored Program Concept, Binary Arithmetic – Addition, Subtraction, Multiplication, Data Representation – Fixed and Floating Point, Semiconductor Memories.

2. Introduction to C, Data Types, Constants, Variables, Expressions, Statements, Operators, Data Input and Output.

3. Control Statements, Arrays, Recursion, Storage Classes, Library Functions.

SECTION-B

4. Functions, User Defined Data Types, Structures, Unions, Passing Structure to Functions.

5. Pointers, Operation on Pointers, Passing Pointers to Functions, Data Files – Opening, Closing, Creating Data Files

BOOKS RECOMMENDED:

1. Programming with C - Byron Gottfried.
2. Programming with C - E. Balaguruswamy.
3. C The Complete Reference - Herbert Schildt.
4. Let us C - Yashwant Kanitkar.
5. Digital Computer Fundamentals - Thomas C. Bartee.
6. Digital Computer Design - V. Rajaraman.

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

COURSE OUTCOMES

COURSE TITLE: COMPUTER PROGRAMMING USING C
COURSE NO: COM –204
After learning this course students will be able to:

CO110.1	Remember the fundamentals of C programming.
CO110.2	Understand the use of loops and decision making statements to solve the problems.
CO110.3	Apply different operations on arrays and user-defined functions to solve real-time problems.
CO110.4	Analyze the operation of pointers, structures and unions.
CO110.5	Implement file operations in C programming for a given application.

B.E. 2ND SEMESTER			**MAXIMUM MARKS: 125**	
COURSE NO. HUM-205			**THEORY**	**SESSIONAL**
COURSE TITLE: ENGINEERING ECONOMICS	**L**	**T**	**100**	**25**
BRANCH: COMMON TO ALL	**3**	**1**		
DURATION OF EXAM : 3 HOURS				

SECTION-A

UNIT-1

Definitions of Economics

a) Science of Wealth

b) Science of Material Welfare

c) Science of Scarcity

Economic System

a) Features of Capitalism

b) Features of Socialism

c) Features of Mixed Economy

UNIT-II

Consumer Behaviour

a) Cardinal Utility Analysis: The Concept and Utility Maximisation: Laws of Diminishing Marginal Utility and Equi-Marginal Utility.

b) Ordinal Utility Analysis: Meaning and Properties of Indifference Curves and Utility Maximization.

Demand Theory:

a) Meaning of Demand and law of Demand

b) Factors Affecting Demand

c) Elasticity of Demand (Price Elasticity, Income Elasticity and Cross Elasticity)

d) Demand Forecasting

SECTION-B

UNIT-III

Theory of Production:

a) Factors of Production and Production Function.

b) Isoquants : Meaning & Properties

c) Law of Variable Proportions & Returns to scale

Costs and Cost Analysis

a) The Concept of Marginal, Average, Fixed and Variable Costs.

b) The Shape of Fixed, Average and Marginal Cost Curves (short run)

Market and Market Structures

a) Meaning and Feature of Perfect Competition, Monopolistic Competition, Oligopoly and Monopoly.

b) Price Determination Under Perfect competition and monopoly.

UNIT-IV

Some commonly used Economic Concepts

a) Meaning, Types and Methods to Control Inflation.

b) Concept of Stock Market

c) Meaning & Concept of National Income

d) Functions of Commercial Bank & Central Bank

e) Features of Development and Under Development

f) Meaning & Phases of Trade/Business Cycle

g) Index Number : Construction and difficulties in measurement of Index Number.

BOOKS RECOMMENDED :

1.	K.K.Dewett	: Modern Economic Theory
2.	H.L Ahuja	: Advanced Economic Theory
3.	M.L. Jhingan	: Macro Economics
4.	P.N Chopra	: Business Economics/Advanced Eco. Theory

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

COURSE OUTCOMES

COURSE NAME- ECONOMICS
COURSE CODE- HUM-205
After learning this course students will be able to:

CO205.1	Understand difference between classical and modern economic views.
CO205.2	Understand business environment of a country of which every business manager has to be aware in order to execute successfully.
CO205.3	Apply the laws in daily routine and be able to become a rational consumer and purchaser
CO205.4	Suggest producing the products at minimum cost by studying in detail about the cost curves and market structures.
CO205.5	Apply the knowledge of macroeconomics such as national income, index numbers, business cycle etc.

B.E. 2ND SEMESTER **MAXIMUM MARKS: 125**

COURSE NO. M-206			**THEORY**	**SESSIONAL**
COURSE TITLE: MACHINE DRAWING-I	**L**	**P**	**100**	**25**
BRANCH: COMMON TO ALL	**1**	**3**		

DURATION OF EXAM : 3 HOURS

SECTION-A

1. I.S. Code for Machine Drawing.
2. Types of Sections and Recommended Scale, Dimensioning and Sectioning of Machine elements.
3. Drawing and sketching of machine elements in Orthographic Projections.
4. Different types of Joints: Riveted joints, Threaded fasteners, Knuckle joint, Cotter Joints: Gib and Cotter, Sleeve and Spigot.
5. Stud assembly, Pipe joints including expansion joint.
6. Shaft pulley, cone pulley, Fast and loose pulley, etc.

SECTION-B

1. Simple assemblies: Shaft couplings and Clutches, Muff Coupling, split muff, Flange Couplings: Solid and Flexible, Protected and Unprotected, Universal Coupling.
2. Bearings: Pedestal bearing including Hanger bearings, Pivot bearing and Swivel bearing.

RECOMMENDED BOOKS:

1.	Machine Drawing	P.S. Gill
2.	Machine Drawing	Sidheshwar and Kannaih
3.	Machine Drawing	N.D. Bhatt

NOTE: -

1. **There will be Six questions in all, five from Section- A (each of 15 marks) and one Compulsory question of 55 marks from Section - B.**
2. **Students are required to attempt Four questions in all, three form Section-A and one compulsory question involving assembly from Sections–B.**

COURSE OUTCOMES

COURSE TITLE: MACHINE DRAWING
COURSE NO: M-206
After learning this course students will be able to:

CO206.1	Helping the student in drafting their technical ideas.
CO206.2	Creating knowledge about the various practices with regard to the dimensioning, sectioning and development of views.
CO206.3	Understanding the importance of the linking functional and visualization aspects in the preparation of the part drawing.
CO206.4	Preparation of the part or assembly drawings as per the conventions.
CO206.5	Interpretation of machine drawings that in turn helps the students in the preparation of the production drawings Machine Drawing Conventions.

B.E 2ND SEMESTER **MAXIMUM MARKS : 75**

COURSE NO: M-207	**L**	**P**	**PRAC/LAB**
COURSE TITLE: WORKSHOP TECHNOLOGY-II	**1**	**3**	**75**

BRANCH : COMMON TO ALL

DURATION OF EXAM : 3 HOURS

WELDING SHOP

1. Introduction to Welding as a fabrication process, Welding application and general safety precautions.
2. Introduction to Gas and Arc welding processes.
3. Preparation of single V-butt joint by Gas and Arc welding processes.
4. Preparation of double V-butt joint, Lap joint, Tee joint and Corner joint by Gas and Arc welding processes.

FITTING SHOP

1. Assembly of Snap fitting of flat pieces (Male, Female).
2. Assembly and fitting of two L-shaped rectangular flat pieces.

SHEET METAL SHOP

1. Introduction to sheet metal tools.
2. Practice of making regular geometrical and traditional shapes in sheet metal, which includes:
   a) Square elbow
   b) Tee joint
   c) Funnel making
   d) Tray and riveted handle.

COURSE OUTCOMES

Course Name: Workshop Technology-II
Course code: M-207
After learning this course students will be able to:

CO207.1	Perform welding process like Arc and Gas welding .
CO207.2	Prepare single V butt joint, double V butt joint, Lap joint, Tee joint and corner joint.
CO207.3	Perform Assembly of Snap fitting of flat pieces.
CO207.4	Perform Assembly and fitting of two L shaped flat piece.
CO207.5	Perform various sheet metal process like square elbow, funnel making and tray and riveted handle.

B.E 2ND SEMESTER **MAXIMUM MARKS : 50**

COURSE NO: PHY-208	**P**	**PRAC/LAB**
COURSE TITLE: ENGINEERING PHYSICS LAB-II	**2**	**50**

BRANCH : COMMON TO ALL

DURATION OF EXAM : 3 HOURS

S.NO.	EXPERIMENT NO.	TITLE OF EXPERIMENT
1.	Exp-1	To determine the wavelength of sodium light using a plane diffraction grating.
2.	Exp-II	To find the wavelength of a monochromatic source of light using Fresnel's Biprism.
3.	Exp-III	To determine the specific rotation of sugar using laurent's half shade polarimeter.
4.	Exp-IV	Verification of Faraday's laws.
5.	Exp-V	To find the wavelength of monochromatic light using Newton's rings Apparatus.
6.	Exp-VI	To find the co-efficient of self-induction of a coil by Anderson's bridge using head phone.
7.	Exp-VII	To determine the value of e/m for electron by a long solenoid (Helical method).
8.	Exp-VIII	To find the impedance of LCR series and parallel circuits.
9.	Exp-IX	To study the Zener diode characteristics.
10.	Exp-X	To find the specific resistance of given wire by using carry Foster's Bridge.
11.	Exp-XI	To find the wavelength of He-Ne gas laser.
12.	Exp-XII	To find the diameter of a thin wire using He-Ne gas laser.

NOTE: AT LEAST A MINIMUM OF SIX EXPERIMENTS IS TO BE PERFORMED IN A SEMESTER.

BOOKS RECOMMENDED:

	TITLE	AUTHOR
1.	B.Sc Practical physics	C.L. Arora
2.	Practical Physics	Worsnop & Flint
3.	Practical Physics	Chauhan & Singh (Vol.I & Vol. II)

COURSE OUTCOMES

COURSE TITLE: ENGG. PHYSICS LAB II
COURSE NO.: PHY-208
After learning this course students will be able to:

CO208.1	Insight about the working principle of LCR circuit and measurement of its impedance parameter.
CO208.2	Understand the concept of interference by using thin films and enable them to calculate the Wavelength of monochromatic light.
CO208.3	Understand the concept of diffraction of light using a transmission grating and thus find out the wavelength of monochromatic light. The students will also be able to understand the concepts of polarization of light and its rotation through optically active solutions by using Laurent's half shade polarimeter.
CO208.4	Work on the principles of wheat stone bridge and thereby calculate the self-induction of a given coil by Anderson's method using a headphone. The students will be able to verify Biot's Savart's Law by calculating the variation of magnetic field with distance along the axis of a circular coil.
CO208.5	Understand the functioning of PNP transistors for various combinations in forward and reverse bias.

B.E 2ND SEMESTER		**MAXIMUM MARKS : 50**
COURSE NO: CHM-209	**P**	**PRAC/LAB**
COURSE TITLE: ENGINEERING CHEMISTRY LAB-II	**2**	**50**

BRANCH : COMMON TO ALL
DURATION OF EXAM : 3 HOURS

EXPERIMENTS

1. Determine the total hardness of a sample of water by complexometric method (using EDTA).
2. Determine the chloride content in supplied water sample using Mohr's method (Argentometric method).
3. Determine dissolved oxygen in the given sample of water (winkler's method).
4. Determine the free chlorine in the given sample of water.
5. Determine the acidity of a given water sample.
6. Determine the alkalinity of a given water sample.
7. Determine the percentage of calcium oxide in cement.
8. Organic Analysis: Identify the following organic compounds (preparation of at least one derivative).
    a) Carboxylic acids
    b) Compounds containing alcoholic and phenolic OH groups
    c) Aldehydes & Ketones
    d) Carbohydrates
    e) Amides, amines, anilides and nitro compounds
    f) Hydrocarbons
    g) Compounds containing Sulphur or halogen

LIST OF BOOKS RECOMMENDED

1.	Experimental Engineering Chemistry	Shashi Chawla
2.	Lab. Manual on Engineering Chemistry	Basin, S K & Sudha Rani
3.	A Manual of Practical Engineering Chemistry	Dr. Rajinder Kumar

COURSE OUTCOMES

COURSE TITLE: ENGINEERING CHEMISTRY LAB-II
COURSE NO: CHM-209
After learning this course students will be able to:

CO209.1	Capable to visualize and understand chemical engineering unit, operations related to fluid and practical mechanics and mass transfer.
CO209.2	Provide an overview of preparation and identification of organic compound.
CO209.3	Relies on quantitative analysis and make use of simple equation to illustrate the concept involved.
CO209.4	Handle different types of instruments for analysis of materials, using small quantity of material involved for quick and accurate results.

B.E 2ND SEMESTER		**MAXIMUM MARKS : 75**
COURSE NO: COM-210	**P**	**PRAC/LAB**
COURSE TITLE: COMPUTER PROGRAMMING USING C LAB.	**2**	**75**
BRANCH : COMMON TO ALL		
DURATION OF EXAM : 3 HOURS		

The practicals will be based on the topics covered under Theory Syllabus. The Students are required to perform at least 15 Programs.

COURSE OUTCOMES

COURSE TITLE: COMPUTER PROGRAMMING USING C LAB.
COURSE NO: COM-210
After learning this course students will be able to:

CO210.1	Read, understand and trace the execution of programs written in C language.
CO210.2	Exercise conditional and iterative statements to write C programs.
CO210.3	Implement Programs using operators, arrays and pointers to access functions.
CO210.4	Write programs that perform operations using derived data types and files.

UNIVERSITY OF JAMMU, JAMMU

COURSE SCHEME
FOR THE B.E. 3rd SEMESTER ELECTRONICS & COMMUNICATION ENGG.
FOR EXAMINATION TO BE HELD FOR BATCH 2014 & ONWARDS

Course		Curriculum Hrs/Week			Marks			
Course No.	**Course Name**	**L**	**T**	**P**	**Theory**	**Sessional**	**Practical**	**Total**
ECE-301	Electronic Devices & Circuits-I	3	2	0	100	50	--	150
ECE-302	Electromagnetic Field & Transmission Lines Theory	3	2	0	100	50	--	150
MTH-311	Engineering Mathematics-III	3	2	0	100	50	--	150
M-314	Thermal Engineering	3	2	0	100	50	--	150
EE-301	Principle of Electrical Engg.	3	2	0	100	50	--	150
EE-302	Network Analysis & Synthesis	3	2	0	100	50	--	150
EE-308	Electrical & Electronics Workshops	0	0	3	---	--	50	50
EE-309	Principle of Electrical Engg.- Lab	0	0	3	---	--	50	50
	Total	**18**	**12**	**06**	**600**	**300**	**100**	**1000**

CLASS: B.E. 3RD SEMESTER
BRANCH: E&C, AEI
COURSE CODE: ECE-301
TITLE: ELECTRONIC DEVICES & CIRCUITS-I
DURATION OF EXAM: 3 HOURS.

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
3	2	0	100	50

SECTION-A

SEMICONDUCTOR DIODES: Introduction to pn junction diodes, Equivalent circuit & symbol, pn junction as rectifier, Ohmic contact & rectifier rectifying contact, Short circuit & open circuit pn junction diodes, Current components in pn junction diode & law of junction, Volt ampere characteristics, Diode capacitances, Static & dynamic resistances, Concept of load line, Zener diode and its break down phenomena, Tunnel diode, Schottky diode, LED, photo diode, varactor diodes, Numerical problems.

RECTIFIERS & FILTERS: Half wave, Full wave & bridge rectifiers with necessary derivations, Voltage regulation ,Capacitor filter, Inductor filter, LC filter with necessary derivation for ripple factor, Bleeder resistor, Numerical problems.

BIPOLAR JUNCTION TRANSISTOR: Introduction, Transistor basics (unbiased & biased transistor), Generalized transistor equation, Transistor current components, Early effect, Ebers-Moll Model,Transistor configurations & characteristics, Reach through & avalanche phenomena, Numerical problems.

SECTION –B

FIELD EFFECT TRANSISTORS: Introduction, Construction of JFET, Operation, Symbol, JFET-Characteristics, JFET Parameters and their relationship, Biasing of FET, with necessary derivations. Comparison between JFET and BJT & MOSFET, FET small signal model , Low frequency model of Common Source & Common drain Amplifiers & their analysis. MOSFET (Depletion & enhancement), Characteristics, Symbol and Operation.

DIODE CLIPPER & CLAMPER CIRCUITS: Diode series & shunt clippers, Clipping at two dependent levels, Diode comparator circuit, Clamping circuits, Clamping at certain voltage level, steady state output waveform for a Square wave input, Clamping circuit theorem, Diode sampling gates.

LINEAR WAVE SHAPING CIRCUITS: RC circuit (both high pass & low pass), RLC circuits & their response to various waveforms such as sinusoidal, step Voltage, Pulse, Square wave, Ramp etc. RC circuit as differentiator & integrator.

RECOMMENDED BOOKS :

1. Integrated Electronics — MillmanHalkias
2. Electronics Devices — Bolystead
3. Electronics Devices — Malvino Leach
4. Pulse, Digital & Switching Waveforms — Millman&Taub
5. Pulse Circuits — D.A. Bell
6. Solid state electronics devices — B.G.streetman

NOTE : There shall be total eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

Course Outcomes	
After learning this course students will be able to:	
CO301.1	Understand semiconductor diodes of different types and their applications
CO301.2	Understand the concept of rectifier. Application of rectifiers in the design of power supplies, concept of noise removal using filters
CO301.3	Understand the construction of transistor, solves the numerical problems using mathematical concepts as applied to transistors
CO301.4	Differentiate the constructional features of FET , MOSFET and other enhancement modes, student understands the clipper clamper working with the help of theoretical concepts and practicals in the laboratory
CO301.5	Understand the response of low and high pass filter, understanding the need of filtering
CO301.6	Understand the need for differentiators and integrator circuits , checking the response with the help of digital oscilloscopes.

	Hours/ Week			**Marks Distribution**	
CLASS: B.E. 3RD SEMESTER					
BRANCH: E&C, EE	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE NO: ECE-302	**3**	**2**	**0**	**100**	**50**

COURSE TITLE: ELECTROMAGNETIC FIELD & TRANSMISSION LINES THEORY

DURATION OF EXAM: 3 HOURS.

SECTION - A

ELECTROSTATICS : Revision of vector analysis with cylindrical, Spherical & polar coordinates, Electrostatic Potential, potential, Potential gradient, Gradient operator, Conductors, Method of images, Energy density in electrostatics field, Electric field in dielectric media, Capacitance, Solution of Electrostatic problems using Poisson's & Laplace equation.

MAGNETOSTATICS : Magnetic flux density, & Magnetic potential, Torque on a closed circuit, Energy density in the magnetic field.

MAXWELL EQUATION UNIFORM PLANE WAVE : Application of Maxwell equation to circuits, Resonant cavity, Radiation antennas, Rotating magnetic field theory, Wave motion in perfect dielectric, Plane wave in lossy dielectric, Propagation in good conduction, Skin effect, Poynting theorem, Standing wave ratio, Polarization, Reflection of uniform plane wave,

SECTION – B

TRANSMISSION LINE : Basic principles of T.L, Equivalent ckt of T.L, Basic transmission line equation, Input impedance, infinite T.L, Characteristics impendence (Zo), Propagation constant, attenuation constant, Phase constant, open and short circuits T.L, Velocity, wavelength, Voltage and power on line. Distortion in line Reflection and its coefficient,

LINE AT HIGH FREQUENCIES : Line Equation, Waveform on line terminated in various impedances, SWR, & its relation with reflection coefficient. Impedance of short Circuit and open Circuit line. Characteristic of ƛ/2 &ƛ/4 lines. Principle of Impedance matching & use of smith chart for impedance matching using ƛ/4 transformer & single stub.

BOOK RECOMMENDED :

01.	Engineering Electromagnetic	By	Jseph A. Edminister
02.	Introduction to Electromagnetic	By	Griffith
03.	Engineering Electromagnetic	By	Jr. Hyat
04.	Network Line & Filters	By	J. D. Ryder
05.	Antenna & Wave Propagation	By	K. D. Prasad

NOTE : There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO302.1: Attain knowledge about the vector analysis, coordinate system, electric and magnetic fields and calculation of flux density, potential and energy densities.
CO302.2: Analyse the Maxwell's equations and the wave propagation equation in free space and in different media
CO302.3: Study the Transmission line and its parameters
CO302.4: Solve for transmission line parameters at high frequencies and principles of stub matching and smith chart

CLASS: B.E. 3RD SEMESTER
BRANCH: ELECTRONICS & COMMUNICATION ENGG. L T MARKS

COURSE TITLE: ENGINEERING MATHEMATICS – III 3 2 Theory Sessionals
COURSE No. MTH-311 100 50
DURATION OF EXAM: 3 HOURS

SECTION-I

LAPLACE TRANSFORMS :

Laplace Transforms, Inverse Laplace Transforms, Properties of Laplace Transforms, LT of unit step function, Impulse function, Periodic function, Initial value theorem, Final value theorem, Convolution theorem, Application of LT to solve linear differential equations and convolution type integral equations.

INTEGRAL TRANSFORMS AND FOURIER INTEGRALS :

Integral transforms and Fourier Integrals Fourier integral theorem, Fourier sine and cosine Integrals, and their inverses.

SECTION-II

SPECIAL FUNCTIONS :

Special Functions Legendre polynomials, Rodgrigue's formula, Recurrence formulae, generating function, Orthogonality of Legendre polynomials, Bessel function of Ist kind. Recurrence formulae, generating function, Orthoganality of Bessel function.

BOOLEAN ALGEBRAS :

Boolean Algebras, Lattices, Finite Boolean algebra, C.N.F and D.N.F, Application of Boolean algebra to switching theory.

BOOKS RECOMMENDED :

01. Higher Engineering Mathematics B.S. Grewal
02. Boolean Lattices V.K. Khanna
03. Engineering Mathematics-III Bhopinder Singh

NOTE : There shall be total Eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO311.1: Learn the concept of Laplace Transform, inverse Laplace transform of various function and its applications.
CO311.2: Understand the idea of Fourier transform, Fourier sine and cosine transform and their properties.
CO311.3: Understand the concept of special functions such as Bessel's functions and Legendre's polynomial and their relations.
CO311.4: Draw the circuits using properties of Boolean algebra.

CLASS: B.E. 3RD SEMESTER Hours/Week MARK

BRANCH : ELECTR. & COMM. ENGG,	L	T	P	Theory	Sessional
ELECTRICAL ENGG.,	3	2	0	100	50

COURSE TITLE : THERMAL ENGINEERING

COURSE NO: M-314

DURATION OF EXAMINATION : 3 HOURS.

UNIT-1

Thermodynamics: Dimensions and units, Basic concepts, Zeroth Law, Temperature scale. First Law of Thermodynamics for closed system and open system, applications, general energy equation for steady flow.

Second Law of Thermodynamics, Reversible and Irreversible processes, Carnot cycle, Clausius theorem, Entropy, entropy change, Clausius inequality, Principle of increase of entropy.

Ideal gases and process calculations.

UNIT-2

Principles of Refrigeration, Vapour compression cycle, Components of Vapour compression systems, COP and related calculations

UNIT-3

BOILERS: Fire tube and Water tube boilers- description and special features, fields of application.

UNIT-4

Properties of steam and process calculations.

Vapour Power Cycles: Carnot's cycle, Rankine cycle, and elementary cycle calculations.

Nozzles: Types, Nozzle efficiency, Critical pressure ratio, Throat and exit areas.

RECOMMENDED BOOKS :

1. Heat Engineering — Vasandani& Kumar--Metropolitan Book Co.
2. Engineering Thermodynamics — Gupta & Prakash--Nek Cahnd
3. Engineering Thermodynamics — PK Nag--Tata McGraw Hill

NOTE: There shall be total Eight questions, Two from each Unit. Five questions have to be attempted selecting at least One from from each Unit. Use of Steam tables, Mollier diagram, Refrigeration tables & charts and a scientific calculator will be allowed in the examination hall.

Course Outcomes	
After learning this course students will be able to:	
CO314.1:	Apply concepts of thermodynamics for evaluating the properties of fluids used in various industrial systems such as Mechanical power production by using engines; refrigeration and air conditioning.
CO314.2:	Identify, formulate and solve thermal engineering problems.
CO314.3:	Develop Intuitive problem solving technique.
CO314.4:	Demonstrate and conduct experiments, interpret and analyze data and report results.
CO314.5:	Encourage students to observe and distinguish the different thermodynamics around them and think creatively.

CLASS: B.E. 3RD SEMESTER
BRANCH: EE/ECE
COURSE CODE: EE-301
TITLE : PRINCIPLE OF ELECTRICAL ENGINEERING
DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	**T**	**P**	**Theory**	**Sessional**
3	**2**	**0**	**100**	**50**

SECTION-A

Electric Circuit Laws & Energy Sources : Basic electric circuit terminology, Ohm's law, Kirchoff's laws, Circuit parameters (Resistance, inductance & capacitance), series & parallel combination of resistance, inductance & capacitance. Ideal & practical voltage and current sources and their transformation. Dependent voltage sources and dependent current sources.

D.C. Circuit Analysis : Power and energy relations, analysis of series parallel D.C. circuits, Star-Delta transformation, Superposition theorem, Mesh & Nodal methods, Thevenin's theorem, Narton's theorem, Maximum power transfer theorem. Reciprocity Theorem

A.C. Circuit : Basic terminology and definition, Average and effective values of periodic functions, instantaneous and average power, Power factor. Phasor and complex number representation.

SECTION-B

A.C. Circuit Analysis: Solution of sinusoidally excited R, L, C circuits, Applications of Network theorems to A.C. circuits. Resonance in series and parallel circuits; quality factor.

Steady State A.C. 3-Phase Circuits : Concept of 3-phase voltage, Wye (y) circuits, Delta circuits current and voltage relations in Wye and delta circuits. Measurement of power in three phase balanced circuits.

Transformer : Construction, operating principle No-load and On-load vector diagrams, Equivalent circuit, regulation and efficiency calculations, Transformer test (open circuit & short circuit). All day efficiency.

RECOMMENDED BOOKS :

1. Electrical Engineering Fundamentals V. Del toro
2. Electrical Technology H.Cotton
3. Electrical Technology E.Hughes
4. Circuit Theory A.K.Chakorbarti

NOTE : There shall be total eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

COURSE CODE: EE-301 **TITLE: PRINCIPLE OF ELECTRICAL ENGINEERING**	
COURSE OUTCOMES: students will be able	
CO301.1	To define concepts of electric circuit terminology, circuit parameters, Kirchhoff's and Ohm's laws.
CO301.2	To solve circuits using electrical theorems and understand the basic terminologies in AC circuit along with the concept of resonance in series and parallel circuits..
CO301.3	To analyze the measurement of power in three phase star and delta connected balanced circuits
CO301.4	To attain knowledge about construction, operating principle, testing and application of transformer.

CLASS: B.E. 3RD SEMESTER
BRANCH: EE/ECE ENGINEERING
COURSE CODE: EE-302
TITLE : NETWORK ANALYSIS & SYNTHESIS
DURATION OF EXAM: 3 HOURS

Hours/ Week			**Marks Distribution**	
L	**T**	**P**	**Theory**	**Sessional**
3	**2**	**0**	**100**	**50**

SECTION-A

Conventions for describing networks : Reference directions for currents and voltages, conventions for magnetically coupled circuits, circuit topology.

First order differential equation : Differential equations as applied in solving networks, Application of initial conditions, evaluating initial conditions in networks.

Laplace Transformations : Solution of network problems with Laplace transformation, Heavisides Expansion theorem

Wave Form Analysis & Synthesis : The unit set up, ramp and impulse functions and their Laplace transforms, Initial and final value theorems, convolution integral, convolution as summation.

SECTION-B

Network Functions-poles and zeroes : Ports or terminal pairs, Network functions for one port and two port networks (ladder and general networks), Poles and Zeros of network functions, Restriction on pole and Zero locations for driving point and transfer functions. Time domain behaviour from pole Zero plot.

Two port parameters : Admittance, impedance, transmission and hybrid parameters, Relationship between parameter sets, parallel series & Cascade connection of two port Networks, Characteristics impedance of two port networks.

Filters : Filter fundamentals- pass and stop band, filter classification, constant K & m derived filters, Behaviour of characteristics impedance over pass & stop bands, design of filters.

Network Synthesis : Synthesis problem formulation, properties of positive real functions. Hurwitz polynomials properties of RC, LC and RL driving point, functions. Foster and Cauer synthesis of LC,RL and RC circuits.

RECOMMENDED BOOKS :

1. Network Analysis — Van Valkenberg
2. Network Analysis & Synthesis — F.F. Kuo
3. Introduction to Circuit Synthesis & Design — Temes& La Patra
4. Fundamentals of Network Analysis & Synthesis — Perikari
5. Network Theory & Filter Design — V. Atre
6. Network analysis and Synthesis — SudhakarShyam Mohan

NOTE: There shall be total eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

COURSE CODE: EE-302 **TITLE: NETWORK ANALYSIS & SYNTHESIS**	
COURSE OUTCOMES: Student will be able to	
CO302.1	Apply the knowledge of basic circuital law, dot convention and topological description of Electrical networks.
CO302.2	Acquire knowledge about the application of differential equation method and Laplace transform in electrical circuits.
CO302.3	Understand pole-zero configuration and determine parameters of two port network.
CO302.4	Understand concept and design of filters and synthesize circuits using Foster and Cauer forms.

CLASS: B.E. 3RD SEMESTER
BRANCH: EE/ECE ENGINEERING
COURSE CODE: EE-308
TITLE : ELECTRICAL AND ELECTRONICS WORKSHOPS
DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	T	P	Theory	Practical
0	0	3	0	50

SECTION-A

Study of Wires & Cables : Study of various type of wiring, Cost estimation for wiring of a single storied building having light & power circuits, Method of earthing& measurement of earth resistance, Electrical shock precautions & treatment, jointing of wires & cables, Soldering of joints, Wiring practices in PVC, Conduit system of wiring, Control of fluorescent lamp circuit power & ordinary circuits suitable for domestic wiring.

SECTION-B

Familiarization with Various Electronic Components : Resistor, Capacitors, Transistors, Diodes IC's, Transformer, Assembly of signal phase, Full wave rectifier circuit with capacitor filter, Assembling the common emitter amplifier circuit, Assembling the following circuit comprising of IC's on a bread board, Like timer circuit using IC 555 & Fabrication on General purpose PCB (to get familiar with soldering techniques).

BOOK RECOMMENDED :

1. Electrical Wiring & Estimation S.I. Uppal
2.

NOTE : The Electronic circuit diagrams will be provided to the students. The operation of the circuits will be explained. The purpose of the exercise is to familiarize the students Fabrication/Assembling of the given Electronic circuits and to solder the different components to form different Circuits.

COURSE OUTCOMES
After learning this course students will be able to:
CO308.1: Understand and apply the general lab safety rules.
CO308.2: Familiarize with different types of wirings and joints.
CO308.3: Study different methods of earthing.
CO308.4: Analyze different electronic components.
CO308.5: Design basic electronic circuits using soldering techniques.

CLASS: B.E. 3RD SEMESTER
BRANCH: ELECTRONICS & COMMUNICATION ENGG.

	Hours/Week		
COURSE NO: EE-309	**L**	**T** **P**	**MARK**
COURSE TITLE: PRINCIPLE OF ELECTRICAL ENGINEERING LAB.	**-**	**-**	**3**
			50

1) Verification of Kirchoff's Laws.
2) Verification of Superposition Theorem.
3) Verification of Thevinin's Theorem.
4) Verification of Reciprocity Theorem.
5) Verification of Maximum Power Transfer Theorem.
6) Measurement of current in various branches of RLC series-parallel circuit.
7) Single phase power measuring by using a Wattmeter.
8) Study of three-phase A.C Circuits with Star and Delta connected Load.
9) Study of single phase transformers. Determination of voltage Ratio, Turns Ratio and Polarity Test. Open circuit and short circuit test of given single phase transformer. Determination of regulation and efficiency.

COURSE OUTCOMES:
After learning this course students will be able to:
CO309.1: Experimentally verify the basic circuit theorems
CO309.2: Measure current in series-parallel RLC circuits.
CO309.3: Measure power dissipation in single phase circuit by using wattmeter.
CO309.4: Determine the turn's ratio and polarity test of single phase transformer.

UNIVERSITY OF JAMMU, JAMMU

COURSE SCHEME
FOR B.E. 4TH SEMESTER ELECTRONICS & COMMUNICATION ENGG.
FOR EXAMINATION TO BE HELD FOR BATCH 2014& ONWARDS

Course	Curriculum Hrs/Week	Marks

Course No.	Course Name	L	T	P	Theory	Sessional	Practical	Total
ECE-401	Electronic Devices & Circuits-II	3	2	0	100	40	--	140
MTH-411	Engg. Mathematics-IV	3	2	0	100	40	--	140
COM-411	Object Oriented Programming using C++	3	2	0	100	40	--	140
EE-411	Electrical Machines	3	2	0	100	40	--	140
M-413	Electrical Engg. Material	3	2	0	100	40	--	140
EE-413	Control System Theory & Applications	3	2	0	100	40	--	140
COM-412	Object Oriented Programming Lab	0	0	2/2	---	--	40	40
EE-408	Control System Lab	0	0	2/2	---	--	40	40
EE-412	Electrical Machine Lab	0	0	2/2	---	--	40	40
ECE410	Electronics Devices & Circuits-II Lab	0	0	2/2	---	--	40	40
	Total	**18**	**12**	**06**	**600**	**240**	**160**	**1000**

CLASS: B.E. 4TH SEMESTER
BRANCH: ECE, AEI
COURSE NO: ECE-401
TITLE: ELECTRONIC DEVICES AND CIRCUITS-II
DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
3	2	0	100	40

SECTION-A

TRANSISTOR BIASING: Introduction, Need for Biasing, Type of biasing circuits with necessary derivations, Load line concept (AC & DC), Bias stabilization (S, S' S"), Thermal runway, Bias Compensation Techniques, Numericals.

HYBRID PARAMETERS: Introduction, Two port network, hybrid model for CE, CB, & CC configuration with necessary derivations, Analysis of transistor CE amplifier with & without emitter resistance, Determination of h-parameters from characteristics, Miller theorem, approximation model of h-Parameter, Amplifiers and their analysis using h-parameters.

SECTION-B

SINGLE & MULTISTAGE AMPLIFIERS: Need for cascading, Two stage cascade amplifiers, N-stage cascade amplifiers, Gain of multistage amplifiers in decibels, Techniques for improving input resistance (Darlington transistor, Bootstrap emitter follower amplifiers), Method of coupling multistage amplifiers (RC coupling, DC coupling, transformer coupling), Frequency response of an amplifiers, Effect of emitter & bypass capacitors on the bandwidth & frequency response of a cascaded amplifiers, Square wave testing of an amplifier, Bandwidth of multistage amplifiers.

Feedback Amplifier: Classification of amplifiers, Limitation of basic amplifier, Distortion in amplifier, need for feedback, Feedback concept, Advantages of negative feedback, Ways of introducing negative feedback in amplifiers, Gain with & without feedback, Effect of negative feedback on input, output resistance & bandwidth of the amplifiers, Their respective analysis for feedback amplifiers, Procedure for analysis of feedback amplifiers, Analysis of different Topologies.

BOOKS RECOMMENDED:

1. Integrated Electronics — MillmanHalkais
2. Electronics Devices — Bolystead
3. Electronics Devices — Malvino Leach
4. Microelectronics — Sedra& Smith

NOTE: There shall be total eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO401.1: Have concept of biasing, its need and types along with necessary derivations, load line concepts, bias stabilization techniques.
CO401.2: Understand h-model for different transistor configurations and analyse amplifiers using h-parameters.
CO401.3: gain knowledge for need of cascading, its frequency response and different coupling methods for multistage amplifiers.
CO401.4: Classify amplifiers on the basis of different parameters (Volt. Gain, Current gain etc.), have feedback concept and analyse different topologies.

CLASS: B.E. 4TH SEMESTER **MARKS**

BRANCH: ECE, EE **L T P Theory Sessional**

COURSE NO: MTH--411 3 2 0 100 40
COURSE TITLE: ENGINEERING MATHEMATICS - IV
DURATION OF EXAM: 3 HOURS

SECTION - A

THEORY OF COMPLEX VARIABLES: Functions of a complex variable, Limits, Continuity, Derivative, Analytic function, Cauchy-Riemann equations, Conformal mappings, Standard Transformation, Bilinear transformation, Line integral, Cauchy's theorem, Cauchy's integral formula, Cauchy's inequality, Liouville's theorem, Taylor and Laurent series expansions, Poles and singularities, Contour integration, Residue theorem, Evaluation of Real Integrals using residue theorem, and Contour integration.

SECTION - B

NUMERICAL METHODS: Definition of operators, Finite and divided difference, Newton's and Lagrange's Interpolation formulas, Numerical differentiation and Numerical integration, Trapezoidal and Simpson's one-third Rule.

Numerical Solutions of Algebraic and Transcendental Equations by Regula Falsi, Newton-Raphson and direct iterative methods, Solution of difference equations, solution of differential equations by Picard's method, Euler's method, Modified Euler's method, Taylor's method, Runge-Kutta method.

BOOKS RECOMMENDED:

01.	Advance Engineering Mathematics	by Jain &Iyengar
02.	Numerical Methods in Engg. & Science	by B.S. Grewal
03.	Difference Calculus (New Edition)	by S.C. Sexena
04.	Engineering Mathematics	by S.S. Sastri

NOTE: There shall be total Eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO411.1: Find limit, continuity, differentiability of a function in a plane.
CO411.2: Calculate the integrals using residue evaluation instead of actual complicated calculation.
CO411.3: The basics of Operators and their types.
CO411.4: To obtain the values of function at a given point within the given data by using certain method of Interpolation
CO411.5: Find out the exact real root of algebraic and transcendental equations.

CLASS: B.E. 4TH SEMESTER
BRANCH: ELECTRONICS & COMMUNICATION ENGG.

				MARKS	
COURSE TITLE : OBJECT ORIENTED PROGRAMMINGC++	**L**	**T**	**P**	**Theory**	**Sessional**
	3	**2**	**0**	**100**	**40**

COURSE NO. COM –411
DURATION OF EXAM: 3 HOURS

SECTION - A

1. **Review of Pointers:** Passing parameters, Array of Pointers, Character Pointers. Programming Techniques: Unstructured, Procedural, Modular. Introduction to objects, object & cohesion. (30)

3. Overview of C++, Object Oriented programming, Encapsulation, Polymorphism, Inheritance, Console I/O, C++ Comments.
Classes, Metaclass, Abstract class, Public and private variables, Constructor and Destructor Functions, Constructors taking parameters, Object pointers, In-Line Functions, Automatic Inlining, Friend Functions, This Pointer, New & Delete, Array of Objects. (50)

SECTION-B

1. Function Overloading, Overloading Constructor Functions, Operator overloading, Overloading Binary and Unary Operators, Overloading Relational & logical Operators. (30)
2. Inheritance, Using Protected Members, multiple inheritance, Virtual Base Classes, Introductionto Virtual Functions. (30)
3. C++, I/O Basics, Ifstream, Ofstream, Fstream, Open(), Close(), EOF(), Binary I/O, Get(), Put(), Read(), Write(), Random Access, Seekg(), Seekp(), Tellg(), Tellp(). (20)

BOOKS RECOMMENDED:

1. Turbo C++ by Robert Lafore**.**

REFERENCE BOOKS:

1. Programming in C++ by Balaguruswamy.
2. C++ the Complete Referance by Herbert Schildt.
3. Mastering C++ by K.R. Venugopal& T. Ravishankar& Raj Kumar**.**

NOTE: There shall be total Eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO411.1: Understand the difference between structured programming approach and object oriented programming approach.
CO411.2: Acquire Knowledge in developing object oriented solutions to problems bylearning the usage of data abstraction, encapsulation, and inheritance.
CO411.3: Design and implement programsusing classes and objects.
CO411.4: Understand the concept of inheritance, polymorphism and file related operations.
CO411.5: Apply the concepts of OOPS real-time application development.

CLASS: B.E. 4TH SEMESTER
BRANCH: ELECTRONICS & COMMUNICATION ENGG.

COURSE TITLE: ELECTRICAL MACHINES	**L**	**T**	**P**	**Theory**	**MARKS Sessional**
COURSE NO. EE –411	**3**	**2**	**0**	**100**	**40**

DURATION OF EXAM: 3 HOURS

SECTION - A

D.C. GENERATORS: Operating principle, constructional features, E.M.F equation, Armature reaction and commutation, operating characteristics losses and efficiency.

D.C. MOTORS: Operating principle, back EMF, Torque equation, Starters, speed control, operating characteristics, and their applications.

TRANSFORMERS: Principle of operation, Vector diagram, Regulation efficiency parallel operation tap changing auto transformer.

SECTION - B

SYNCHRONOUS GENERATORS: Principle of operation, E.M.F equation, Leakage reactance, Vector diagram, Voltage regulation by EMF and MMF method.

SYNCHRONOUS MOTORS: Principle of operation, Vector diagram, V-curves and invertedV-curves, method of starting and their applications.

INDUCTION MOTORS: Principle of operation, TYPES OF MOTORS, Equivalent circuits, Torque and power calculations, No load and blocked rotor test, speed control, Method of starting and their applications.

SPECIAL A.C. MACHINES: Repulsion motors, A.C series motors, Universal motor, single phase induction motor and their applications.

BOOKS RECOMMENDED:

1) Theory of A.C Machines — A. Langsdrof
2) Principles of D.C. Machines — Clayson and Hancock

3) Performance and design of A.C Machines M.G. Say

4) Advanced Electrical Technology H.A. Cotton

NOTE: There shall be total eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO411.1: To acquire knowledge about the construction and operating characterstics of DC machines.
CO411.2: To identify the relation between transformer and autotransformers..
CO411.3: To understand the principle of operation, testing and speed control of synchronous machines as generators and motors.
CO411.4: o analyse the application of special machines in various fields with their working principle.

CLASS: B.E. 4TH SEMESTER
BRANCH: ELECTRONICS & COMMUNICATION ENGG.

COURSE TITLE: ELECTRICAL ENGINEERING MATERIALS	**L**	**T**	**P**	**Theory MARKS**	**Sessional MARKS**
	3	**2-**		**100**	**40**

COURSE NO. M –413
DURATION OF EXAM: 3 HOURS

UNIT-1

Classification of Engineering materials (with special reference to Electrical and Electronics engineering materials), Engineering requirements of materials.
Crystal structure--space lattice, Bravais lattice, Miller indices of cubic and hexagonal systems, closed-packed plane and directions, Packing in solids, voids, diamond cubic structure, packing in conic solids, crystal imperfections, point defect, line defect, surface defects (in brief).

UNIT-2

Solid solutions, Hume-Rothery rule, phase diagrams, binary phase diagrams, Fe-C phase diagrams, Alloys, alloys transformations, properties of various alloys, applications of Iron –silicon, Iron-nickel and Iron-cobalt alloys, heat treatment processes- annealing, normalizing, hardening, case-hardening etc.

UNIT-3

Conductors, Free electron theory, equation of conductivity, conducting materials, material requirement for contact resistors, precision resistors, thermometers, heating elements, transmission line etc.

Semi-conductors, Band theory, equation for conductivity, zone theory (for explaining energy gaps), types of semi-conductors, semi-conductor materials, method of glowing, technique for producing single crystal, zone referring technique.

UNIT-4

Magnetism, types of magnetisms, dipole moment, domains, ferrimagnetism, anti-ferromagnetism, ferrite magnets, soft and hard magnetic materials and heat treatment cycles.

Dielectric materials, polarization, types, dielectric strength, dielectric losses etc., Piezo-electric effect, ferro-electric materials, optical properties of materials.

RECOMMEENDED BOOKS :

1. Electrical Engineering Materials — AJ Dekker.
2. Material Scince and Engineering — V Rahghvan.
3. Electrical Engineering Materials — PC Kapoor.
4. Electrical Engineering Materials — NITTTR, Madras

NOTE: There shall be total Eight questions, Two from each Unit. Five questions have to be attempted selecting at least One from each Unit. Use of calculator is allowed.

COURSE OUTCOMES	
After learning this course students will be able to:	
CO413.1	Understand the mechanical behavior of materials and calculations of same using appropriate equations.
CO413.2	Understand and suggest the heat treatment process and types, significance of properties vs. microstructure, surface hardening and its types.
CO413.3	Explain features, classification, applications of newer class materials like smart materials, piezoelectric materials, biomaterials, optical materials, composite materials, magnetic materials.
CO413.4	Understand the functioning of conducting materials and magnetic materials and apply them in practical life and also understand the concept of conduction theory and their involvement in practical lives.
CO413.5	Explain the concept of phase and phase diagram and understand the basic terminologies associated with metallurgy.

	Hours/ Week			Marks Distribution	
CLASS: B.E. 4TH SEMESTER					
BRANCH: ECE ENGINEERING	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE CODE: EE-413	**3**	**2**	**0**	**100**	**40**

TITLE: CONTROL SYSTEMS-THEORY AND APPLICATION

DURATION OF EXAM: 3 HOURS

SECTION-A

Introduction to Linear Control System: Control Systems, types of control systems, feedback and its effects, mathematical modeling of physical systems.

System Representation: Block diagrams, representation of control systems, transfer functions, signal flow graphs, polar and Bode plot representation of loop gains of control systems.

Time Domain Analysis of Control Systems: Time domain analysis of 1^{st}& 2^{nd} order Control systems. Typical test signals for time response of control systems, time domain performance of first and second order control systems (steady state response and transient response).

Introduction to compensators: Introduction to phase lead, phase lag & phase lag-lead networks and their applications. Introduction to P, PI and PID controllers.

SECTION-B

Analysis of Linear Feedback Systems: Stability characteristic equation, state transition matrix, stability of linear time invariant systems, Rough-Hurwitz stability Criterion, Root locus plot, Bode plot, Niquest Criterion .

Frequency Domain Analysis of Control Systems: Frequency domain characteristics second order systems relative stability, graphic methods of determining gain margin and phase margin, Nicholas chart.

Control Components: General block diagram of a control system, a.c. and d.c. Servomotors, a.c. tachometer, synchro transmitter and receiver, stepper motor.

Adaptive Control: Introduction, modal reference adaptive control systems, controller structure, self tuning regulators.

Introduction to Modern Control Theory: State equations, State transition Matrix, State transition equations, State diagrams, Concept of controllability and observability.

RECOMMENDED BOOKS:

1. Modern Control Engineering — K.Ogatta
2. Automatic Control Systems — B.C. Kuo
3. Control System Engineering — Nagrath and Gopal
4. Digital Control and State variable methods — M. Gopal

NOTE: There shall be total eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

COURSE OUTCOMES
After learning this course students will be able to:
CO413.1: : Understand feedback control system and determine the transfer function by using block reduction technique and signal flow graph
CO413.2: Obtain the time response, steady state error analysis and analysis of compensators..
CO413.3: Compute the gain and phase margin from different plots with the concept of stability.
CO413.6: Understand the concepts of a state space model for a dynamic system.

CLASS: B.E. 4TH SEMESTER	**L**	**T**	**P**	**MARKS**
BRANCH: ELECTRONICS & COMM. ENGG.	**-**	**-**	**2/2**	**40**

COURSE TITLE: OBJECT ORIENTED PROGRAMMINGLAB.

COURSE NO. COM-412

The Practicals will be based on Computer Languages Theory Syllabus. The students are required to submit at least 10 Programs covering at least 2 programs from each unit

COURSE OUTCOMES
After learning this course students will be able to:
CO412.1: Develop solutions for a range of problems using objects and classes.
CO412.2: Write code for implementation of constructors, destructors and operator overloading.
CO412.3: Apply fundamental algorithmic problems including type casting, inheritance.
CO412.4: Write code for achieving run time polymorphism using virtual functions.
CO412.5: Implement the concepts of generic programming, templates, file handling using C++.

CLASS: B.E. 4TH SEMESTER
BRANCH: ELECTRONICS & COMM. ENGG. **L T P MARK**
COURSE TITLE: CONTROL SYSTEM LAB. **- - 2/2 40**
COURSE NO. EE - 408

1. Transient response of Second order system comprising R.L&C finding therefore maximum overshoot, rise time, settling time, damping factor/ratio natural undamped frequency.
2. Frequency response of a first order and second order system comprising RC, RLC and draw the Bode plots and Nyquist Plots.
3. Transient response of a first, second and higher order Pneumatic servo system.
4. Transient response of a first, second and higher order Hydraulic system.
5. To find the torque speed, torque voltage characteristics of a servo motor and determine its transfer function.
6. Study of synchros, transmitter, receiver and control transformer. Voltage angular wave forms and zeroing.
7. To simulate a second and higher order system on an analog simulator and find its transient response to step, ramp and other input functions.
8. Study of a demonstration servo system (both open & closed) loop comprising error detector, amplifier, a motor cum load having a tachofeed back.
9. Study of phase lag and phase lead networks.

Course Outcomes
After learning this course students will be able to:
CO408.1: Understand transient response of Second & higher order order systems practically.
CO408.2: Understand frequency response of a first order and second order system with Bode Plots & Niquist Plots.
CO408.3: Demonstrate servo system, phase lag & phase led networks.
CO408.4: Find torque speed, torque voltage characteristics of servo motor.

CLASS: B.E. 4TH SEMESTER
BRANCH: ELECTRONICS & COMM. ENGG. **L T P MARKS**
COURSE TITLE: ELECTRICAL MACHINE LAB. **- - 2/2 40**
COURSE NO. EE - 412

1. To study the magnetic characteristics of a D.C. Machines at various operating speeds and finds the operating point of D.C. shunt machine from the same.
2. To determine the load characteristics of a D.C. Shunt generator and find its overall efficiency.
3. To determine the Torque speed characteristics of a D.C. Shunt motor and compound motor (Short & long shunt). Also study of these using armature control and field control.
4. To study the torque/speed characteristics of a D.C. series motor using various field tappings.
5. To find the efficiency and study various losses of D.C. Machines using Hopkinson test.

6. To study a single phase transformer, its Voltage ratio and turns ratio relationship. Perform open & short circuit test to determine losses, efficiency and voltage regulation and also its various parameters.
7. To perform polarity test on single phase transformers for parallel operation and study the load sharing of two parallel operated transformers.

COURSE OUTCOMES	
After learning this course students will be able to:	
CO406.1	Identify the parts of cut-sectional model of D.C. machines.
CO406.2	Study the operating characteristics of D.C. machines.
CO406.3	Perform the turn's ration and polarity test on single-phase transformer.

CLASS: B.E. 4TH SEMESTER **L T P MARK**
BRANCH: ECE, EE, AEI **- - 2/2 40**
COURSE NO: ECE-410
COURSE TITLE: ELECTRONICS DEVICES & CIRCUITS-II LAB
DURATION OF EXAM: 3 HOURS

LIST OF PRACTICALS

1. To study the operation characteristics of the P.N. junction, Ge /Si (Forward & Reverse Characteristics).
2. To study the operation characteristics of Zener diode (Forward & Reverse Characteristics).
3. Half wave Rectifier.
4. Full wave / Bridge Rectifier.
5. To study the operation characteristics (Input/Output) of PNP/ NPN Transistor (Common Emitter/Common Base).
6. To study the frequency response of signal amplifier (CE/CB).
7. To study the characteristics of FET.
8. Determination of h parameter from transistor characteristics.
9. Design of self Bias circuits using BJT.
10. Design of self Bias circuits using FET.

COURSE OUTCOMES
After learning this course students will be able to:
CO410.1: Plot forward and reverse characteristics of silicon and zener diodes.
CO410.2: Fabricate half and full wave rectifiers and evaluate their performance parameters.
CO410.3: Plot the characteristics of FET using trainer kits.
CO410.4: Plot V-I characteristics of transistor for various configurations using trainer kit.

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COURSE SCHEME
FOR B.E. 5TH SEMESTER ELECTRONICS & COMMUNICATION ENGG.
FOR EXAMINATION TO BE HELD FOR BATCH 2014& ONWARDS

Course		Curriculum Hrs/Week			Marks			
Course No.	**Course Name**	**L**	**T**	**P**	**Theory**	**Sessional**	**Practical**	**Total**
ECE-501	Electronic Devices & Circuits-III	3	2	0	100	40	--	140
ECE-502	Communication Engg.-I	3	2	0	100	40	--	140
ECE-503	Digital Electronics	3	2	0	100	40	--	140
ECE-504	Linear Integrated Circuits	3	2	0	100	40	--	140
ECE-505	Random Process & Noise	3	2	0	100	40	--	140
EE-511	Transmission & Distribution of Electrical Power	3	2	0	100	40	--	140
ECE-511	Electronics Devices & Circuits-III Lab	0	0	2	---	--	40	40
ECE-512	Digital Electronic Lab	0	0	2/2	---	--	40	40
ECE-513	Linear Integrated Circuits Lab	0	0	2	---	--	40	40
EE-512	Transmission & Distribution of Electrical Power Lab	0	0	2/2	---	--	40	40
Total		**18**	**12**	**06**	**600**	**240**	**160**	**1000**

CLASS: B.E. 5TH SEMESTER
BRANCH: ECE, AEI

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
3	2	0	100	40

COURSE CODE: ECE-501
TITLE: ELECTRONIC DEVICES ANDCIRCUITS-III
DURATION OF EXAM: 3 HOURS

SECTION-A

Sinusoidal Oscillators: Introduction, Necessity of oscillator, Gain with feedback, Barkhausein criteria, Requirements of oscillator, Types of oscillators, RC oscillators & phase shift oscillators, Wien bridge oscillators, LC oscillators, with necessary derivations to determine gain required for oscillation & frequency of oscillation, Amplitude & frequency stability of oscillators, Crystal oscillators, Multivibrators: Monostable, Astable, Bistable, (with necessary derivations), using transistors.

Tuned and Power Amplifiers: Introduction, General features of power transistor, Difference between power transistor & a voltage amplifier, Need for power amplifier, Classification of power amplifiers with necessary load lines concept & derivations (Efficiency,power dissipation), Class A, B & AB amplifier, their types & analysis, Cross over distortion & its remedy, Determination of harmonic distortion, Heat sinking for power transistor, Monolithic power amplifier, Tuned amplifier-Introduction, Classification of tuned amplifiers (single tuned & double tuned) with respective analysis.

SECTION-B

Voltage Regulators: Introduction & necessarily of voltage regulators, Difference between unregulated & regulated power supply, Factor affecting unregulated power supply, Stabilization, Basic representation of voltage regulators Type of voltage regulators-series & shunt voltage regulators, Series voltage regulators using emitter follower & its expressions for Sv& Ro, Preregulators, Short circuit protection-simple & fold back current limiting, Zener regulators, & its analysis, Monolithic & IC regulators(78XX,79XX,LM317,LM337) and design, Switching Regulator

Transistor at High Frequencies: Introduction, Hybrid (Pie) model, Relation between hybrid pie & h-parameters, Validity of hybrid-pie-model, Variation of hybrid-pie-parameters, Current gain with & without resistive load, Gain bandwidth product, Single stage CE transistor amplifiers response, Emitter Follower at high frequency, Common Drain amplifier at high frequency.

BOOKS RECOMMENDED:

1. Integrated Electronics MillmanHalkias
2. Electronics Devices Boylstead
3. Electronics Devices Malvino Leach
4. Microelectronics Sedra& Smith

NOTE: There shall be total eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

Course Outscomes

After learning this course students will be able to:
CO501.1: Understand the concept behind need and design of oscillator
CO501.2: Determine gain and frequency of oscillations generated, need and design of multivibrators (astable, monostable and bistable)
CO501.3: The design of various power amplifiers and tuned amplifiers, concept of distortions is understandable to the students
CO501.4: Get the concept of series, shunt , monolithic and IC regulators is clear and concept is being applied in the design
CO501.5: To get the knowledge of high frequency model, the response of Common emitter amplifier theoretically as well as practically.
CO501.6: Understand the emitter follower and common drain amplifier at high frequency

CLASS: B.E. 5TH SEMESTER **MARKS**

BRANCH : ECE	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE NO: ECE-502	**3**	**2**	**0**	**100**	**40**

COURSE TITLE : COMMUNICATION ENGG- I

DURATION OF EXAM: 3 HOURS

SECTION-A

AM Modulation: Introduction to Elect. Comm. System, Concept & need for modulation, Definition of signal to noise ratio & noise figure, periodic & non-periodic signals, Spectral analysis of signal- Fourier series & Fourier Transforms, Representation of AM, Frequency spectrum of AM wave, Power relation in AM wave, Modulation & Demodulation of AM, SSB techniques, Balanced modulator, Type of SSB including VSB, ISB, Modulation & Demodulation of SSB signals.

Angle Modulation: Theory of FM, Representation & frequency spectrum of FM, Pre-Emphasis, De-Emphasis, Wide band & Narrow band FM, Generation & detection of FM signal, Comparison with PM & AM.

Receiver: TRF receivers, Superhetrodyne receiver, Receiver characteristics- sensitivity, selectivity, Image frequency & its Rejection, Double spotting.

SECTION-B

Pulse Modulation: Techniques,sampling theorem, Natural & flat top sampling, principle, generation & detection of PAM, PWM, PCM, DM, ADM, Time division multiplexing, Frequency division multiplexing.

T.V. Engg: Element of a T.V systems, Pick up & Display tube of monochrome T.V Image Continuity-Interlace scanning, VSB modulation & its need in T.V. system. Essential of colour T.V. Three colour theory, Luminance Hue & saturation, Pick up (i.e Camera) & Display tube of colour T.V system.

BOOKS RECOMMENDED :

01. Electronics Comm. System By G. Kennedy
02. Principles of Comm. System By Taub& Schilling
03. Monochrome &Coloured T.V. By R.R. Gulati

REFERENCE BOOK :

Communication System By Simon Haykins

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO 502.1: Analyze and demonstrate the block diagram of Electronic Communication System
CO 502.2: Describe different types of signals and find their Fourier Transform. Also understand its importance in communication system
CO 502.3: Evaluate Analog and pulse modulated signals in time and frequency domain
CO 502.4: Calculate Bandwidth and power requirement in Analog communication system
CO 502.5: Analyze different characteristics of superheterodyne receiver
CO 502.6: Understand fundamental concepts of Television system

CLASS: B.E. 5TH SEMESTER
BRANCH: ECE / EE
COURSE NO: ECE-503
COURSE TITLE: DIGITAL ELECTRONICS
DURATION OF EXAM: 3 HOURS

	Hours/ Week			Marks Distribution	
	L	**T**	**P**	**Theory**	**Sessional**
	3	**2**	**0**	**100**	**40**

SECTION-A

Number System, Radix conversion, Arithmetic with base other than ten, Data representation–fixed & floating points, Binary codes – weighted/Non weighted codes, Error detecting & correcting code (Hamming code), Alphanumeric code, Subtraction of signed/unsigned number.

Logic Gates, Boolean algebra, Simplification of Boolean expressions, Minimization techniques, Karnaugh map (up to five variables), Simplification of Logic families – RTL, DTL, TTL, ECE & MOS families and their characteristics.

SECTION-B

Combinational logic circuits: Half and Full adders, Subtractors, BCD Adder, Comparators, Multiplexer, Realization of function using MUX, Demultiplexer, Decder, Encoder, Code converters, General problems, PLA, Design of combinational circuit using PLA & PAL.

Introduction to sequential logic circuits, Synchronous and Asynchronous operation, Flip-Flops– R-S, J-K, D, T & Master-Slave flip-flop, Conversion of flip-flops, Shift registers, Analysis of asynchronous & synchronous sequential counter, Design of sequential logic circuits, Problem formulations, State minimization techniques.

NOTE: There shall be total 8 questions, four from each section. Five questions have to be attempted by the students selecting atleast two questions from each section**.**

Books Recommended:

01. Digital Electronics By R.P Jain

02. Digital Electronics & Microcomputer By R.K. Gaur

03. Computer System Architecture By M.M. Mano

04. Digital Electronics By Jamini& K.M. Backward

COURSE OUTCOMES (CO'S)
After learning this course students will be able to:
CO503.1: Understand and examine various number systems to be used in digital design
CO503.2: Minimize the expressions using karnaugh map up to five variables and implement them using logic gates in different logic families
CO503.3: Analyze and design various combinational and sequential circuits
CO504.4: Formulate problems and simplify with state minimizing techniques

CLASS: B.E. 5TH SEMESTER
BRANCH: ECE/AEI
COURSE CODE: ECE-504
TITLE: LINEAR INTEGRATED CIRCUITS
DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	**T**	**P**	**Theory**	**Sessional**
3	**2**	**0**	**100**	**40**

SECTION-A

Basic Operational Amplifiers: Basic differential amplifiers, Its working & types, Transfer characteristics, Small Signal analysis of differential amplifier, using h-parameter, Differential Gain & Common-Mode Gain, Constant Current basic circuit, Constant Current source/Current mirror circuit, Level shifting techniques, Active load, Output stage.

Ideal & Practical Op-Amp & Characteristics: Block diagram, characteristics of ideal &practical operational amp, Ideal voltage transfer curve, Open loop Op-amp configurations, Op-Amp as inverting, Non-inverting amplifier, Differential amplifiers using one and two Op-Amp, Op-amp Characteristics, Measurement of Op-amp parameters, Offset voltage compensating N/W, Frequency response of internally compensating Op-amp, High frequency Op-Amp equivalent circuit, Open loop & close loop frequency response, Circuit Stability, Slew rate and its cause.

SECTION-B

Op-Amp & Applications: DC & AC Amplifier, AC amplifier with single power supply, Peaking amplifier, Summing, Scaling & Averaging amplifiers using inverting/Non-inverting Configurations, Differential input / Differential output amplifier, High input impedance circuit, Active filters,

Integrator, Differentiator, Instrumentation amplifier,

Op-Amp circuits and Waveform generators: Square, Triangular, Saw tooth, Sine wave generator, Op-amp, as clipper, Clamper & comparator circuits, Sample and hold circuit, Comparator characteristics, Voltage limiter, Peak detector, comparators, zero crossing detector, Schmitt trigger, Digital to Analog Converter, Binary Weighted Resistor, R-2R Resistor type D/A Converters, A/D Converters & its types; Dual slope, Successive approximation & Counter type A/D Converter

Phase-Locked Loops & 555 Timers: Block diagram, Operations and their applications

BOOKS RECOMMENDED:

1. Op-Amp & Linear Integrated Circuit — Ramakant A. Gayakwad
2. Linear Integrated Circuit — Wixer
3. Linear Integrated Circuit — Tobey Graeme &Huelsomen
4. Op-Amp Design Application — Dailey
5. Design with Op-Amp — Franco

NOTE: There shall be total eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

COURSE OUTCOME (CO'S)
After learning this course students will be able to:
CO504.1: Understand the theoretical and the circuit aspects of operational amplifier.
CO504.2: Understand the DC and AC characteristics of operational amplifier and its effect on output.
CO504.3: Design the liner and non liner applications of an op amp for special applications.
CO504.4: Classify and comprehend the working principle of data converters.
CO504.5: Illustrate the function of application specific IC's such as voltage regulators, PLL etc. for application in communication.

CLASS: B.E. 5TH SEMESTER
BRANCH: ECE
COURSE NO: ECE-505
COURSE TITLE: RANDOM PROCESSES & NOISE
DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	**T**	**P**	**Theory**	**Sessional**
3	**2**	**0**	**100**	**40**

SECTION-A

Spectral Analysis: Fourier series, Representation of Signal & System, Sampling function, Response of a linear system, Normalised power, Power spectral, Density, Fourier transform, convolution,

Perseval's theorem, Correlation (Auto & cross)

Random Variable & Processes: Probability, Random variable, Probability density function, Variance, Tchebvcheff's inequality, Gaussian probability density, Rayleigh probability density, Correlation between random variable, Central-limit theorem, random process.

SECTION-B

Noise : Source of Noise, Type of Noise, Frequency domain representation of Noise, Superposition of Noise, Mixing involving Linear filtering, noise effect of a filter on spectral density of Noise, Noise bandwidth, quadrature components of Noise, Resistor Noise, Noise temperature, Noise filter, Probability of error, Optimum filter, White Noise, The matched filter, Probability of error of the matched filter.

Information Theory: Discrete Messages, The concept of amount of information, Entropy,Source coding:ShannonFano algorithm and Hoffman coding Shannon's theorem, Channel-Capacity, Bandwidth & S/N tradeoff, information rate, Capacity of a Gaussian channel.

NOTE : There shall be total 8 questions, four from each section. Five questions have to be attempted by the students selecting atleast two questions from each section**.**

BOOK RECOMMENDED :

01.	Principle of Communication System	Taub& Shilling
02.	Communication System	Lathi
03.	Communication System	Haykin

REFERENCE BOOK :

01.	Random Process	Peebles
02.	Communication System	Singh &Sapre

Course Outcomes
After learning this course students will be able to:
CO505.1: Characterize properties of signals and find Fourier transform of these
CO505.2: Understand the axioms of probability theory and characterize the various models
CO505.3: Describe different types of noise, its properties and find its spectrum
CO505.4: Find probability of error of various digital communication system
CO505.5: Determine equation for entropy, mutual information. Able to apply the knowledge to find source code of digital sources

CLASS: B.E. 5TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: EE-511
TITLE: TRANSMISSION ANDDISTRIBUTION OF ELECTRICALPOWER
DURATION OF EXAM: 3 HOURS

Hours/ Week			**Marks Distribution**	
L	**T**	**P**	**Theory**	**Sessional**
3	**2**	**0**	**100**	**40**

SECTION-A

D.C. & A.C. Distribution Systems: Introduction to a Power System (an overall view).Distribution systems- Feeder, Distributors, service mains. Classification of distribution system, various types of D.C. and A.C. distributors .Voltage drop calculations.

Transmission lines: Types of conductors, bundling of conductors, skin effect, proximity effect. Inductance and capacitance of single phase, 3-phase, single circuit and double circuit lines.

Insulators: Materials for insulators, types of insulators, potential distribution over a string of suspension insulators, methods for equalizing the potential.

SECTION-B

Cables: Insulating materials for cables, classification of cables, insulation resistance and capacitance of single core cable. Dielectric stress, grading of cables, capacitance of 3- core cables, current carrying capacity of underground cables, methods of laying of underground cables.

Corona: Visual and critical disruptive voltage, conditions effecting corona, power loss due to corona, practical consideration.

Sub-stations: Types of substations, key diagrams.

RECOMMENDED BOOKS:

1. Electric Power System — C.L. Wadhwa
2. Transmission and distribution of Electrical Energy — H. Cotton
3. Elements of power system Analysis — W.D. Stevenson
4. Modern Power System Analysis — Nagrath& Kothari
5. A Course in Electrical Power — Soni,Gupta and Bhatnagar

NOTE: There shall be total eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

COURSE OUTCOMES (CO's)
After learning this course students will be able to:
CO511.1: The awareness of general structure of power system and enable the students to do analysis of different types of distribution systems.
CO511.2: Knowledge about the over-head transmission line conductors, underground cables and insulators, their characteristics.
CO511.3: The ability to compute various parameters related to underground cables .
CO511.4: The awareness about the effect of corona and the functioning of various substations

CLASS: B.E. 5TH SEMESTER

BRANCH: ECE/AEI	**L**	**T**	**P**	**PRACTICAL**
COURSE NO: ECE-511	**0**	**0**	**2**	**40**

COURSE TITLE: E.D.C LAB

DURATION OF EXAM: 3 HOURS

LIST OF PRACTICAL :

01. Determination of voltage gain, Input/output resistance of amplifiers using with & without feedback.
02. Determination of Distortion output power in case of push pull class-B amplifier.
03. Determination of frequency response of class-C tuned amplifier.
04. Study of signal stage class-A power amplifier & determine output power & efficiency.
05. Study of complimentary symmetry push pull amplifier.
06. Design & determination of stability factor series of zener shunt Regulator / IC Regulator.
07. Design of voltage regulator using series pass transistor.
08. Study of Collpitt, Clapp, Hartley, Weinbridge, Phase regulator & Determine the frequency of output waveform.

COURSE OUTCOMES
After learning this course students will be able to:
ECE 511.1: Calculate the voltage gain, resistance calculation at input and output using feed back and without feed back
ECE 511.2: distortion out put calculation at the output of Class B amplifier
ECE 511.3: plot the frequency response of class c amplifier
ECE 511.4: calculation of output power and efficiency of a class A amplifier
ECE 511.5: study the output in case of push pull amplifier
ECE 511.6: study stability factor for zener, shunt and IC regulators
ECE 511.7: designing of voltage regulator using series pass transistor
ECE 511.8: determine the output of collpitt clapp hartley wein bridge in frequency form

CLASS: B.E. 5TH SEMESTER
BRANCH: ECE/EE
COURSE NO: ECE-512
COURSE TITLE: DIGITAL ELECTRONIC LAB
DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	**T**	**P**	**Theory**	**Practical**
0	**0**	**2/ 2**	**0**	**40**

LIST OF PRACTICAL :

01. Verification of truth tables of logical gates AND / OR / NOT, NAND, NOR, EXOR, EXNOR, gates.

02. Implementation of Boolean expression using AND, OR, NOT, NAND, & NOR logic.
03. Implementation of Decoder, Encoder using IC's & gates.
04. To implement half adder, half subtractor, full adder, full subtractor using different IC's & gates.
05. Implementation of multiplexer, Demultiplexer using IC's & gates.
06. Design of BCD to seven segment display using logical gates & IC's.
07. To design & verification of truth table of SR, JK, MS-JK Flip Flops.
08. To design various asynchronous counters using flip flops, gates & IC's.
09. To design various synchronous counters using flip flops, gates & IC's.
10. To design &verify the Truth tables of shift Registers.

COURSE OUTCOMES (CO's)
After learning this course students will be able to:
CO512.1: Implementation and verification of Boolean expressions using logic gates.
CO512.2: Design and implementation of various combinational circuits using digital IC's.
CO512.3: Design seven segment decoder using logical gates.
CO512.4: Design and implementation of various sequential circuits using digital IC's.

CLASS: B.E. 5TH SEMESTER

BRANCH: ECE	**L**	**T**	**P**	**PRACTICAL**
COURSE NO: ECE-513	**0**	**0**	**2**	**40**

COURSE TITLE: L.I.C LAB
DURATION OF EXAM: 3 HOURS

LIST OF PRACTICAL :

01. Design of OP-amp as closed loop Inverting, Non-Inverting, amp voltage follower & Inverter.
02. Design of Op-Amp as summer, Scaling, Averaging using Inverting amplifier & Non-Inverting amplifier.
03. Design & study of Op-Amp as clipper, clamper circuit.
04. Design of Op-Amp as Square wave generator.
05. Design of Op-Amp as Integrator & Differentiator.
06. Design of Op-Amp as low pass filter & high pass filter.
07. Design of IC 555 timer as Monostable,Multivibrator&AstableMultivibrator.
08. Study of IC – LF 398 N sample & hold circuit & show the waveform on CRO.
09. Design of OP-Amp as Schmitt trigger.

Course Outcomes
After learning this course students will be able to:
CO513.1. Designing of OP-Amp as amplifiers, clippers and clamper, integrator, differentiator and filter circuits.
CO513.2. Designing of multivibrator using IC 555
CO513.3. Study of IC –LF398 N for designing sample and hold circuit and its waveforms.

CLASS: B.E. 5TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: EE-512
TITLE: TRANSMISSION AND DISTRIBUTION OF ELECTRICAL POWERLAB

Hours/ Week			Marks Distribution	
L	**T**	**P**	**Theory**	**Practical**
0	**0**	**2/2**	**0**	**40**

LIST OF EXPERIMENTS:

1. Performance Characteristics of a Short Transmission Line.
2. Performance Characteristics of a Medium Power Transmission Line.
3. Performance Characteristics of a long Power Transmission Line.
4. Study of all types of Overhead Line Conductors.
5. Study of all types of Overhead Line Insulators.
6. Study of Corona formation of High Voltage Overhead Lines.
7. Steady of all types of underground Cables.

COURSE OUTCOMES	
After learning this course students will be able to:	
CO512.1	Determine the various parameters of transmission line.
CO512.2	Understand types of overhead line conductors and insulators.
CO512.3	Understand the concept of formation corona

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COURSE SCHEME
FOR B.E. 6TH SEMESTER ELECTRONICS & COMMUNICATION ENGG.
FOR EXAMINATION TO BE HELD FOR BATCH 2014 &ONWARDS

Course		Curriculum Hrs/Week			Marks			
Course No.	**Course Name**	**L**	**T**	**P**	**Theory**	**Sessional**	**Practical**	**Total**
ECE-601	Microprocessor (8085) & Peripheral Interfacing	3	2	0	100	40	---	140
ECE-602	Digital Signal Processing	3	2	0	100	40	---	140
ECE-603	Communication Engg.-II	3	2	0	100	40	--	140
ECE-604	Microwave Devices & Systems	3	2	0	100	40	--	140
ECE-605	Electronics Measurement & Instrumentation	3	2	0	100	40	--	140
EE-603	Power Electronics	3	2	0	100	40	---	140
ECE-606	Microprocessor (8085) & Peripheral Interfacing Lab	0	0	2/2	---	---	30	30
ECE-607	Communication Lab	0	0	2/2	---	---	30	30
EE-606	Power Electronics Lab	0	0	2/2	---	---	30	30
ECE-608	Microwave Devices & systems Lab	0	0	2			40	40
ECE-609	Electronics Measurement & Instrumentation Lab	0	0	2/2			30	30

	Total	**18**	**12**	**06**	**600**	**240**	**160**	**1000**

CLASS : B. E. 6TH SEMESTER **Hours/ Week** **Marks Distribution**
BRANCH : ECE / EE / AEI **L T P** **Theory Practical**
COURSE NO : ECE-601 **3 2 0** **100 40**
COURSE TITLE : MICROPROCESSOR (8085) & PERIPHERAL INTERFACING
DURATION OF EXAM: 3 HOURS

SECTION-A

1. Microprocessor 8085 pin diagram, Architecture, Addressing modes, Instruction set, Instruction format, Timing diagram, Programming techniques with additional instructions, looping, Counting design of counters & time delays, debugging & memory mapping.
2. Stack & Subroutines, Advanced subroutines concept, Call & Ret instructions, Advanced programming (Code conversions, BCD addition/subtraction, Multiplication etc), 8085 interrupts & process….

SECTION-B

1. Interfacing I/O devices, Basic interfacing concept, Interfacing with scanned multiplexed displays & LCD's, Interfacing output displays, Interfacing i/p devices, Memory mapped i/o design, Memory wait states & access time.
2. Serial I/O data communication, Basic concepts in serial I/O, 8085 serial I/O lines – SID & SOD, Synchronous & asynchronousdata communication, Software controlled asynchronous serialI/O.
3. Interfacing to 8085 Microprocessor: PPI – 8155 I/O & timer, PPI – 8255 (mode-0, 1, 2 & BSR), PID 8279 keyboard/display interface, PIC 8259, DMA controller 8257/8237.

NOTE: There shall be total 8 questions of 20 marks each four from each section. Five questions have to be attempted by the students selecting atleast two questions from each section**.**

BOOKS RECOMMENDED :

01. Microprocessor Architecture Programming & App. By Ramesh Gaonkar
02. Introduction to Microprocessor By Aditya P. Mathur
03. The Intel Microprocessor By Brey
04. Fundamental of Microprocessor & Microcomputers By B. Ram
05. Microprocessor and Interfacing By D.V. Hall

COURSE OUTCOMES (CO's)
After learning this course students will be able to:
CO601.1: Understand the logical and functional design of microprocessor 8085 with the architecture.
CO601.2:Perform various arithmetic and logical operations using the microprocessor.
CO601.3:Write assembly language programs for performing various operations involving practical applications.

CO601.4: Perform advanced programming using the microprocessor for various computations.
CO601.5:Perform interfacing of the microprocessor with I/O devices, displays, LCD's, LED's and peripheral devices.

CLASS : B. E. 6TH SEMESTER **MARKS**

BRANCH: ECE/AEI	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE NO: ECE-602	**3**	**2**	**0**	**100**	**40**

COURSE TITLE: DIGITAL SIGNAL PROCESSING
DURATION OF EXAM: 3 HOURS

SECTION-A

Discrete Time Signal & System:
Introduction, Classification of discrete time signal, Discrete time system, Frequency domain representation, Analysis of linear time Invariant system, Properties of LTI system, System described by difference equations, Correlation of discrete time system, Recursive & Non-recursive structures, Realization of Digital linear systems.

The Z-Transform:
Introduction, Defination,Properties of Z-Transform, Evaluation of the Inverse Z-Transform, Realisation of Digital Linear Systems.

SECTION-B

Discrete & Fast Fourier Transform :
Introduction, Properties of DFT, Linear convolution using DFT, Circular convolution, Discrete time Fourier transform (DTFT), Fast fourier transform (FFT), FFT Algorithms–Decimation in time FFT algorithms & decimation in frequency algorithms, Computational consideration.

Digital Filter Design :
Generation consideration, Design of FIR filter, Design of IIR filter-Impulse Invariant method, Bilinear transformation Application of DSP, Radar, Image processing.

NOTE: There shall be total 8 questions of 20 marks each four from each section. Five questions have to be attempted by the students selecting atleast two questions from each section**.**

BOOKS RECOMMENDED :

01. Digital Signal Processing by S. Salivaharan
02. Digital Signal Processing by John G. Proakes
03. Digital Signal Processing by O.P. Verma

Course Outcomes
After learning this course students will be able to:
CO602.1: Understand:the discrete nature of the signal and it's importance in the development of a discrete system.
CO602.2: Realize a digital system with the help of mathematical relations
CO602.3: Explain the importance of Z transforms and it's inverse transform and its applications
CO602.4: Understand the principle of DFT, Convolution, algorithmic approaches in FFT and its use in data reduction

CO602.5: understand theoretically designing of FIR and IIR filters, signal analysis for application using digital signal processing/ image processing

CLASS : B. E. 6TH SEMESTER **MARKS**

BRANCH : ECE	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE NO: ECE-603	**3**	**2**	**0**	**100**	**40**

COURSE TITLE : COMMUNICATION ENGG.-II

DURATION OF EXAM: 3 HOURS

SECTION-A

1. **Digital Modulation Techniques:** Introduction, Types of digital modulation techniques, FSK, ASK, BPSK, DPSK, QPSK generation and reception, Differentially encoded PSK (DEPSK), M-ray PSK, MSK, Comparison of digital modulation techniques.
2. **Spread Spectrum Modulation:** Introduction, DS spread spectrum, CDMA, Frequency hopping spread spectrum, Generation of PN sequences, Acquisition & tracking of a FH & DS signal.

SECTION-B

1. Introductionto Linear block code – hadamard, Hamming code, Convolution codes – code tree, Trellis & state diagram for a convolution encoder, Decoding method of convolution code – viterbi algorithm.
2. **Telephone Switching Systems:**Dialling Techniques, Classification of switching systems, Central switching, Traffic load, Grade of service Switching matrices, Time Division multiplexed switch, Time slot Intercharge, Combination time & space switch.

NOTE: There shall be total 8 questions of 20 marks each four from each section. Five questions have to be attempted by the students selecting atleast two questions from each section**.**

Text Books:

01.	Principle of Communication Systems	By Taub& Schilling
02.	Digital Communication	By Das, Mullick&Chaterjee
03.	Telecommunication switching systems and Networks	By T. Vishwanathan

Reference:

01.	Analog & Digital Communication	By Simon Haykins

Course Outcome (CO's)
After learning this course students will be able to:
CO603.1: describe generation and reception of different digital modulation techniques and compare their performances in terms of of probability of error and bandwidth requirement

CO603.2: describe the applications of Spread spectrum system and the process of achieving Acquisition and Tracking in DSSS and FHSS
CO603.3: identify various algorithms for encoding and decoding of error correcting codes
CO603.4: analyze the working principle of switching systems involved in telecommunication system

CLASS : B. E. 6TH SEMESTER
BRANCH: ECE
COURSE CODE: ECE-604
TITLE: MICROWAVE DEVICES & SYSTEMS
DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	**T**	**P**	**Theory**	**Sessional**
3	**2**	**0**	**100**	**40**

SECTION-A

Waveguides: Frequency allocations and frequency plans, Rectangular waveguide and its mathematical analysis, Power Transmission, Circular waveguide and its mathematical analysis, modes of propagation, dominant modes, cut off wavelength, excitation modes.

Microwave passive devices: Scattering matrix of microwave junction, cavity resonators, E-plane tee, H-plane tee, magic tee, phase shifters, attenuators, directional couplers, ferrite devices, Faraday rotation, gyrator, isolator, circulators and detector.

Microwave generators and amplifiers: limitations of conventional tubes, reflex klystron, two and multi cavity klystron amplifiers and oscillators, backward wave oscillators, Magnetrons, cross field amplifiers & the MASER.

SECTION-B

Microwave solid-state devices: Gunn diode and its modes of operation, Avalanche IMPATT diode, TRAPATT diode,Tunnel diode, Schottky diode, Backward diode, Varactor diodes, PIN diode

Microwave Link: Microwave radio station**,** microwave transmitter and receiver, multiplexing equipment, microwave link.

Microwave Measurements: Measurement of standing wave ratio, measurement of frequency, measurement of power, phase shift, attenuation, antenna pattern measurement.

Micro-Strip Lines: Introduction, Micro strip lines, parallel strip lines, coplanar strip lines, shielded strip lines, characteristic impedance of micro strip lines, losses in micro strip lines, quality factor of micro strip lines.

RECOMMENDED BOOKS:

1. Foundations for Microwave Engineering — R E.Collins
2. Microwave Devices and Circuits — Samuel Y Liao.
3. Microwave and Radar Engineering — M Kulkarni
4. Microwave Engineering — David M. Pozar

5. Microwave Engineering — A Das and S K Das
6. Microwave Engineering — Rajeswari Chatterjee
7. Microwaves — M.L.Sisodiya and Vijay Laxmi Gupta

NOTE: There shall be total eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed

Course outcomes (CO'S)
After learning this course students will be able to:
CO604.1: Understand and gain knowledge about various microwave devices such as oscillators, amplifiers being used at higher frequencies.
CO604.2: Understand various parameters of waveguides, couplers and use of components as per applications.
CO604.3: Able to compute dominant modes, degenerate modes for particular waveguide.
CO604.4: Able to analyze and find applications of microwave engineering in specific area.
CO604.5: Able to demonstrate the ability to design different oscillators, mixers, amplifiers as per needs and specifications.

CLASS : B. E. 6TH SEMESTER
BRANCH: ECE
COURSE NO: ECE-605
COURSE TITLE: ELECTRONIC MEASUREMENT & INSTRUMENTATION
DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
3	2	0	100	40

SECTION-A

Measurement & Error: Introduction to Measurement & Instrumentation, Types of instrumentation & measurement, Sensitivity, resolution, Accuracy, Precision, significant figures, Absolute & relative errors, Types of errors, Probability of errors, Limiting errors, Linearity.

Analog Instruments: Analog multimeter, Analog voltmeter, Analog ammeter, Analog ohmmeters & their design analysis, Ac voltmeter using rectifiers, True RMS responding voltmeter, Wave analyzers, (simple & heterodyne), Harmonic distortion analyzer (Tuned circuits heterodyne), Loading effect of voltmeter, Electronic multimeter,

Digital Instruments: Digital voltmeter, Digital multimeter, Digital LCR & measurements, Special frequency meters & application, Shielding & grounding, Q meter, Vector impedance meter, Vector voltmeter, RF power & Voltage measurement.

SECTION-B

Oscilloscopes: Block Diagram, CRT, Probes, Deflection amplifier & delay line, Automatic time base, Dual trace Oscilloscope, Sweep modes, Measurement of voltage, Frequency & phase pulse measurement,

Special Oscilloscope: CRT storage target characteristics, Sampling Oscilloscope, Digital storage Oscilloscope, Spectrum analysis.

Transducers: Introduction, Selection of transducers, Resistive transducers, Strain gauges, Thermistor & thermometer, LVDT, Load cells, Piezo Electric transducers, Photo voltaic, Frequency generation transducer.

Bridge: Introduction, Wheat stone bridge, Kelvin bridge, Guarded wheat stone bridge, AC bridge & their application, Maxwell bridge, Hay bridge, Schering bridge, Wagner ground connection, Unbalance conditions.

NOTE : There shall be total 8 questions, four from each section. Five questions have to be attempted by the students selecting atleast two questions from each section**.**

BOOKS RECOMMENDED :

01.	Electronic Instrument & Measurement Technique	By Copper W.D &Helfric A.
02.	Electrical & Elect. Measurement Instrumentation	By A.K.Sawhney
03.	Electronic instrumentation	By H.S. Kalsi

REFERENCE BOOK :

Electronic Instrumentation & Measurement	By Oliber B.M & Cage J.M**.**

Course Outcomes
After learning this course students will be able to get:
CO605.1: Knowledge about different types of electronic instruments used in different circuits
CO605.2: Analyse different analog and digital instruments and wave analyzers as the metering circuits in different circuits.
CO605.3: Understanding how to handle and operate the electronic instrument and measure values for current, voltage, etc.
CO605.4: Identify the errors and provide necessary calibration for accurate readings and decide which instrument is required for a particular circ
CO605.5: Work on different instruments like Oscilloscopes, transducers, bridges, vector impedance meter and Q-meter.

Hours/ Week			**Marks Distribution**	
L	**T**	**P**	**Theory**	**Sessional**

CLASS : B. E. 6TH SEMESTER **3 2 0 100 40**
BRANCH: EE/ECE ENGINEERING
COURSE CODE: EE-603
TITLE: POWER ELECTRONICS
DURATION OF EXAM: 3 HOURS

SECTION-A

Concept of Power Electronics, Applications, Advantages and disadvantages. Power electronic system and devices.

Solid state devices: SCR: Basic theory of operation, characteristics: Static and Dynamic, SCR ratings, Protection of SCR against over current, over voltage high dV/dt, de/dt. Snubber circuit, series and Parallel operation of SCR. Gate protection. Firing circuits of SCR. SCR gate characteristics, Two-transistor analogy of SCR. Thyristor family: SCR, TRIAC, DIAC, GITO, PUT, LASCR

Classification of Rectifiers, Phase Controlled rectifiers: Single phase and three phase, half wave and full wave fully controlled and half controlled rectifiers with R, L, E loads with and without free wheeling diodes.

SECTION-B

Methods of commutation.

AC phase control: Operation of Single phase, Half and full wave AC controller with R, R-L Load, Integral cycle control, sequence control.

Choppers: Principles and basic ckt. Operation, classification, steady state analysis, Control strategies. Communication in chopper circuits.

Inverters: Single phase voltage source Inverters, Voltage control of single phase inverters.
Cycloconverters: Classification, single phase to single phase cycloconverters with resistive inductive load.

RECOMMENDED BOOKS:

1. Power Electronics — PS Bhimbra,
2. Power Electronics — MD Singh and KB Khanchandani
3. Power Electronics — AF Gupta and LP Singh
4. Fundamental of Power Electronics — Rama Reddy
5. Power Electronics Converters, Applications & Design — Mohan, Undeland and Robbins
6. Advanced Power Electronics — B.K.Bose

NOTE: There shall be total eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

COURSE CODE: EE-603 **TITLE: POWER ELECTRONICS**	
COURSE OUTCOMES: Student will be able to	
CO603.1	Understand fundamental concepts of power electronics, characteristics, series-parallel operation, protection and firing circuits of SCR and operation of various thyristor devices.
CO603.2	Analyze various single phase and three phase controlled converter circuits with different loads.
CO603.3	Understand various commutation techniques and working and control of ac voltage controller and chopper.
CO603.4	Understand the concept of cycloconverters and inverters.

CLASS : B. E. 6TH SEMESTER
BRANCH : ECE/EE/AEI
COURSE NO : ECE-606
COURSE TITLE : MICROPROCESSOR (8085) & PERIPHERAL INTERFACING LAB

Hours/ Week			Marks Distribution	
L	**T**	**P**	**Theory**	**Practical**
0	**0**	**2/ 2**	**0**	**30**

LIST OF EXPERIMENT :

01. Programs of data transfer group and block transfer of data fromSource memory to destination memory.
02. Programs on Arithmetic, Logical group of instruction, Multiplicationof two unsigned 8 bit number & factorial of a number.
03. Programs on time delay & counters.
04. Advanced programming such as binary to ASCII, vice versa & BCD addition.
05. Study of 8255-PPI interfacing card, 8257-DMA controller interfacing card, 8259-PIC interfacing card, 8253-Timer & counter interfacing card.

Course outcomes
After learning this course students will be able to:
CO606.1: write assembly language programs using 8085 kit.
CO606.2: perform arithmetic and logical operations using 8085 kit.
CO606.3: perform advanced programming such as BCD addition, binary to ASCII, etc.
CO606.4: perform peripheral interfacing of microprocessor with 8255, 8257, 8259, etc.

CLASS : B. E. 6TH SEMESTER

	L	T	P	PRACTICAL
BRANCH: ECE				
COURSE NO: ECE-607	**0**	**0**	**2/2**	**30**

COURSE TITLE : COMMUNICATION LAB

LIST OF EXPERIMENTS :

01. To plot the response of RF Tuned Amp.
02. To find the modulation index of AM signal.
03. Hardware realization of AM demodulation circuit.
04. Hardware realization of FM modulation circuit using IC 8038.
05. To plot the response of IF transformer.
06. Hardware realization of sample & hold circuit.
07. Hardware realization of ASK modulation circuit.
08. Study of PCM & TDM signal.

Course Outcomes:
After learning this course students will be able to:
CO607.1: Plot frequency response of RF Tuned Amplifier and IFT by calculating gain at different range of frequencies.
CO607.2**:** Understand the significance of modulation index in communication system by observing maximum and minimum value in AM modulated wave
CO607.3: Design frequency modulation circuit using IC 8038
CO607.4: Design sampler using IC-LF398, ASK modulation circuit using transistor BC547.

CLASS : B. E. 6TH SEMESTER
BRANCH: EE/ECE
COURSE CODE: EE-606
TITLE: POWER ELECTRONICS LAB

Hours/ Week			**Marks Distribution**	
L	**T**	**P**	**Theory**	**Practical**
0	**0**	**2/ 2**	**0**	**30**

LIST OF EXPERIMENTS:

1. SCR Triggering circuits.
2. Forced Commutation Circuits in Converters.
3. SCR Phase Control Circuits.
4. Triac Phase Control Circuits.
5. Fully Controlled Single - Phase thyristor bridge.
6. SCR DC Circuit breaker.
7. Zero Voltage switching.
8. Voltage Commutated DC chopper.
9. Current commutated DC chopper.
10. Microprocessor based three – phase thyristor bridge.

11. Series connected single – phase converters.
12. Series inverters.
13. Converter fed drive.
14. Chopper fed drive.

Course Outcomes
After learning this course students will be able to:
CO606.1: Observe the voltage across load and thyristor of SCR by R-triggering method.
CO606.2: Observe the voltage across load and thyristor for half–wave circuit by RC-triggering method.
CO603.3: Observe the voltage across load and thyristor for full–wave circuit by RC-triggering method.
CO603.4: Analyze voltage waveforms in single phase controlled rectifier circuit using Lamp load.
CO603.5: Understand the concept of series inverter by observing waveforms.

CLASS : B. E. 6TH SEMESTER
BRANCH: ECE
COURSE NO: ECE-608
COURSE TITLE: MICROWAVE DEVICES & SYSTEM LAB

	Hours/ Week			Marks Distribution	
	L	T	P	Theory	Practical
	0	0	2	0	40

LIST OF PRACTICAL :

01. To study and draw the following characteristics of Reflex Klystron.
02. To determine the frequency and wave length in Rectangular wave guide.
03. Determine the standing-wave ratio & reflection coefficient.
04. To measure an unknown impedance with smith chart.
05. To study the following characteristics of Gunn diode.
    i. V-I Characteristics.
    ii. Output power & frequency as a function of voltage.
06 To drawn the Radiation pattern of a Horn Antenna.
07 To calculate the Coupling Factor & directivity using a directional coupler.
08 To study the following Tees:-
    i) E-Plane Tee.
    ii) H-Plane Tee.
09 Study of Magic Tee to study the Isolator & Circulators.

Course Outcomes
After learning this course students will be able to:
CO608.1: plot and understand the impact of change in reflector voltage on current and frequency in reflex klystron tube
CO608.2: evaluate the parameters (frequency, wavelength, dimension) of rectangular waveguide for a particular mode.
CO608.3: calculate reflection coefficient and VSWR of electromagnetic field.
CO608.4: Verify the impedance measured using klystron tube 2K2S with smith chart.

CLASS : B. E. 6TH SEMESTER
BRANCH : ECE
COURSE NO : ECE-609
COURSE TITLE: ELECTRONIC MEASUREMENT & INSTRUMENTATION LAB
DURATION OF EXAM : 3 HOURS

	Hours/ Week			Marks Distribution	
	L	T	P	Theory	Practical
	0	0	2/2	0	30

LIST OF PRACTICAL :

01. Study of analog multimeter (Voltmeter, Ammeter, & Current meter)
02. Study of Rectifier type instruments
03. Study of Analysers (Wave, Spectrum & Distortion)
04. Study of Digital multimeter
05. Study of LCR Q meter
06. Study of frequency meter
07. Study of Oscilloscope, Measurement of frequency, Phase, Amplitude using lissajous pattern, Digital storage & Sampling Oscilloscope
08. Study of Transducers: LVDT, Strain, RTD, Thermocouple, Load cell, Photo voltage & Frequency generation transducers
09. Study of Bridge: wheat stone, Kelvin, AC bridge

Course Outcomes
After learning this course students will be able to:
CO609.1: analyze analog and digital devices for various measurements.
CO609.2: Study of rectifiers, analyzers and LCR Q-meter.
CO609.3: measurement of frequency using Lissajous method.
CO609.4: study and verify characteristics of active and passive transducers.

CO609.5: study different bridges to calculate resistance, capacitance and inductance.

UNIVERSITY OF JAMMU, JAMMU

COURSE SCHEME
FOR B.E. 7TH SEMESTER ELECTRONICS & COMMUNICATION ENGINEERING
FOR EXAMINATION TO BE HELD FOR BATCH 2014 & ONWARDS

Course No.	Name of the Course	Hours Per Week			Marks			
		L	T	P	Theory	Sessional	Practical	Total
ECE-701	Microprocessor (8086) & Applications	3	2	--	100	50	--	150
ECE-702	VLSI Design & Technology	3	2	--	100	50	--	150
Elective-I ECE-703	(A) Wireless Communication (B) Computer Networks & Communication	3	2	--	100	50	--	150
HUM-711	Industrial Management	3	2	--	100	50	--	150
ECE-704	Industrial Training	--	--	--	--	--	50	50
ECE-705	Minor Project	--	--	6	--	--	150	150
ECE-706	Seminar	--	--	4	--	--	100	100
ECE-711	Microprocessor (8086) & Applications Lab.	--	--	2	--	--	30	30
ECE-712	VLSI Lab	--	--	2	--	--	40	40
ECE-713	Matlab Programming	--	--	2	--	--	30	30
Total		**12**	**08**	**16**	**400**	**200**	**400**	**1000**

NOTE : Students have to select one course from Elective-I

CLASS: BE 7TH SEMESTER
BRANCH: ECE/AEI ENGINEERING
COURSE NO: ECE-701
COURSE TITLE: MICROPROCESSOR (8086) & APPLICATIONS
DURATION OF EXAM: 3 HOURS.

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
3	2	0	100	50

SECTION-A

Microprocessor 8086 pin diagram, Architecture, Instruction format & set, Introduction to assembly language programming & techniques, 8086 string instructions & programming, Passing parameters using procedures & macros, Nested procedures & macros, Assembler directives.

8086 Timing diagrams, 8086 interrupts, 8086 in minimum & maximum mode configuration, Bus connection & its remedy, closely & loosely coupled configuration.

SECTION-B

8087 math coprocessor, Pin diagram, Architecture, Instruction set, Interfacing to 8086, Introduction to 8089 I/O processor, Pin diagram, Architecture, Instruction set, Interfacing with 8086, Data sharing through memory management.

Interfacing 8255 with 8086, Interfacing of 8279 with 8086, Interfacing of USART 8251 with 8086, Memory interfacing with 8086.

Introduction, Architecture, Pin diagram of Usart-8251, 80286, 80386, 80486 & Pentium processor, Use of RISC & CISC instructions.

BOOKS RECOMMENDED :

01. Microprocessor & Interfacing Programming by Douglas V Hall
02. Microprocessor Architecture & Programming by Ramesh Gaonkar
03. Microprocessor Systems by Liu Gibson
04. The Intel Microprocessor by Brey

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

COURSE OUTCOMES (CO's)
After learning this course students will be able to:
CO701.1: Understand the basic architecture of 16 bit and 32 bit microprocessor.
CO701.2: Understand the techniques for faster execution of instructions and improve the speed of operation of microprocessor which includes parallel processing.
CO701.3: Understand the RISC and CISC based microprocessor.
CO701.4: Perform advanced programming to run programs on 8086 microprocessor based systems.

CO701.5: Understand the concept of advanced processors like 80496, Pentium etc.
CO701.6: Perform interfacing of 16-bit microprocessor with co-processors, I/O processors, peripherals, LED's, LCD's.

CLASS: BE 7TH SEMESTER
BRANCH: ELECTRONICS & COMMUNICATION
COURSE NO: ECE-702
COURSE TITLE: VLSI DESIGN & TECHNOLOGY
DURATION OF EXAM: 3 HOURS.

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
3	2	0	100	50

SECTION-A

MOS Technology: NMOS fabrication and CMOS fabrication using N-Well, P-Well & Twin-Tub processes, VLSI Design flow-Design specification, Design Entry, Final Simulation.

Basic VHDL and Verilog HDLs codes: logic gates, 2 to 4 line decoder, 4 to 1 multiplexer, half adder, full adder, half substractor, full substractor, 4-bit adder, 4-bit gray to 4-bit binary converter and 2-bit comparator.

MOSFET: Structure and operation, Current voltage characteristics, MOSFET scaling, Layout design rules, CMOS inverter layout design.

SECTION-B

CMOS Inverter: CMOS inverter operation, Design of CMOS inverter, Switching characteristics of CMOS inverter, Calculation delay times, Switching power dissipation of CMOS inverter.

Simple Combinational CMOS logic circuits: Logic Gates, transmission gate, 2 to 1 Multiplexer, Half Adder and Full Adder.

Simple Sequential CMOS logic circuits: Latch circuits and flip flops.

RECOMMENDED BOOKS :

01.	Basic VLSI Design	Douglas A. Pucknell& K. Eshraghian
02.	Principles of CMOS VLSI Design	Neil H.E Weste& K. Eshraghian
03.	VLSI Fabrication Principles	S.K. Gandhi
04.	VLSI Technology	S.M. Sze
05.	Circuit Design for CMOS VLSI	J.P. Uyemura
06.	CMOS Digital ICs Analysis & Design Sung-Mo Kang & Yusuf	Lablebici
07.	VHDL: Programming by Example.	Douglas L. Perry.
08.	A VHDL Primer	J. Bhasker
09.	Verilog HDL	Samir Palnitkar

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO702.1: Understand CMOS fabrication and techniques.
CO702.2: To write VHDL & Verilog HDL codes.
CO702.3: Understand MOSFET operation, characteristics and scaling.
CO702.4: Understand CMOS inverter layout and design rules.
CO702.5: Understand CMOS inverter operation, characteristics and switching power dissipation.
CO702.6: Draw and understand CMOS combinational and sequential circuits.
CO702.7: Understand the operation of transmission gate and its use.

BRANCH: ELECTRONICS & COMMUNICATION **MARK**

COURSE NO : ECE-703(A) ELECTIVE-I	**L**	**T**	**P**	**THEORY**	**SESSIONAL**
COURSE TITLE: WIRELESS COMMUNICATION	**3**	**2**	**0**	**100**	**50**

DURATION OF EXAM: 3 HOURS.

SECTION-A

Introduction to Wireless Communication: Examples of different wireless system, communication system- Cordless Telephone systems, Cellular Telephone system, Introduction to 2G and 3G wireless Network.

The Cellular Concept: Introduction, frequency reuse, Handoff strategies, Co channel interference and system capacity, Adjacent channel capacity, Improving Coverage and capacity- Cell splitting, Sectoring.

Multiple Access Techniques: Introduction, TDMA, FDMA, CDMA, SDMA,

Modulation Technique: BPSK, QPSK, π/4QPSK, MSK, GMSK Transmission & detection.

SECTION-B

Mobile Radio Propagation: Free space propagation model, Small scale Multipath propagation, Parameters of Mobile Multipath channels, Types of small scale fading, Rayleigh Distribution, Ricean Distribution, Diversity techniques -Space Diversity, Frequency Diversity, Rake Receiver, Introduction to SISO & MIMO (Multiple I/P Multiple O/P systems).

Wireless System & Standards: GSM-Features, Architecture, Channel types, CDMA Digital Cellular standard (IS-95) - Forward & Reverse CDMA channels, Introduction to Bluetooth, Wi-Fi,

Wi-mac.

BOOKS RECOMMENDED :

01. Wireless Communication : by T.S. Rappaport

02. Personal & Mobile Communication : by R. Panday

03. Mobile Communication Engg. : by W.C.Y. Lee Tata McGraw Hill

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

Course Outcome (CO's)
After learning this course students will be able to:
CO703A.1:Describe the evolution and history of wireless technology and understand the wireless communication system.
CO703A.2:Understand the different multiple access techniques and modulation techniques for transmission and detection.
CO703A.3: Understand the different mobile radio propagation models and diversity techniques in wireless communication.
CO703A.4:Understand the different cellular standards in the wireless system.

CLASS: BE 7TH SEMESTER
BRANCH: ELECTRONICS & COMMUNICATION
COURSE NO: ECE-703(B) ELECTIVE-I
COURSE TITLE: COMPUTER NETWORKS & COMMUNICATION
DURATION OF EXAM: 3 HOURS.

Hours/ Week			Marks Distribution	
L	**T**	**P**	**Theory**	**Sessional**
3	**2**	**0**	**100**	**50**

SECTION-A

Introduction: Goal of Network, Network classification (LAN, MAN, WAN), Topology signification of layered models, Reference models OSI & TCP/IP and comparison.

Data Communication : Synchronous and asynchronous, Encoding techniques, (NRZ, RZ, Manchester, AMI), Transmission media, Guided and unguided, Switching techniques-circuit switching, Message switching, Packet switching-datagram & virtual circuit, Example physical layer protocol-RS232, Error detection and correction, flow control stop and wait protocol, Sliding window protocol, Example protocol HDLC.

Medium Access Control: Access Techniques FDMA, TDMA, Media Access control-ALOHA, Slotted ALOHA, CSMA, CSMA/CD, LAN protocol IEEE 802.3.

SECTION-B

Routing and Congestion Control : Routing algorithm-Shortest path algorithm, flooding, distance vector routing, Link state routing, Congestion control of virtual circuit subnets, Congestion control in datagram subnets, leaky bucket algorithm,

Internet Protocol : IP addressing, Address resolution protocol (ARP), Reverse ARP, Subnetting&supernetting.

Network Security : Cryptography, Data encryption standard (DES), DES chaining, public key algorithm.

Network Applications : Introduction to Email, FTP, Telenet, WWW, DNS.

TEXT BOOK :

01. Computer Networks by Andrew S. Tanenbaum

REFERENCE :

01. Data Communication & Computer Networks by William D. Stallings
02. Computer Networking by Behrouz A. Forouzn

NOTE : There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

Course Outcome (CO's)
After learning this course students will be able to:
CO703B.1: Have thorough knowledge of different models required for communication networks.
CO703B.2: Implement encoding techniques, switching techniques
CO703B.3: Introduce the concepts of communication protocols used in various types of computer networks.
CO703B.4: Gain knowledge about how a signal is transmitted using various access techniques.

CLASS: BE 7TH SEMESTER
BRANCH : COMPUTER ENGINEERING/ECE
COURSE NO: HUM-711
COURSE TITLE: INDUSTRIAL MANAGEMENT
DURATION OF EXAM: 3 HOURS.

			MARKS	
L	**T**	**P**	**THEORY**	**SESSIONAL**
3	**2**	**0**	**100**	**50**

SECTION-A

Unit-1: Entrepreneurship: Definition and types, Difference Between Intrapreneur& Entrepreneur, Qualities of good Entrepreneurs - Role of Entrepreneurs in the economic development of a country, Functions of entrepreneur, Factors affecting entrepreneurship, Entrepreneurship as a career option for technocrats in India, Schemes and policies for entrepreneurship development. Women Entrepreneur: Classification of Women Entrepreneur in India, Problems of Women Entrepreneur, Steps for promoting women entrepreneurship.

Unit-2: Legal Forms of Industrial Ownership:

a) Sole Proprietorship.
b) Partnership.
c) Joint Stock Company

Unit-3: Industrial Development in India after Independence: Industrial Policy of the Five-Year Plans, Industrial Policy (1956, 1977, 1991), Need for Economic Reforms and their Assessment, Multi National Corporations (MNCs) - Concept, Merits & Demerits of MNCs

Unit-4: Industrial Relations:

1) **Workers participation in management**: Meaning, Objectives & Forms
2) **Trade Union**: Objectives, Functions, Present Position, and Weakness
3) **Industrial Conflict**: Sources and managing conflict
4) **Collective Bargaining**: Meaning, Process, Essential conditions for effective bargaining

SECTION-B

Unit-5: Management: Meaning, definition, Characteristics, Importance & Functions of Management, **Management Theories** – Taylor's Scientific Management Theory & Henry Fayol's Administrative Management Theory. **MBO** – Definition, Features, Process, Advantages & Limitations of MBO**.**

Unit-6 : Departmentation& Delegation of Authority: Meaning, Importance, Basis or pattern of Departmentation, **Delegation of Authority:** Meaning, Characteristics, Importance, Process, Obstacles/ Barriers to effective delegation of authority, **Authority Relationships** - Line Organization, Line & Staff Organization, Functional Organization.

Unit 7: Personnel Management & Decision Making: Meaning, Objectives, Characteristics, Principles & Functions of Personal department**. Decision making**- Meaning, Importance & Steps in Decision Making.

Unit 8: Wage Administration & Job Enrolment: Concept of Wages, Characteristics of good wage, Factors affecting wages,Methods of wage payments. **Job Evaluation** - Objectives, Principles & Methods of job evaluation.

BOOKS RECOMMENDED :

1. George Terry & Stephen G. Franklin – Principles of Management.
2. Harold Koontz & Heinz – Essentials of Management
3. Sherlekar – Principles of Business Management
4. M. Mahajan – Industrial Engineering & Production Management

5. Dr. NeeruVasisth--Principles of Management

6. Dr. B. P. Singh & Dr. T. N. Chhabra – Business Organisation& Management

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

COURSE OUTCOMES
After learning this course students will be able to:
CO711.1: understand the concepts of management and types of business ownerships.
CO711.2: understand the concept and relevance of entrepreneurship, trade unions, industrial conflicts, collective bargaining.
CO711.3: apply different management principles to increase the productivity of the workers and become effective managers and leaders.
C0711.4: become a good entrepreneur and thus start his own business venture.
CO711.5: analyze management problems and finding solutions to resolve conflicts emerging while working in groups within the organizations.

CLASS: BE 7TH SEMESTER

BRANCH: ELECTRONICS & COMMUNICATION	**L**	**T**	**P**	**MARKS**
COURSE NO: ECE-704	**0**	**0**	**0**	**50**

COURSE TITLE: INDUSTRIAL TRAINING

Students are required to undertake 4 to 6 weeks Practical Training during the summer vacations in the field of Electronics & Communication in Govt./Semi-Govt./Private sector. Thereafter, each student shall be required to submit a report on the practical training to the concern HOD for evaluation.

Guidelines for evaluation of Practical Training:

The evaluation shall be done by the departmental committee by the end of 7th semester. The committee shall have a convener and at least two member.

Distribution of Marks as per the University statues:

Total Marks for Evaluation		= 50 marks	
i)	Report	= 20	40%
ii)	Viva-Voce	= 15	30%
iii)	Miscellaneous Marks	= 15	30%

Due weightage will be given to those who have opted Industrial Training outside the State as well as keeping in view the profile of that Industry.

Award of the Marks:

Marks under (i), (ii) & (iii) will be awarded by the departmental committee constituted for the purpose.

COURSE OUTCOMES	
After learning this course students will be able to:	
CO704.1	Interact and study with a range of students and to practice multiple management skills, including communication, independent action and teamwork.
CO704.2	Understand the engineering code of ethics and be able to apply them as necessary.
CO704.3	Demonstrate knowledge of practical application of training.
CO704.4	Submit a training report along with the certificate issued by the concerned department.

EXAMINATION: B.E. 7TH SEMESTER
BRANCH: E&C ENGINEERING
COURSE CODE: ECE-705
TITLE: MINOR PROJECT

Hours/ Week			**Marks**
L	**T**	**P**	
0	**0**	**6**	**150**

The project will be assigned to the students towards the end of 6th semester and will start working on these projects at the commencement of their 7th semester. The topic of the project will be decided as per the developments taking place in the field of Electrical Engineering.

This may require complete literature survey, design, fabrication, simulation of models and/or some preliminary laboratory experiments etc. The same project can be extended to 8th semester also.

Distribution of Marks as per University statues:

Total Marks for End semester Evaluation = 150 marks
Presentation/Demonstration = 45 marks 30%
Viva-voce = 45 marks 30%
Actual work done = 60marks 40%

Award of Marks :

Marks under (1) and (2) will be awarded by the Departmental committee constituted comprises of convener and atleast two members.
Marks under (3) will be awarded by the concerned Project Guide(s)/supervisor(s).

COURSE OUTCOMES	
After learning this course students will be able to:	
CO705.1	Work in a team to select a topic for project work.
CO705.2	Review the available literature on the selected topic.
CO705.3	Understand the concept of project and work in a team to develop project.
CO705.4	Design, fabricate or simulate the project model.

CO705.5	Apply the methods and techniques to solve the problems and can be extended for major project also.

EXAMINATION: B.E. 7TH SEMESTER
BRANCH: E&C ENGINEERING
COURSE CODE: ECE-706
TITLE: SEMINAR

Hours/ Week			Marks
L	T	P	
0	0	4	100

This will involve a detailed study of a topic of interest reproduced in the candidate's own style. For this, a student has to prepare a seminar by doing proper survey of literature, compilation of information so gathered and then presentation of the same followed by question-answer session. The report of which has to be submitted by the student well before the conduct of seminar. The handout submitted by the student will be in accordance with the standards of technical papers.

Guidelines and evaluation of Seminar in 7th semester:

The topic of the Seminar is to be finalized and approved by the departmental committee by the end of 6th Semester. The committee shall have a convener and atleast two members.

Distribution of Marks:

Total Marks for Seminar Evaluation = 100 marks

1. Project Report = 30 marks
2. Presentation = 50 marks
3. Attendance = 20 marks.

Award of Marks:

- Marks Under (1) will be awarded by the Seminar Incharge.
- Marks Under (2) and (3) will be awarded by the Departmental committee constituted for the purpose.

COURSE OUTCOMES	
After learning this course students will be able to:	
CO706.1	Select a topic relevant to the field of electronic engineering system.
CO706.2	Undertake a review of the literature on the chosen topic.
CO706.3	Prepare and present a technical report.

CLASS: BE 7TH SEMESTER
BRANCH: ECE / AEI
COURSE NO: ECE-711
COURSE TITLE: MICROPROCESSOR (8086) & APPLICATIONS LAB
DURATION OF EXAM: 3 HOURS.

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
0	0	2	0	30

List of Practical:

01. Write a program to calculate the factorial of a number.

02. Write a program for the addition of two numbers.
03. Write program to find average of two numbers.
04. Write a program to find the sum of numbers in the array & store it in Register or Memory.
05. Write a program to find the greatest number from a given array.
06. Write a program find the smallest number from a given array.
07. Write a program for arranging numbers in ascending order.
08. Write a program for arranging numbers in descending order.
09. Write a program to search an element from a given array.
10. Write a program to convert BCD number into its binary equivalent number.
11. Write a program to move a string from one location to another.

Course Outcome (CO's)
After learning this course students will be able to:
CO711.1: Write assembly language programs using microprocessor 8086.
CO711.2: Perform operations using microprocessor 8086 and store the result in a register or memory.
CO711.3: Perform conversions using 8086 microprocessor such as BCD to its binary equivalent etc.

CLASS: BE 7TH SEMESTER
BRANCH:ELECTRONICS& COMMUNICATION
COURSE NO: ECE-712
COURSE TITLE:VLSI LAB
DURATION OF EXAM: 3 HOURS.

Hours/ Week			Marks Distribution	
L	**T**	**P**	**Theory**	**Sessional**
0	**0**	**2**	**0**	**40**

List of Experiments:

Write atleast six programs for combinational and sequential circuits using VHDL/Verilog Hardware Description Languages.

Course Outcomes
After learning this course students will be able to:
CO712.1: Write VHDl and Verilog Codes Combinational Circuits.
CO712.2: Write VHDL and Verilog Codes of Sequential Circuits.
CO712.3: Verify VHDL and Verilog Codes of Combinational Circuits.
CO712.4: Verify VHDL and Verilog Codes of Sequential Circuits.

CLASS: BE 7TH SEMESTER
BRANCH: ECE
COURSE NO: ECE-713
COURSE TITLE: MATLAB PROGRAMMING
DURATION OF EXAM: 3 HOURS.

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
0	0	2	0	30

LIST OF EXPERIMENTS:

01. **Write Program :** study of arithmetic, exponential, Logarithmic, Trigonometric, complex number calculation.
02. **Write Program:** To generate equation of straight line, Geometric series, points on circle, multiply, divide and exponential vectors.
03. **Write Program:** To create and print simple plots and execution of functions.
04. **Write Program:** To generate matrices and vectors, array operations, inline functions anonymous functions etc.
05. **Write Program:** To generate functions like execution a function, global variable, structures.
06. **Write Program:** To generate 2D, 3D plots.
07. **Write Program:** Study of various library blocks and their interconnections.
08. **Write Program:** MATLAB Application in Digital Signal Processing

Course Outcome (CO's)
After learning this course students will be able to:
CO713.1: Study of various arithmetic calculations.
CO713.2: Find importance of this software for generating equations of vectors and other mathematical expressions.
CO713.3: Articulate importance of software's in creating and printing simple,2D &3D plots and execution functions.
CO713.4: In-depth knowledge of various library blocks and their interconnections.
CO713.5: Applications of MATLAB in Digital Signal Processing.

UNIVERSITY OF JAMMU, JAMMU

COURSE SCHEME
FOR B.E. 8TH SEMESTER ELECTRONICS & COMMUNICATION ENGINEERING
FOR EXAMINATION TO BE HELD FOR BATCH 2014 & ONWARDS

Course No.	Name of the Course	Hours Per Week			Marks			
		L	T	P	Theory	Sessional	Practical	Total
ECE-801	Microcontrollers & their Applications	3	2	-	100	50	---	150
ECE-802	Antenna & Radar Engineering	3	2	-	100	50	---	150
Elective-II ECE-803	(A) Satellite Communication (B) FPGA Based Digital Design Techniques (C) Nanotechnology (D) Digital Image	3	2	-	100	50	---	150
Elective-III ECE-804	(A) Optical Fibre Comm. (B) Neural Networks & Fuzzy Systems (C) Biomedical Electronics	3	2	-	100	50	---	150
ECE-811	Microcontrollers & their Application Lab	--	--	2	--	--	50	50
ECE-805	Major Project	--	--	14	--	--	350	350
Total		**12**	**8**	**16**	**400**	**200**	**400**	**1000**

NOTE : Students have to select one course from Elective-II & Elective-III

	Hours/ Week			Marks Distribution	
CLASS: B.E.8TH SEMESTER					
BRANCH: ECE/AEI	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE NO: ECE-801	**3**	**2**	**0**	**100**	**50**

COURSE TITLE: MICROCONTROLLERS & APPLICATIONS
DURATION OF EXAM: 3 HOURS.

SECTION–A

Role of Microcontrollers– 8 bit Microcontroller, architecture of 8031/8051/8751. Comparison of Microprocessors and Microcontroller watch dog tuner, Data types and Directives. Pin description 0f 8051,I/O port functions, time delay generation and calculation. Addressing modes, logic instructions and programs, single bit instructions and programs, counter timer programming, simplex, half duplex, full duplex transmission, synchronous and asynchronous communication.

SECTION–B

Architecture: PIN and Block Diagram , Instruction Set, Addressing Modes of PIC and ARM Processor. System Design based on 8051, PIC, ARM Processor. Peripheral Interfaces: LCD, Seven Segment Display, Sensor: IR, temperature. Relays, analog to digital converter, digital to analog converter interfaces with 8051 and PIC.

BOOKS RECOMMENDED :

01. The 8051 Microcontroller (architecture, Programming and Applications)
By: Kenneth J. Ayala -----Penram International.
02. The 8051 Microcontroller and Embedded Systems-
By: Muhammed Ali Mazidi& Janice GillispieMazdi.
03. Design with Microcontroller
By: John B. Peatman (Tata McGraw Hill Publications)
04. ARM system development guide
By: Andrew-n-sloss& Dominic Symes Publisher –Morgan Aausamann.

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

COURSE OUTCOMES (CO's)
After learning this course students will be able to:
CO801.1: Understand the concept of Microcontroller 8051, learn to write simple programs.
CO801.2 : Understand the concept and applications of DC motor and indicators and use in project work.

CO801.3: Understand the concept of hardware details of 8096.
CO801.4: write the algorithm and design a system based on AVR or PIC microcontrollers.

CLASS : B.E. 8TH SEMESTER
BRANCH : ELECTRONICS & COMMUNICATION
COURSE NO: ECE-802
COURSE TITLE : ANTENNA & RADAR ENGINEERING
DURATION OF EXAM: 3 HOURS.

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
3	2	0	100	50

SECTION-A

ANTENNA PARAMETERS : Basic ideas of properties of antennas, Radiation patterns, directional properties of dipole antennas, Antenna gain, Antenna aperture and its relation to gain, antenna terminal impedance,. Elementary ideas about self and mutual impedance, front to back ratio, antenna beam width and bandwidth, antenna efficiency, antenna beam area, polarization, Antenna temperature and signal to noise ratio, Reciprocity theorem & application.

RADIATION: Retarded potentials, radiation from a short dipole, radiation from thin linear antenna,radiation resistance of dipole(short and thin linear)

ANTENNA ARRAYS :–Various forms of arrays, Arrays of two point sources, linear arrays of n-point sources, pattern multiplication Arrays of equal amplitude and spacing, array factor ,(Broadside and end fire arrays), directivity of endfire and broadside array, Steered phase array

SECTION-B

PRACTICAL ANTENNAS : Types of antennas, (a) VLF and LF antennas (Hertz and Marconi Antennas), medium frequency antenna and Rhombic antennas, Loop antennas, (b) VHF, UHF and SHF antennas: Folded dipole antennas, Yagi-uda antenna, slotted and hornantennas, helical antennas, Turnstile antenna, Log periodic antenna, Antenna with parabolic reflecter. Microstrip antenna.

RADAR : Radar Block diagram and operation, radar frequencies, application of radar, radar equation, Prediction of range, minimum detectable signal, receiver noise, transmitter Power, pulse repetition frequency and range ambiguity, antenna parameters, system losses and Propagation effects.

RADAR SYSTEM: Doppler effect and its application to CW radar, FM CW Radar altimeters,MTI and pulse doppler radar, tracking radar, Advance Radar, Pulse compression, Chip Radar, Synthetic Aperture Radar, Hologram Radar, Text Book:--

1. J. D. Kraus, "Antennas, "McGraw Hill.
2. Antennas Theory and Design, C.A. Balanis, Raw & Harper.
3. Introduction to Radar Systems, by Merill. I Skolnik.

4. Radar Principles, Technology & Applications Byron Edde

REFERENCE BOOK :

1. F.C. Jordan &B.C.Balmann, "Electromagnetic waves & radiating System", P.H.I.
2. Antennas and Radio wave propagation, Collins, R.E., McGraw Hill.
3. Digital Satellite Communications (Second Edition) Tri, T.Ha. 1990.

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO802.1: Understand fundamental Antenna parameters and terminology
CO802.2: Develop the performance characteristics of wire antenna and antenna array
CO802.3: Understand the principle of pattern multiplication and apply this to find the radiation pattern of antenna array
CO802.4: Understand the basic concept of radar and find the operation charactersics of CW and FM radar

CLASS : B.E. 8TH SEMESTER **MARKS**

BRANCH: ELECTRONICS & COMMUNICATION	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE NO: ECE-803(A) ELECTIVE-II	**3**	**2**	**0**	**100**	**50**

COURSE TITLE: SATELLITE COMMUNICATION
DURATION OF EXAM: 3 HOURS.

SECTION-A

Introduction: Evolution and growth of Communication Satellite, Principle of Satellite Communication, Different types of Satellite, Adv. and Disadv. of Satellite Communication, Frequency Allocation and Band spectrum.

Orbital Mechanics: Equation of the orbit, Locating the Satellite in the orbit and with respect to earth, Telemetry, Tracking and command systems, Transponder, Earth station subsystem--LNA, HPA.

SECTION-B

Satellite link Design–Introduction, Basic Transmission theory, System Noise temperature, C/N and G/T ratio, Uplink design, Down link design.

Multiple Access Techniques--Introduction, TDMA–Frame structure, Frame efficiency, Super frame, Burst structure, FDMA – Demand assigned FDMA, SPADE system.

Satellite Applications – VSAT, MSAT, DB S system , GPS system.

Textbook :-

01 Digital Satellite Communications (Second Edition) Tri, T. Ha. 1990.
02 Satellite Communications by T. Pratt
03 Satellite Communications by Dennis Roddy

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO803A.1: Describe the various advantages and disadvantages of satellite communication.
CO803A.2: Analyze the requirement for frequency allocation and spectrum.
CO803A.3: Define orbital mechanics and launch methodologies.
CO803A.4: Explain different satellite access techniques.
CO803A.5: Compare competitive satellite services.

CLASS : B.E. 8TH SEMESTER	**Hours/ Week**			**Marks Distribution**	
BRANCH: ELECTRONICS &	**L**	**T**	**P**	**Theory**	**Sessional**
COMMUNICATIONCOURSE CODE: ECE-803(B) ELECTIVE-II	**3**	**2**	**0**	**100**	**50**

TITLE: FPGA BASED DIGITAL DESIGN TECHNIQUES
DURATION OFEXAM: 3 HOURS

SECTION-A

Logic Design Fundamentals: Combinational logic, hazards in combinational networks, Mealy and Moore sequential circuit design, and sequential circuit timing.

VHDL: Introduction, VHDL terms, code structure, data types, operators and attributes, concurrent and sequential code, variables and signals, subprograms and procedures, packages and libraries, pre-defined attributes.

VHDL Description of Combinational and Sequential Circuits: Multiplexers, decoders, encoders, code converters, Flip-flops, registers, counters, clock synchronization

SECTION-B

Design of Programmable Logic Devices, Circuits and Memories: Read-only memories, programmable logic arrays, programmable array logics, Serial adder, binary multiplier, multiplication of signed numbers, binary divider, VHDL models for memories and buses, simplified bus model.

Design with Field Programmable Gate Arrays: Introduction of FPGAs, designing with FPGAs and CPLDs, Testing combinational logic, testing sequential logic, scan testing.

BOOKS RECOMMENDED:

1. Digital Design M.M.Mano and M.D Ciletti
2. Digital Design–Principles and Practices J.F. Wakerly

3. VHDL Programming by Example D.L Perry
4. Digital System Design Using VHDL C.H Roth
5. Fundamentals of Digital Logic with VHDL Design S. Brown and Z.Vranesic
6. Circuit design with VHDL V.A.Pedroni

NOTE: There shall be total eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO803B.1: Understand hazards in combinational circuits.
CO803B.2: Understand Moore and Mealy sequential circuit design.
CO803B.3: To get knowledge of sequential circuit timing.
CO803B.4: Understand basic VHDL terms, data types and VHDL statements.
CO803B.5: To write VHDL Codes for combinational and sequential circuits.
CO803B.6: Understand the PLDs, circuits and memories.
CO803B.7: Understand CPLD, FPGA and their testing.

CLASS : B.E. 8TH SEMESTER **MARKS**

BRANCH: ELECTRONICS & COMMUNICATION	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE NO: ECE-803(C) ELECTIVE-II	**3**	**2**	**0**	**100**	**50**

COURSE TITLE: NANOTECHNOLOGY
DURATION OF EXAM: 3 HOURS.

SECTION-A

Introduction

Introduction to nanoscale science and technology, why nanoscience and nanotechnology?Length energy and time scales, nanostructure types and properties, electronic and opticalproperties of materials, top down approach to nanolithography. Spatial resolution of optical,deep ultraviolet, X-ray, electron beam and ion beam lithography.

Quantum Mechanics

Band gap engineering, Quantum confinement of electrons in semiconductor nano structures,One dimensional confinement (Quantum wires), Two dimensional confinement (Quantumwells), three dimensional confinement (Quantum dots) and Bottom up approach, Singleelectron transistors, coulomb blockade effects in ultra small metallic tunnel junctions.

SECTION-B

Molecular Techniques:
Molecular Electronics, Chemical self-assembly, carbon fullerenes and nanotubes, Selfassembled mono layers, MWNT (Multiwalled nanotubes) Applications in biological and chemical detection.
Surface analytical instrumentation techniques for nanotechnology:
Atomic scale characterization techniques, scanning probe microscopy, scanning tunnelingmicroscopy and atomic force microscopy.
Application: Introduction to Nanoelectronics, Nanobioteb

TEXT BOOK :

1. Beenaker and Van Houten "Quantum Transport in Semiconductor Nanostructures inSolid state Physics" Ehernreich and Turnbell, Academic press, 1991

REFERENCES

1. David Ferry " Transport in Nano structures" Cambridge University press 2000
2. Y. Imry " Introduction to Mesoscopic Physics, Oxford University press 1997
3. S. Dutta " Electron Transport in Mesoscopic systems" Cambridge University press
4. H. Grabert and M. Devoret "Single charge Tunneling" Plenum press 1992

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO803C.1: Have thorough knowledge of different characterstics and ypes of nanostructures
CO803C.2: To describe the top down approach used for lithography
CO803C.3: Define spatial resolution of different lithography techniques
CO803C.4: Apply the fundamental science and quantum mechanics in nano electronics
CO803C.5: Gain the knowledge of a quantum well, quantum transport and tunnelling effects

CLASS : B.E. 8TH SEMESTER
BRANCH: ELECTRONICS & COMMUNICATION
COURSE NO: ECE-803(D) ELECTIVE-II

	Hours/ Week			Marks Distribution	
	L	**T**	**P**	**Theory**	**Sessional**
	3	**2**	**0**	**100**	**50**

COURSE TITLE: DIGITAL IMAGE PROCESSING
DURATION OF EXAM: 3 HOURS.

SECTION-A

Digital Image Processing Fundamentals: Fundamental concepts of image processing, Image sensing & acquisition, Image sampling & quantization, since basic relationship between pixels.
Image Enhancement in Spatial and Frequency Domain : Basic gray level transformation, Histogram processing, Basics of spatial filter ,smoothing & sharpening filters.
2-D Fourier Transform & DFT & their properties, Filtering in frequency domain, smoothing & sharpening filters

SECTION-B

Image Restoration & Segmentation :A model of image degradation & restoration process, Linear position invariant degradation ,estimating degradation function, Inverse filtering.

Detection of discontinuities & Edge Linking Thresholding

Image Compression : Coding, interpixel&Psychovisual redundancy, Error free compression-variable length coding, Lossy compression, Lossy prediction coding.

Object Recognition: Pattern & pattern classes optimum statically classifies & neural networks.

BOOKS :

01. Digital Image Processing : RafaelcGanzalez& Richard Woods

02. Digital Image Processing Using Matlab : Ganzalez& Woods

03. Fundamentals of Digital Image Processing : A.K. Jain

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO803D.1: Attain the knowledge of fundamentals required for image acquisition and processing.
CO803D.2: Design frequency domain filters and spatial filters for image enhancement.
CO803D.3: Analyze the methodologies required for image Segmentation.
CO803D.4: Analyze the coding for error free compression of images.
CO803D.5: Describe the patterns for object recognition.

CLASS : B.E. 8TH SEMESTER
BRANCH : ELECTRONICS & COMMUNICATION COURSE NO: ECE-804(A)
ELECTIVE- IIICOURSE TITLE: OPTICAL FIBRE COMMUNICATION
DURATION OF EXAM: 3 HOURS.

Hours/ Week			Marks Distribution	
L	**T**	**P**	**Theory**	**Sessional**
3	**2**	**0**	**100**	**50**

SECTION-A

Overview of Optical Fiber Communication: Block diagram of Fiber Optical Comm. system, Evolution of fiber optic system, Elements of transmission link, Nature of light, Basic optical laws, Advantages and Disadvantage of optical fiber Communication.

Optical Fiber Structure and Waveguiding: Mode and configuration, Fiber types, Rays and modes, Step-index fiber structure, Wave equation for step index fiber, Modes in step index fiber, Graded index fiber structure, Numerical Aperture of fibers.

Signal Degradation in Optical Fiber: Attenuation, Absorption, Scattering and bending losses, signal degradation in fiber, Group delay, Material dispersion, Waveguide dispersion, Interamodal& intermodal dispersion, Pulse broadening in graded index fiber.

SECTION-B

Fiber Material Fabrication and Connectors: Glass fibers, Halide glass, Chalgenide glass, Plastic fiber, Fiber fabrication, Outside vapor phase oxidation, modified chemical vapor deposition, Plasma activated chemical vapor deposition, Double crucible method, optical fiber connectors, Requirements of good design, Connector types, Single mode fiber connector.

Optical Sources and Detectors: LED—materials used, structure, Power, Modulation and quantum efficiency, Laser diode—material, structure and efficiency, Photodiode-PIN--Principle. Avalanche photodiode, Principle, Detector response time.

Optical Amplifier: Semiconductor amplifier, External pumping and gain-erbium doped amplifiers, Amplification mechanism.

Applications: Optical WDM, TDM networks and their switching, SDH/SONET, Optical ATM.

BOOK SUGGESTED :

01. Optical Fiber Communication principles and practice by J.Senior
02. Optical Fiber Communication by Gerd Keiser

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO804A.1: Overview about the optical fiber communication.
CO804A.2: Identify and characterise different types of optical fibre configuration and fiber modes.
CO804A.3: Analyze different reasons for signal degradation in optical fibers.
CO804A.4: Study the optical fiber link design parameters, fabrication and connectors.
CO804A.5: Understanding various optical sources, detectors and amplifiers with applications.

CLASS : B.E. 8TH SEMESTER
BRANCH : ECE/AEI

				MARKS	
COURSE NO: ECE-804(B) ELECTIVE-III	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE TITLE: NEURAL NETWORKS & FUZZY SYSTEMS	**3**	**2**	**0**	**100**	**50**

DURATION OF EXAM: 3 HOURS.

SECTION-A

Neural Networks Characteristics: History of development in Neural Networks Principles, Artificial Neural Net terminology, Model of a neuron, Topology and types of learning supervised, Unsupervised.

Learning Rules: The perception, Linear reparability, Basic learning laws, Hebb's rule, Delta rule, Widrow& Hoff LMS learning rule, Correlation learning rule, Instars and out star learning rules. Unsupervised learning, Competitive learning, K-Meams clustering algorithm, Kohonen's feature maps.

Different Neural Networks: Basic learning laws in RBF nets, Back propagation algorithm, Feed forward networks, ART networks.

SECTION-B

Application of Neural Nets: Pattern recognition applications of BPN, Associative memories, Vector.

Fuzzy Logic: Basic concepts of Fuzzy Logic, Fuzzy vs Crisp set, Linguistic variables, Membership function, Operation of Fuzzy sets, Fuzzy IF-THEN rules, Variable inference, Techniques, Defuzzication techniques, Basic fuzzy inference algorithm, Applications of fuzzy logic, Fuzzy system design, Implementation of fuzzy system.

RECOMMENDED BOOKS :

01. Artificial Neural Networks — Zurada
02. Artificial Neural Networks — Vegna Narayanan
03. Neural Networks — Simon Haykin

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO804B.1: Comprehend the concepts of neural network topologies and different types of learning.
CO804B.2: Have knowledge in developing different algorithms for neural networks.
CO804B.3: Analyze neutral controllers.
CO804B.4: Broad knowledge in fuzzy logic principles.

CO804B.5: Determine different methods of defuzzification.

CLASS : B.E. 8TH SEMESTER
BRANCH: ELECTRONICS & COMMUNICATION

				MARKS	
COURSE NO: ECE-804(C) ELECTIVE-III	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE TITLE: BIOMEDICAL ELECTRONICS & INSTRUMENTATION	**3**	**2**	**0**	**100**	**50**

DURATION OF EXAM: 3 HOURS.

SECTION-A

Introduction to Bio-Medical Instrumentation: Basic Medical Instrumentation system, Sources of Bio Medical signal, Origin of Bio electric potential, ECG.EEG,EMG, Skin contact impedance and its measurement, Electrode for ECG-limb electrodes, Floating electrodes, Pregelled disposable electrodes for EEG & EMG.

Anatomy and Physiology: Anatomy of heart, Cardiovascular system (Physiology), Conduction system of heart, Anatomy of brain, Nervous system (Physiology).

Bio-Medical Recorders: ECG recorder (Basic and Microprocessor Based), EEG recorder (EEG machine & 10-20 electrode system) and EMG recorder, ECG lead configuration & electrode placement, Phonocardiography.

SECTION-B

Medical Imaging Instrumentation: X-rays-Introduction, Generation of X-ray and X-ray machineUltrasound-Introduction, Basic pulse echo system, A scan- Echo-encephalography, Echo-ophthalmoscope, M-scan-Echo-cardiograph, B-scan-linear, Sector, Compound scan, Biological effects of ultrasounds.

Therapeutic Instrument: Cardiac pacemakers, need for pacemakers, External pacemakers (continuous & on-demand), Voltage, Current, & current limited voltage pacemakers, Implantable pacemakers i.e fixed rate, Demand and its types.

Cardiac defibrillators, their need, de defibrillators, Implantable defibrillators, pacer-cardiovertor defibrillators.

Patient Safety: Electric shock lazard, Leaking currents, Test instruments for checking safety parameters of Biomedical equipments.

BOOKS RECOMMENDED:

1. Handbook of Biomedical Instrumentation by R.S.Khandpur.
2. Biomedical Instruments: Theory and Design by Walter Welko- Witiz and Sid Doutsch

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting atleast two questions from each section. Use of Calculator is allowed.

Course Outcomes
After learning this course students will be able to:
CO804C.1: Have knowledge about different types of biomedical instrumentation.
CO804C.2: Study the anatomy and physiology of human body.
CO804C.3: Understand types of biomedical recorder and medical imaging instruments for body parameter measurements.
CO804C.4: Acquaintance about therapeutic instruments used for improvement in human health.
CO804C.5: Have an idea of instruments being used for checking safety parameters of biomedical equipments.

CLASS : B.E. 8TH SEMESTER
BRANCH: ECE / AEI
COURSE NO: ECE-811
COURSE TITLE: MICROCONTROLLERS &APPLICATIONS LAB
DURATION OF EXAM: 3 HOURS.

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
0	0	2	0	50

Programs to be introduced based on 8051/PIC:

01. Program to display a message "Excell" on the first line & a message "_____" on 2nd line using LCD display.
02. Program to output incrementing date on Do to D7 on output part in a Continuous loop with some delay.
03. **Program to switch on & switch off the relays on output port simultaneously with delay in between.**
04. **Program to display a message "_____" by pressing reset key. Now press any key, the code will be echoed on Computer Screen.**
05. **Program to display a message "_____" on the seven segment display with a delay.**
06. **Program to output the date FA, F6, F5, & F9 on four winding in a continuous loop with delay of a stepper motor.**
07. **Program to scan Eight keys & display its binary code on LED's.**
08. **Program to output logic '1'- logic 'O' alternatively on Eight LED's with delay between by making the eight LED's flash.**
09. **Write a program to convert digital voltage 5v and display using D/A converter.**
10. **Write a program to convert analog voltage of 5v and display using A/D converter.**

Programs based on ARM processor :

11. Study of ARM7-32 Bit Processor Architecture and pin dig.
12. Write a program of Flashing LED connected to port 1 of the Micro Controller
13. Interfacing of ARM Processor with Robot System such as DTMF,IR,RF.
14. Interfacing of the SD-MMC card with ARM7 microcontroller.
15. Interfacing of Biometric & RFID module with ARM7 microcontroller

Course Outcomes
After learning this course students will be able to:
CO811.1: Write assembly language programs using microcontroller for performing operations such as displaying message using LCD display.
CO811.2: Display message on the seven segment display with a delay.
CO811.3: Perform interfacing of ARM processor with Robot system.
CO811.4: Perform interfacing of biometric and RFID module with ARM 7 microcontroller.

CLASS : B.E. 8TH SEMESTER

BRANCH: ELECTRONICS & COMMUNICATION	**L**	**T**	**P**	**MARKS**
COURSE NO: ECE-805	**0**	**0**	**14**	**350**

COURSE TITLE: MAJOR PROJECT
DURATION OF EXAM: 3 HOURS.

The student will complete their assigned project work initiated in 7th semester under course No.ECE-705 and submit a detailed project report individually to the Head of the department.

Guidelines for evaluation of Project work in 8th semester:
Sub-distribution of marks:

- For External Examiner : 100
- For Internal Examiner : 250

Sub distribution of internal Marks:

- Mark distribution of internal Project work as per the University statues shall be based on:
  a. Viva-Voce = 75 30%
  b. Presentation = 75 30%
  c. Report = 100 40%

Total = 250

COURSE OUTCOMES	
After learning this course students will be able to:	
CO805.1	Complete their assigned project work initiated in minor project.
CO805.2	Demonstrate the project work followed by question-answer session.
CO805.3	Present and submit the detailed project report.