CURRICULUM AND SYLLABI

for

B.Tech.

I & II Semesters

For the branches

Electronics and Communication Engineering (ECE)

Electrical and Electronics Engineering (EEE)

Information Technology (IT)

Mechanical Engineering (ME)

Printing Technology (PT)

(Applicable to 2019 admission onwards)

UNIVERSITY OF CALICUT

THENHIPALAM – 673635, KERALA

CURRICULUM (2019 SCHEME) FOR 1ST & 2ND SEMESTERS

(For the branches - EEE, ECE, IT, ME, PT)

SUBJECTS AND GROUPS			
GROUP	**SUBJECT CODE**	**SUBJECT NAME**	**COMP/ OPT**
A	MA19 100	Calculus and Linear Algebra	COMP FOR SEM 1
	MA19 200	Differential Equations and Vector Calculus	COMP FOR SEM 2
B	CH19 100	Engineering Chemistry	OPT (1/2) IN BOTH SEMESTERS
	PH19 100	Engineering Physics	
C	GS19 100	Engineering Graphics	OPT (1/2) IN BOTH SEMESTERS
	EM19 100	Engineering Mechanics	
D	EC19 100	Concepts of Electronics Engineering	COMP. FOR ECE IN SEM 1
	EE19 100	Concepts of Electrical Engineering	COMP. FOR EEE IN SEM 1
	ME19 100	Concepts of Mechanical Engineering	COMP. FOR ME IN SEM 1
	IT19 100	Introduction to Computing and Problem Solving	COMP. FOR IT IN SEM 1
	PT19 100	Concepts of Printing Technology	COMP FOR PT IN SEM 1
E	EC19 101	Basics of Electronics Engineering	OPT (1/4) FOR SEM 1 & OPT (2/4) FOR SEM 2 - RELEVANTSUBJECTS
	EE19 101	Basics of Electrical Engineering	
	CE19 101	Basics of Civil Engineering	
	ME19 101	Basics of Mechanical Engineering	
F	ES19 100	Environmental Science	COMP FOR SEM 1
	DE19 200	Concept Based Engineering	COMP FOR SEM 2
G	CH19 100(P)	Engineering Chemistry Lab	OPT (1/2) IN BOTH SEMESTERS
	PH19 100(P)	Engineering Physics Lab	
H*	EE19 100(P)	Electrical Engineering Workshop	OPT (2/4) IN BOTH SEMESTERS
	EC19 100(P)	Electronics Engineering Workshop	
	CE19 100(P)	Civil Engineering Workshop	
	ME19 100(P)	Mechanical Engineering Workshop	
	IT19 100 (P)	Introduction To Computing and Problem Solving Lab	
	PT19 100 (P)	Printing Technology Workshop	
I	CM19 100	Communicative English	COMP. FOR SEM 1
	LL19 200	Language Lab	COMP. FOR SEM 2

COMP- COMPULSORY SUBJECT.
OPT - OPTIONAL SUBJECT.
* EE19 100(P), EC19 100(P), ME19 100(P), IT19 100 (P), PT19 100 (P) are COMPULSORY for respective branches in SEMESTER 1.

* Concerned branches have to avoid choosing Basic of Engineering (E) ie., Mechanical Engineering students are not permitted to choose Basics of Mechanical Engineering and same is applicable for other branches also.

SCHEME FOR 1ST & 2ND SEMESTERS

SEMESTER I

Subject code	Subject Name	Lecture (L)	Theory (T)	Practical /Drawing (P)	Internal	End Semester	Duration of End Semester Examination	Credits
MA19 100	Calculus and Linear Algebra	3	1	0	50	100	3	3
PH19/ CH19 100	Engineering Physics/ Engineering Chemistry	3	1	0	50	100	3	3
GS19 / EM19 100	Engineering Graphics/	3	0	2	50	100	3	4
	Engineering Mechanics	4	1	0				
EC/ EE/ME/PT 19 100 *IT 19 100	Concepts of Electronics/ Electrical/ Mechanical Engineering/Printing Technology. *Introduction to computing and problem solving	3	0	0	50	100	3	3
EC19/EE19/ CE19/ME19 101	Basics of Electronics/Electrical/Civil/Mechanical Engineering	2	1	0	50	100	3	2
ES19 100	Environmental Science	2	1	0	50	100	3	2
PH19/CH19 100 (P)	Engineering Physics/ Engineering Chemistry Lab	0	0	2	100	-	3	1
EC19/ EE19/ME19 / PT19 100 (P)	Electronics /Electrical / Mechanical Engineering /Printing Technology Workshop	0	0	2	100	-	3	1
IT19 100 (P)	Introduction To Computing and Problem Solving Lab	0	0	2	100	-	3	1
CM19 100	Communicative English	2	0	0		-		
	TOTAL	**30**			**600**	**600**	**27**	**20**

SEMESTER II

Subject Code	Subject Name	Hours/Week			Marks		Duration of Semester End Examination	Credits
		L	T	P/D	Internal	End Semester		
MA19 200	Differential Equations And Vector Calculus	3	1	0	50	100	3	3
PH19 / CH19 100	Engineering Physics/ Engineering Chemistry	3	1	0	50	100	3	3
EM19/ GS19 100	Engineering Mechanics/ Engineering Graphics	4	1	0	50	100	3	4
		3	0	2				
CE19/EE19 101	Basics of Civil/Electrical Engineering	2	1	0	50	100	3	2
ME19/EC19 101	Basics of Mechanical/Electronics Engineering	2	1	0	50	100	3	2
DE19 200	Concept Based Engineering	2	1	0	50	100	3	2
PH19/CH19 100 (P)	Engineering Physics/Chemistry Lab	0	0	2	100		3	1
CE19/EE19 100 (P)	Civil/Electrical Engineering Workshop	0	0	2	100		3	1
ME19/EC19 100 (P)	Mechanical/ Electronics Engineering Workshop	0	0	2	100		3	1
LL19 200	Language Lab	0	0	2				
	TOTAL	**30**			**600**	**600**	**27**	**19**

GROUP A

MA19 100	CALCULUS AND LINEAR ALGEBRA	3-1-0-3 (L-T-P-C)

COURSE OBJECTIVES:

- To familiarize with functions of several variables that is essential in most branches of Engineering.
- To develop the tool of Power series for learning Advanced Engineering Mathematics.
- To develop the tool of Fourier series for learning Advanced Engineering Mathematics.
- To develop the essential tool of Matrices and Linear Algebra in a comprehensive manner.

SYLLABUS:

Module I: Sequences and Series. (12 hours)

Indeterminate forms and L'Hospital's rule ; Definition of sequences and series; Convergence of sequence and infinite series, Tests for convergence of infinite series-Comparison test, Ratio test, Root test, Raabe's, Logarithmic test; convergence of Alternating series (Leibnitz's test), absolute convergence.

Module II: Power Series. (8 hours)

Taylor's and Maclaurin's theorems with remainders, Power series, Taylor's Series, Maclaurin's series, series for exponential, trigonometric, hyperbolic and logarithmic functions. Leibnitz formula for derivative of product of two functions.

Module III: Multivariable Calculus. (10 hours)

Functions of several variables; Limit, continuity and partial derivatives, total derivative; Maxima, minima and saddle points; Radius of curvature, Circle of curvature, evolutes and involutes.

Module IV: Fourier Series. (10 hours)

Periodic functions, Trigonometric series, Fourier series, Euler Formula, Even and Odd functions, Fourier series for Even and Odd functions, Functions having arbitrary period, Fourier series of functions having arbitrary period, Half range expansions, Half range sine and cosine series.

Module V: Matrices. (12 hours)

Rank of a matrix, Solution of System of linear equations-Homogeneous and non-homogeneous; Hermitian, skew –Hermitian and Unitary matrices; Eigen values and Eigen vectors; Cayley Hamilton theorem; Diagonalisation of matrices; Quadratic forms; Orthogonal Transformation.

COURSE OUTCOMES:

At the end of the course the students will be able to

- Use the derivatives to find critical points, inflection points and local extrema.
- Understand the basic concept of partial differentiation and its applications in engineering.
- Develop skills in computations and applications of infinite sequences and sums.
- Expand the periodic function by using Fourier series and apply it in signals and systems.
- Use matrices and determinants for solving system of linear equations and apply it in engineering problems.

TEXT BOOKS:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

REFERENCE BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley& Sons,2006.
2. Veerarajan T., Engineering Mathematics for First year, Tata McGraw-Hill, New Delhi2008.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw-Hill, New Delhi, 11th Reprint, 2010.
4. D.Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint,2008.
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Edition, 2010.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2)

20% - Assignments (minimum 2) such as homework, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.

10% - Attendance and Regularity in the class.

University Examination Pattern *(Maximum Marks-100).*

PART A*: Analytical/problem solving SHORT questions* ***10x 5 marks= 50 marks***

Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B*: Analytical/Problem solving DESCRIPTIVE questions* ***5 x 10 marks= 50 marks***

Two questions from each module with choice to answer one question.

MA19 200	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	3-1-0-3 (L-T-P-C)

COURSE OBJECTIVES:

- To introduce effective mathematical tools for the solutions of differential equations that model physical process
- To acquaint with mathematical tools needed in evaluating multiple integrals and their usage.
- To familiarize with concept of vector differentiation and vector integration.

SYLLABUS:

Module I: First order ordinary differential equations. (10 hours)

Differential equations reducible to homogeneous, Exact, linear and Bernoulli's equations, Equations of the first order and higher degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairout's type. Applications of differential equations of first order- orthogonal trajectories.

Module II: Ordinary differential equations of higher orders. (10 hours)

Second order linear differential equations with constant coefficients, method of variation of parameters, second order linear differential equations with variable coefficients, Cauchy- Euler equations, Legender's linear equations.

Module III: Multiple integrals and their applications**.** (12 hours)

Double integrals (cartesian and polar co-ordinates), Change of order of integration of double integrals, change of variables (cartesian to polar), applications: areas and volumes, triple integrals, volume of solids, change of variables (rectangular to cylindrical, rectangular to spherical polar).

Module IV: Vector differential calculus. (10 hours)

Vector functions of a single variable, Differentiation of vector functions, scalar and vector fields, gradient of scalar field, divergence and curl of vector fields, physical meaning, relation between the vector differential operators.

Module V: Vector integral calculus. (10 hours)

Integration of vectors, scalar line integrals, surface and volume integrals of vector functions, Gauss divergence theorem, Stokes theorem, Greens theorem (without proof).

COURSE OUTCOMES:

At the end of the course the student will be able to.

- Acquire basic knowledge of differential equations and methods of solving them.
- Model and analyse differential equations in a wide range of physical phenomena and has got applications across all branches of engineering.
- Model physical phenomena involving continuous changes of variables and parameters
- Acquire basic training in visualizing graphs and surfaces.

TEXT BOOKS / REFERENCE BOOKS:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002 Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley& Sons, 2006.
2. Erwin Kreyszig, Advanced engineering mathematics, 9th Edition, John Wiley & sons 2006.
3. E.A.Coddington, An introduction to ordinary differential equations, Prentice Hall 1995.
4. S L Ross, Differential Equation, 3rd ed., Wiley India 1984.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
6. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers,36th Edition, 2010.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2)

20% - Assignments (minimum 2) such as homework, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.

10% - Attendance and Regularity in the class.

University Examination Pattern *(Maximum Marks-100).*

PART A*: Analytical/problem solving SHORT questions* ***10x 5 marks= 50 marks***

Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B*: Analytical/Problem solving DESCRIPTIVE questions* ***5 x 10 marks= 50 marks***

Two questions from each module with choice to answer one question.

GROUP B

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CH19 100	ENGINEERING CHEMISTRY	3-1-0-3 (L-T-P-C)

COURSE OBJECTIVES:

- To enable the students to acquire knowledge in the concepts of chemistry for engineering applications.
- To familiarize the students with different application oriented topics like polymers, nanomaterial's, lubricants, fuels, storage devices, etc.
- To focus the students on the chemistry of compounds resulting from pollution, waste generation and environmental degradation and to apply the knowledge in solving these current environmental problems effectively.
- To develop abilities and skills that is relevant to the study and practice of chemistry.

SYLLABUS:

Module I: (10 Hours)

Water: hardness, determination of hardness by edta method, softening (lime-soda and ion exchange methods), numerical problems based on hardness and lime soda method, purification of water for domestic use.
Polymers: classification, addition polymerization (free radical, cationic, anionic, and coordination mechanism of polymerisation), condensation polymerization, crystallinity in polymers (amorphous, crystalline and semi-crystalline), concept of glass transition temperature (Tg), factors affecting Tg.
Conducting polymers: introduction, synthesis, structure, properties and applications of conducting polymers like polyacetylene and polyaniline.

Module II: (10 Hours)

Lubricants: classification of lubricants (solid, liquid, and semisolid), Mechanism of lubrication (thick film, thin film, and extreme pressure), properties of lubricants (viscosity, flash and fire point, cloud and pour point, aniline point, and corrosion stability).

Fuels: classification of fuels, calorific value, determination of calorific value using bomb calorimeter; numerical problems based on calorific value, liquid fuels (petroleum), refining of petroleum, cracking and reforming, petrol knock and octane number, diesel knock and cetane number, bio-diesel.

Module III: (10 Hours)

Nanoscience: introduction, classification of nanomaterials, synthesis of nanomaterials (hydrolysis and reduction), fullerenes and carbon, nanotubes, properties and applications of CNTs.

Green chemistry : definition, importance and limitations, twelve principles of green chemistry with their explanations and examples.

Module IV: (10 Hours)

Electrochemistry: electrochemical cells, salt bridge, Helmholtz double layer, single electrode potential, EMF and its measurement by Poggendorf's compensation method, determination of single electrode potential using SHE, electrochemical series and its applications, Nernst equation and its applications; numerical problems based on potential and Nernst equation, concentration cells (electrode and electrolyte concentration cells), glass electrode and pH measurement using glass electrode (Numerical problems).

Storage and fuel cells: lead acid accumulator and nickel cadmium battery, fuel cells, H_2/O_2 fuel cell, solar cells.

Module V: (12 Hours)

Corrosion: theories of corrosion, dry corrosion (self protecting corrosion products, pilling-bed worth rule), wet corrosion (corrosion of iron in acidic, neutral and basic conditions), galvanic corrosion and galvanic series, differential aeration corrosion, stress corrosion, factors influencing corrosion, corrosion control by cathodic protection.

Protective coatings: inorganic metallic coatings (galvanizing, tinning, cementation, electroplating), inorganic non-metallic coatings (phosphate, chromate, chemical oxide, anodising), organic coatings (paints).

COURSE OUTCOME:

The student will be able to

- apply the knowledge of chemistry and will be equipped to take up chemistry related topics as part of their project works during higher semester of the course.

TEXT BOOKS:

1. A textbook of Engineering Chemistry by Dr. Sunitha Rattan, S. K. Kataria Publisher.
2. Engineering Chemistry by N. Krishnamurthy and D. Madhavan, PHI Learning, Pvt Ltd.

REFERENCE BOOKS:

1. Seymour R.B, Introduction to Polymer Chemistry, McGraw Hill, New York.
2. Billmeyar F.W, Text book of Polymer Science, Wiley Inter-science, New York.
3. L.H. Sperling, Introduction to Physical Polymer Science, Wiley Interscience, New York.

4. P.K. Goel, Water Pollution, Causes, Effects and Control, New Age International F. A. Cotton, and G. Wilkinson, Advanced Inorganic Chemistry, 3rd Ed., Wiley Eastern Ltd.
5. P. W. Atkins, Physical Chemistry, J.D. Paula, Oxford University Press.
6. V. Kumar, Introduction to Green Chemistry, Vishal Publishing House.
7. V.S. Muraleedharan and A. Subramania – Nano Science and Technology, Ane Books.
8. B. S. Bahl and ArunBahl S. Advanced Organic Chemistry, Chand & Company.
9. L. S. Brown and Thomas A. Holme, Chemistry for Engineering Students, Cengage Learning.
10. Engineering Chemistry by Jain and Jain, Dhanpat Rai Publishers.
11. Engineering Chemistry by P. Rath, Cengage Learning.
12. Engineering Chemistry by M.J Shultz, Cengage Learning, New Delhi.
13. Engineering Chemistry by R. Mukhopadhyay and S. Datta, New Age International Publishers.
14. A textbook of Engineering Chemistry by S. S. Dara and S. S. Umare, S. Chand Pvt Ltd.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2)
20% - Assignments (minimum 2) such as homework, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.
10% - Attendance and Regularity in the class

University Examination Pattern *(Maximum Marks-100).*

PART A*: Analytical/problem solving SHORT questions* ***10x 5 marks= 50 marks***

Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B*: Analytical/Problem solving DESCRIPTIVE questions* ***5 x 10 marks= 50 marks***

Two questions from each module with choice to answer one question.

PH19 100	ENGINEERING PHYSICS	3-1-0-3 (L-T-P-C)

COURSE OBJECTIVES:

- To impart the basic concepts and ideas in physics.
- To develop scientific attitudes and enable the students to correlate the concepts of physics with the core programmes.

SYLLABUS:

Module I: (10 Hours)

Interference: coherence, interference in thin films and wedge shaped films (reflected system) Newton's rings; measurement of wavelength and refractive index of liquid, interference filters, antireflection coating.
Diffraction: Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, plane transmission grating, grating equation; measurement of wavelength, Rayleigh's criterion for resolution of grating, resolving power and dispersive power of grating.
Polarization of Light: types of polarized light, double refraction, Nicol Prism, quarter wave plate and half wave plate, production and detection of circularly and elliptically polarized light, induced birefringence; Kerr Cell, polaroid & applications.

Module II: (10 Hours)

Quantum Mechanics: uncertainty principle and its applications, formulation of time dependent and time independent Schrodinger equations, physical meaning of wave function, energy and momentum operators, eigen values and functions, one dimensional infinite square well potential , quantum mechanical tunnelling (qualitative).
Statistical Mechanics: macrostates and microstates, phase space, basic postulates of Maxwell-Boltzmann, Bose-Einstein and Fermi Dirac statistics, distribution equations in the three cases (no derivation), Fermi level and its significance.

Module III: (10 Hours)

Waves: one dimensional wave; differential equation and solution. three dimensional waves: differential equation and its solution (no derivation), transverse vibrations of a stretched string.

Acoustics: Intensity of sound, loudness, absorption coefficient, reverberation and reverberation time, significance of reverberation time, Sabine's formula (no derivation), factors affecting acoustics of a building.
Ultrasonics: production of ultrasonic waves; magnetostriction effect and piezoelectric effect, magnetostriction oscillator and piezoelectric oscillator, detection of ultrasonics; thermal and piezoelectric methods, applications of ultrasonics - NDT and medical.

Module IV: (12 Hours)

Photonics: basics of solid state lighting, LED, photodetectors, photo voltaic cell, junction and avalanche photo diodes, photo transistors, thermal detectors, solar cells; V-I characteristics.

Optic fibres: principle of propagation-numerical aperture, optic fibre communication system (block diagram), industrial, medical and technological applications of optical fibre, fibre optic sensors, basics of intensity modulated and phase modulated sensors.

Module V: (10 Hours)

Laser: properties of lasers, absorption, spontaneous and stimulated emissions, population inversion, Einstein's coefficients, working principle of laser, optical resonant cavity, Ruby laser, Helium-Neon laser, semiconductor laser (qualitative), applications of laser, holography (recording and reconstruction).

Superconductivity: superconducting phenomena, Meissner effect. Type-I and Type-II superconductors, BCS theory (qualitative), high temperature superconductors, Josephson Junction, SQUID; Applications of superconductors.

COURSE OUTCOME:

Students will be

- Familiarised with the principles of Physics and its significance in engineering systems and technological advances.

TEXT BOOKS:

1. Physics for Engineers- M.R.Seenivasan- New Age Publishers 1996 Edition.
2. Beiser A, Concepts of Modern Physics, McGraw Hill India Ltd.
3. Brijlal and Subramanyam, A Text Book of Optics, S.Chand & Co.
4. Mehta V K, Principles of Electronics, S.Chand & Co.
5. Rajendran V and Marikani A, Physics I, Tata McGraw Hill Co Ltd.

REFERENCE BOOKS:

1. Aruldhas G, Engineering Physics, PHI Ltd.
2. Bhattacharya and Tandon, Engineering Physics , Oxford India.
3. Dominic and Nahari, A Text Book of Engineering Physics, Owl Books Publishers
4. Hecht E, Optics, PearsonEducation.
5. Mehta N, Applied Physics for Engineers, PHILtd.
6. Palais J. C, Fiber Optic Communications, Pearson Education.
7. Pandey B. K and Chathurvedi S, Engineering Physics, Cengage Learning.

8. Philip J, A Text Book of Engineering Physics, Educational Publishers.
9. Premlet B, Engineering Physics, McGraw Hill India Ltd.
10. Sarin A and Rewal A, Engineering Physics, Wiley India Pvt Ltd.
11. Sears and Zemansky, University Physics, Pearson.
12. Vasudeva A. S, A Text Book of Engineering Physics, S. Chand &Co.
13. Kakani A. S, A Text Book of Electronics, New Age International (p) publishers 2000 Edition.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2)
20% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.
10% - Attendance and Regularity in the class.

University Examination Pattern *(Maximum Marks-100)*

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PART A*: Analytical/problem solving SHORT questions* ***10x 5 marks= 50 marks***

Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B*: Analytical/Problem solving DESCRIPTIVE questions* ***5 x 10 marks= 50 marks.***

Two questions from each module with choice to answer one question.

GROUP C

GS19 100	ENGINEERING GRAPHICS	3-0-2- 4 (L-T-P-C)

COURSE OBJECTIVES:

- Graphics is the language of engineers and hence make the student capable of conceiving shape and geometry of various objects and to effectively communicate their design ideas through drawings and sketches as per standards.
- Enable students to prepare & understand engineering drawings.

SYLLABUS:

Module I: (8 hours)

Engineering Graphics – introduction - Drawing instruments and their use – lines, Lettering and dimensioning – Scales- Familiarization with Standard Code of practice for general engineering drawing. Theory of projections - Projections of points in different quadrants.

Module II: (16 hours)

a) Projections of straight lines - True length and inclinations of a line with reference planes. Traces of lines – Line parallel to both reference planes - Perpendicular to one of the reference planes - Inclined to one and parallel to other reference plane - Inclined to both the reference planes – Rotating line method – Rotating plane method.

b) Projections of planes - lamina of geometrical shapes - Plane lamina parallel, inclined and perpendicular to the reference planes - Inclined to one and perpendicular to the other reference plane - Inclined to both the reference planes - Inclined to the two reference planes but perpendicular to the profile plane.

Module III: (16 hours)

a) Projections of Solids of revolution and Frustums - Projections of solids with axis parallel to one and inclined to the other reference plane - Axis inclined to both the reference planes - Projections of solids on auxiliary planes (Solids to be drawn: Cube, Prisms, Pyramids, Tetrahedron, Cone and Cylinder).

b) Sections of solids - Sections by cutting planes parallel to the reference planes - Cutting plane inclined to one and perpendicular to other reference plane - True shape of the section by projecting on auxiliary plane (Solids to be drawn: Cube, Prisms, Pyramids, Tetrahedron, Cone and Cylinder).

Module IV: (15 hours)

a) Development of surfaces of solids - Method of parallel line & radial line developments - Development of Polyhedra, Cylinder, Cone and sectioned solids - Development of solids having hole or cut.

b) Introduction to isometric projection - Isometric scale - Isometric views - Isometric projections of Prisms, Pyramids, Cylinder, Cone, Spheres, sectioned solids and combination of them.

Module V: (10 hours)

a) Introduction to perspective projections – Classification of perspective views - Visual ray and vanishing point method of drawing perspective projection - Perspective views of plane figures such as polygons and circles - Perspective views of solids like Prisms and Cube.

b) Conventional representation of threaded fasteners - Drawing of nuts, bolts, washers and screws -Locking arrangements of nuts - Bolted and screwed joints - Foundation bolts.

c) Introduction to Computer Aided Drafting (CAD) - Preparation of engineering drawings by using any software capable of drafting and modelling - Creation of simple figures like polygon and general multiline figures only.

(Module V, Part C: For internal work assessment only, not for University Examination)

COURSE OUTCOMES:

Upon successful completion of this course students will be accomplishing the following abilities and skills:

- Familiarise with the Fundamentals of Engineering Drawing standards.
- Interpretation of 3D shapes from orthographic projections of objects and they will be able to make orthographic projections of any object.
- To make orthographic engineering drawings.
- To draw the sectional view of the solids.
- To make developments of surfaces & solids.
- To draw the perspective projections of objects.
- To prepare engineering drawings using CAD (Computer Aided Drafting) software tools.

TEXT BOOKS / REFERENCE BOOKS:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. P.I Varghese, Engineering Graphics, VIP Publications, Thrissur.
3. N D Bhatt, "Engineering Drawing", Charotar Publications.
4. John.K.C, Engineering graphics, PHI Learning Pvt, Ltd. 2009.

Internal Continuous Assessment *(Maximum Marks-50).*

60% - Assignments (minimum 10 Drawing sheets, 2 from each module) plus two assignments on CAD.

30% - Tests (minimum 2).

10% - Regularity in the class.

University Examination Pattern (*Maximum Total Marks- 100*).

PART A

Q 1. Two questions (a) and (b) of 20 marks each from module II, one from module II (a) and one from module II(b), with choice to answer any one.
Q 2. Two questions (a) and (b) of 20 marks each from module III, one from module III(a) and one from module III(b), with choice to answer any one.
Q 3. Two questions (a) and (b) of 20 marks each from module IV, one from module IV(a) and one from module IV(b), with choice to answer any one.

PART B

Q 4. Three Questions (a), (b) and (c) of 20 marks each from module III &V, one from module III(b), one from module V(a) and one from module V(b), with choice to answer any two.

EM19 100	ENGINEERING MECHANICS	4-1-0-4 (L-T-P-C)

COURSE OBJECTIVES:

- To acquaint with general approach of solving engineering problems.
- To illustrate the application of the theory learned in Mechanics in practical engineering problems.
- To lay clear fundamentals to core Engineering Subjects.

SYLLABUS:

Module I: (16 hours)

Introduction to engineering mechanics - units - dimensions - vector and scalar quantities - laws of mechanics - elements of vector algebra - important vector quantities - equivalent force systems – translation of a force to a parallel position - resultant of a force system - simplest resultant of special force systems - distributed force systems - equations of equilibrium - free body diagrams - free bodies involving interior sections - general equations of equilibrium - problems of equilibrium - static indeterminacy. (Both vector and scalar formulations are to be introduced to solve problems).

Module II: (12 hours)

Friction – laws of friction – simple contact friction problems. Introduction to structural mechanics - trusses - analysis of simple trusses - method of sections – method of joints.

Module III: (12 hours)

First moment and centroid– theorems of Pappus-Guldinus - second moment of plane and composite areas – parallel and perpendicular axis theorems – polar moment of inertia of area – product of inertia and principal axis (conceptual level treatment only).
Moment of inertia of a rigid body and lamina (derivation of MI for cylinder, rod and sphere).

Module IV: (15 hours)

Dynamics: Rectangular and Cylindrical co-ordinate system - Combined motion of rotation and translation – Concept of instantaneous center – Motion of connecting rod of piston and crank of a reciprocating pump- Rectilinear translation – Newton's second law – D'Alembert's Principle– Application to connected bodies (Problems on motion of lift only).

Module V: *(10 hours)*

Mechanical vibrations – Free and forced vibration - Degree of freedom - Simple harmonic motion – Spring-mass model – Period – Stiffness –Frequency – Simple numerical problems of single degree of freedom.

COURSE OUTCOMES:

- Enable the students to gain knowledge on basic concepts of Engineering Mechanics.
- Enable students to apply the theory of mechanics in practical level.

TEXT BOOKS:

1. Shames I. H, Engineering Mechanics - Statics and Dynamics, Pearson Prentice.
2. Timoshenko, S & Young D. H, Engineering Mechanics, McGraw Hill.

REFERENCE BOOKS:

1. Benjamin J., Engineering Mechanics, Pentex Book Publishers and Distributors.
2. Bhavikkatti S. S., Engineering Mechanics, New Age International Publishers.
3. Hibbeler R. C., Engineering Mechanics: Statics and Dynamics. Pearson PrenticeHall.
4. Kumar, D.S., Engineering Mechanics: Statics and Dynamics, S.K. Kataria& Sons.
5. Kumar K. L., Engineering Mechanics, Tata McGraw Hill Publishing Company Ltd.
6. Rajasekaran S and Sankarasubramanian G, Engineering Mechanics, Vikas Publishing House Private Limited.
7. Tayal, A. K., Engineering Mechanics- Statics and Dynamics, Umesh Publications.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2).

20% -Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.

10% - Regularity in the class.

University Examination Pattern *(Maximum Marks-100).*

PART A*: Analytical/problem solving SHORT questions* ***10 x 5 marks= 50 marks***
Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B*: Analytical/Problem solving DESCRIPTIVE questions* ***5 x 10 marks= 50 marks***
Two questions from each module with choice to answer one question.

GROUP D

EC19 100	CONCEPTS OF ELECTRONICS ENGINEERING	3-0-0-3 (L-T-P-C)

COURSE OBJECTIVES:

- To get knowledge about types, specification and common values of passive components.
- To understand the working of diodes and its applications.
- To understand the working of transistors and its applications.
- To familiarize the working and characteristics of MOSFET.
- To familiarize some measuring instruments.

SYLLABUS:

Module I: (8 hours)

Passive components: Resistors: concepts of fixed & variable resistors, Carbon composition type resistors, metal film resistors, wire wound resistors, construction, power rating & tolerance, Capacitors: different types, construction of mica and ceramic capacitors (disc & tubular), color code, electrolytic (Teflon) capacitors, Inductors: construction of single layer, multilayer and variable inductors, principle of low power transformers, Electro mechanical components: relays and contactors.

Module II: (8 hours)

Semiconductor Physics: Basic concepts, Intrinsic and extrinsic semiconductors, PN Junction diode, barrier potential, Terminal characteristics of diodes, V-I characteristics, Effect of temperature, Equivalent circuit of a diode, Diode small signal model, Specification parameters of diodes and numbering, Diode applications - diode clipping and clamping circuits, voltage multiplier circuits, Rectifiers, Half wave and full wave rectifiers, derivation of rectifier specifications like PIV, DC output voltage, ripple factor, efficiency, rectification factor, analysis of filters with rectifiers L, C, LC and pi filters, Zener diode, Varactor diode, characteristics, working principle of LED, photo diode, solar cell.

Module III: (8 hours)

Bipolar Junction Transistors: Structure, typical doping, Principle of operation, concept of different configurations. Detailed study of input and output characteristics of common base and common emitter configuration, current gain, comparison of three configurations. Concept of load line and operating point. Need for biasing and stabilization, voltage divider biasing, Transistor as amplifier, switch, RC coupled amplifier and frequency response.

Module IV: (8 hours)

Junction Field Effect Transistors: Structure, principle of operation, characteristics, comparison with BJT.

MOSFET: Structure, principle of operation of Enhancement type MOSFET, Current voltage characteristics, Depletion-type MOSFET.

Principle of operation of Photo transistor, UJT, SCR.

Module V: (7 hours)

Electronic Measurements and measuring Instruments, Generalized performance parameters of instruments: error, accuracy, sensitivity, precision and resolution, Principle and block diagram of analog and digital multimeter, Block diagram of CRO, Measurements using CRO, Lissajous patterns, Principle and block diagram of DSO, function generator.

COURSE OUTCOMES:

The student will be able to

1. Identify various active and passive electronic components.
2. Explain the operation, uses and limitations of PN junction diodes.
3. Explain the operation of Bipolar Junction Transistors and some applications.
4. Describe the operation of Field Effect Transistors.
5. Identify the constructional details and functions of various electronic measuring instruments.

TEXT/ REFERENCE BOOKS*:*

1. Bell D. A., Electronic Devices and Circuits, Oxford University Press.
2. Boylested R. L. and Nashelsky L., Electronic Devices and Circuit Theory, Pearson Education.
3. Kal S., Basic Electronics: Devices, Circuits and its Fundamentals, PHI Learning.
4. Millman J., Halkias, C and Parikhu C. D., Integrated Electronics, Tata McGraw Hill.
5. Neaman D. A, Electronic Circuits Analysis and Design, McGraw Hill.
6. Sedra, A. S. and Smith K. C., Microelectronic Circuits, Oxford University Press.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2)

20% - Assignments (minimum 2) such as homework, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.

10% - Attendance and Regularity in the class.

University Examination Pattern (*Maximum Total Marks- 100*).

PART A*: Analytical/problem solving SHORT questions* ***10x 5 marks= 50 marks***

Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B*: Analytical/Problem solving DESCRIPTIVE questions* ***5 x 10 marks= 50 marks***

Two questions from each module with choice to answer one question.

EE19 100	CONCEPTS OF ELECTRICAL ENGINEERING	3-0-0-3 (L-T-P-C)

COURSE OBJECTIVES:

The objective of this course is to set a firm and solid foundation in Electrical Engineering with strong analytical skills and conceptual understanding of basic laws and analysis methods in electrical and magnetic circuits.

SYLLABUS:

Module I: (8 hours)

D. C. Circuits (Only Independent sources) Kirchhoff's law, ideal and practical voltage and current sources. Mesh and Nodal analysis (Super node and super Mesh excluded). Source transformation. Star delta transformation. Superposition theorem, Thevenin's theorem Norton's theorem, maximum power transfer theorem (Source transformation not allowed for superposition theorem, Mesh and Nodal analysis.

Module II: (8 hours)

Fundamentals: Sinusoidal voltage and currents, their mathematical and graphical representation, concept of cycle period, frequency, instantaneous, peak, average, R.M.S. values, peak factor, and form factor, phase difference, lagging, leading and in phase quantities and phasor representation. Rectangular and polar representation of phasors.

Study of circuits of pure resistance, inductance and capacitance and corresponding voltage-current phasor diagrams, voltage – current and power waveforms.

Module III: (8 hours)

Single phase and poly phase A. C. circuits:
A) Single phase AC Circuits: Study of series and parallel R-L, R-C, R-L-C circuits, concept of impedance and admittance for different combinations, wave form and relevant voltage current phasor diagrams. Concept of active, reactive, apparent, complex power and power factor, resonance in series and parallel RLC circuit. Q- factor.
B) Polyphase AC circuits: Concept of three phase supply and phase sequence. Balanced and unbalanced loads voltage current and power relations in three phase balance star and delta loads and their phasor diagrams.

Module IV: (7 hours)

Electromagnetism:
A) Magnetic effect of electrical current cross and dot convention, right hand thumb rule and cork screw rule, nature of magnetic field of long straight conductor, concepts of solenoid and torrid. Concepts of m.m.f, flux, flux density, reluctance, permeability and field strength, their units and relationship. Simple series and parallel magnetic circuits, comparison between electrical and magnetic circuits ,force on current carrying conductor placed in magnetic field, Fleming's left hand rule.

B) Faraday's law of electromagnetic induction, Fleming's right hand rule, statically and dynamically induced EMF's self and mutual inductance coefficient of coupling, energy stored in magnetic field.

Module V: (8 hours)

Introduction to electrical AC and DC Machines: Principles of operation and applications. Single phase transformer and electrostatics, Single phase transformers: Construction, principle of working, e.m.f equations, voltage and current ratios, losses, definition of regulation and efficiency, determination of these by direct loading method. Descriptive treatment of autotransformer. Electrostatics: electrostatic field, electric flux density, electric field strength, absolute permittivity, relative permittivity and capacitance, composite dielectric capacitors, capacitors in series and parallel, energy stored in capacitors, charging and discharging of capacitors and concept of time constant.

COURSE OUTCOMES:

At the end of this course, students will acquire the ability

- To understand and analyse basic electric and magnetic circuits.
- To study the working principles of electrical machines.
- To introduce the components of low-voltage electrical installations.

TEXT BOOKS*:*

1. Edward Hugs – Electrical & Electronic Technology, Pearson Education.

2. Vincent Del Toro, Electrical Engineering Fundamentals, Pearson Education.

3. SK Bhattacharya, Basic Electrical & Electronics Engineering, Pearson.

4. M.S Sukhija and T.K Nagsarkar, Basic Electrical and Electronics Engineering, Oxford University press, 2012.

REFERENCE BOOKS:

1. Kothari and Nagrath, Theory & problems of Basic Electrical engineering. Tata McGraw Hill.

2. JB Gupta, A course in electrical Engg. SK. Kataria & Sons.

3. BL Theraja, Electrical Technology Vol. 1.

4. K Uma Rao, Basic Electrical Engineering, Pearson.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2).

20% - Assignments (minimum 2) such as homework, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.

10% - Attendance and Regularity in the class.

University Examination Pattern *(Maximum Marks-100).*

PART A*: Analytical/problem solving SHORT questions* ***10x 5 marks= 50 marks***

Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B*: Analytical/Problem solving DESCRIPTIVE questions* ***5 x 10 marks= 50 marks***

Two questions from each module with choice to answer one question.

ME19 100	CONCEPTS OF MECHANICAL ENGINEERING	3-0-0-3 (L-T-P-C)

COURSE OBJECTIVES:

- To introduce different disciplines of Mechanical Engineering.
- To kindle interest in Mechanical Engineering.
- To impart Basic Mechanical Engineering principles.

SYLLABUS:

Module I: (8 hours)

Thermodynamics: Nature & scope of thermodynamics and basic concepts; Thermodynamic processes: isobaric, isochoric, isothermal, adiabatic and polytropic : workdone and P-V diagrams; Laws of Thermodynamics, entropy, enthalpy; Ideal and real gas equations; Analysis of Carnot cycle, Otto cycle , Diesel cycle and Dual cycle; Efficiency of these cycles.

Module II: (8 hours)

Thermal Engineering: Historical development of steam engine, steam turbines, gas turbines. Engines: major components and their functions (Description only); Working principle of two stroke and four stroke I.C. Engines (Diesel and Petrol), applications, comparison; MPFI,GDI & CRDI Engines. Power Transmission Devices: Belts and belt drives; Chain drive; Rope drive; Gears and gear trains; friction clutch (cone and single plate), brakes (types and applications only).

Module III: (8 hours)

Refrigeration: History & scope of refrigeration; applications of refrigeration; Food preservation, refrigerated storage; applications in chemical and process industries: vapour compression and absorption refrigeration systems, COP, Study of household refrigerator, Energy Efficiency Rating, Refrigerants and their impact on environment.

Hydraulic turbines: Pelton, Francis and Kaplan turbines (applications only).Pumps: Introduction, classification, reciprocating and centrifugal (brief description and working only).

Module IV: (8 hours)

Sources of Energy & power generation: Introduction, Classification : Non-renewable energy ; Fossil fuels – solid, liquid and gaseous; Calorific value. Renewable Energy ; Hydroelectric, solar, wind, biomass, biogas, ocean thermal, tidal, wave and geothermal energy.
Power Plants: Introduction; Layout and working of Diesel, Nuclear, Thermal and Hydel power plants.

Module V: (7 hours)

Manufacturing Engineering & Materials: Machine Tools (Basic elements, Working principle and types of operations) Lathe, Drilling Machine, Shaper, planer, Slotter, Milling Machine, Grinding machine, Introduction to NC and CNC machines; Engineering materials: classification, properties; Alloys and their Applications; Manufacturing process : Introduction , elementary ideas of rolling and extrusion ;Machining operations : turning, shaping, milling and drilling.

COURSE OUTCOMES:

By taking this course fundamentals of mechanical engineering.

- At the end of the course, the students will have exposed to the different areas of Mechanical Engineering.
- Gained idea about nature, scope and applications of Mechanical Engineering principles.

TEXT BOOKS / REFERENCE BOOKS:

1. Balachandran, Basic Mechanical Engineering, Owl Books.
2. Benjamin J., Basic Mechanical Engineering, Pentex Books.
3. Clifford M., Simmons K. and Shipway P., An Introduction to Mechanical Engineering Part I – CRC Press.
4. Crouse, Automobile Engineering, Tata Mc-Graw-Hill, New Delhi.
5. Gill, Smith and Zuirys, Fundamentals of IC Engines, Oxford and IBH publishing company Pvt. Ltd. New Delhi. Crouse, Automobile Engineering, Tata Mc-Graw-Hill, New Delhi.
6. Nag P. K., Basic and Applied Thermodynamics, Tata McGraw-Hill.
7. Pravin Kumar, Basic Mechanical Engineering.
8. Roy and Choudhary, Elements of Mechanical Engineering, Media Promoters & Publishers Pvt. Ltd. Mumbai.
9. Sawhney G. S., Fundamentals of Mechanical Engineering, PHI.
10. V Ganeshan, Internal combustion engines, Mc-Graw-Hill.
11. R K Rajput, Thermal Engineering, Laxmi Publications, 2010
12. R K Bansal, A Text Book of Fluid mechanics and hydraulic machines, Laxmi Publications.
13. P C Sharma, Production Technology, S Chand publications.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2).

20% -Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.

10% - Regularity in the class.

University Examination Pattern (*Maximum Marks- 100).*

PART A*: Analytical/problem solving SHORT questions* ***10 x 5 marks= 50 marks***

Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B*: Analytical/Problem solving DESCRIPTIVE questions* ***5 x 10 marks= 50 marks***

Two questions from each module with choice to answer one question.

IT19 100	INTRODUCTION TO COMPUTING AND PROBLEM SOLVING	3-0-0-3 (L-T-P-C)

COURSE OBJECTIVES:

- To learn basics of digital computers.
- To develop problem solving skills.
- To learn programming and to solve problems using python language.

SYLLABUS:

Module I: (7 hours)

Computer basics: Algorithms, a simple model of a computer- hardware and software, characteristics of computers, problem solving using computers. Computer generations and classification. Input/ Output Units: Different input and output methods.

Module II: (7 hours)

Computer memory: read only memory, RAM, different types of storage devices. Hierarchy of memory.
Processor; System Software: Operating Systems, Compiler, Interpreter, Assembler, Loader, Linker, Macro; Application Software;
Computer Languages: machine language, high level languages.

Module III: (8 hours)

Introduction to python: data types (mutable and immutable), variables, expressions and statements, operators, precedence, arithmetic and string operations, control and conditional statements, Boolean expressions and logical operators.

Module IV: (8 hours)

Functions: function definition**,** function calls, type conversions and coercion, composition of functions, built-in functions and mathematical functions, user-defined functions, parameters, arguments, parameter passing.

Module V: (9 hours)

Sequences: Manipulation on Tuple, Strings, List and Set.
Dictionaries: operations and examples. Files and exceptions: text files, directories. Introduction to Classes and Objects: attributes, instances.

COURSE OUTCOMES:

1. Able to explain the functionalities of digital computer and different kinds of softwares.
2. Able to design algorithmic solutions to problems.
3. Able to formulate Python programs for simple algorithms.
4. Able to design modular python programs using functions.
5. Able to design python programs using various built in data structures (strings, lists, tuples, dictionaries).

TEXT BOOKS:

1. Lambert K A., Fundamentals of Python- First Programs, Cengage Learning India, 2015.
2. Rajaraman V., Fundamentals of computers - Hall India.

REFERENCE BOOKS

1. Downey. A. et al., How to think like a Computer Scientist: Learning with Python, John Wiley, 2015.
2. Goel A., Computer Fundamentals Pearson Education.
3. P. Norton, Peter Norton's Introduction to Computers, Tata McGraw Hill, New Delhi.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2)

20% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.

10% - Attendance and Regularity in the class

University Examination Pattern *(Maximum Marks-100).*

PART A*: Analytical/problem solving SHORT questions* ***10x 5 marks= 50 marks***

Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B*: Analytical/Problem solving DESCRIPTIVE questions* ***5 x 10 marks= 50 marks***

Two questions from each module with choice to answer one question.

PT19 100	CONCEPTS OF PRINTING TECHNOLOGY	3-0-0-3 (L-T-P-C)

COURSE OBJECTIVES:

The objective of this course is to set a firm and solid foundation in Printing Engineering with strong analytical, skills and conceptual understanding of basic technologies in Printing and Packaging.

SYLLABUS:

Module I: (9 hours)

Printing (Origin and development): definition, brief history, developments, Influence in human development, Classification of Printing: conventional (with Master) and non-Impact printing (without Master); Relief, Intaglio, Planography, Screen Printing.
Print production work flow: idea and concept, creative production.
Industrial Production: prepress, produce printing plates; Printing: select the apt printing process; Finishing and binding: foiling, varnishing, lamination cut to size, die-cutting, perforation and punching, folding, creasing, binding, glue binding, role of printing in packaging applications.
Logistics: distribution of the printed product to the end user.
Division of Printing Industry: printing industry and allied industry, printing industry.
Allied industries: trade shops or production houses, supplies, sales and service, equipment, related areas.

Module II: (7 hours)

Print Media: Books, Magazines, Brochures, Newspapers, Other Printed media, Future of printing. Size of the Printing Industry: Govt Sector, Private Sector, National& Abroad, Job Opportunities and Entre preneur ship: Govt Sector, Private Sector, National & Abroad. Publishing, Book Publishing , Different types of publishers, House style, Copy Editing, Proof Reading, Proof reading marks, Different types of proof, Parts of book, e-publishing, Outsourcing.

Module III: (9 hours)

Computer in Printing: basics of computer, computer operation, software and hardware, system software: operating system; application softwares, computer peripherals, computer network; LAN, WAN, MAN, wireless Networks,
Advantages of networking : internet and e-mail server, connecting media, modem, browser; URL, Application of internet in printing industry; Introduction to digital imaging, types of digital printing, advantage of digital printing.

Module IV: (7 hours)

Images for printing: types of originals, line original, tone original, rastor images, vector images, resolution, DPI, PPI, LPI; Image input methods; scanner, types of scanners; Image manipulation: cropping, scaling; advantages of image editing software; Image formats: JPEG, GIF, PDF, TIFF, EPS, PSD, PS, ZIP/RAR.

Module V: (7 hours)

Colours for printing: light and colour, electromagnetic spectrum, wavelength of different colours, colour theory, additive colours, subtractive colours RGB and CMYK, colour psychology, warm colour, cool colour, neutral colour, hue, saturation, value, colour printing process; Introduction to Offset Printing: principle of offset printing, four units of an offset press, cylinder configuration: Web Offset: Advantage of offset printing.

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability.

- To understand and analyze basics of Printing media and packaging.
- To study the basics of working principles of Printing related machines.
- To introduce the Printing and packaging technologies.

TEXT BOOKS:

1. Printing Technology Fifth Edition, J Michael Adams.

2.Technology of Offset Printing, C S Misra.

3. Handbook of Printing Processes Technologies &Industries, SudhirGuptha.

4. Modern Packaging Technology, EIRI board of consultants & engineers.

REFERENCE BOOKS:

1. Handbook of Print Media, Technologies and Production Methods Kipphan, Helmut (Ed.).
2. Hand book of Packaging Technology, By ERI Board of consultants & Engineers.
3. Introduction to Prepress design , color scanning, typesetting, fonts reproduction, By SPEIRS, Hugh.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2)

20% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.

10% - Attendance and Regularity in the class.

University Examination Pattern *(Maximum Marks-100).*

PART A*: Analytical/problem solving SHORT questions* ***10x 5 marks= 50 marks***

Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B*: Analytical/Problem solving DESCRIPTIVE questions* ***5 x 10 marks= 50 marks***

Two questions from each module with choice to answer one question.

GROUP E

EE19 101	BASICS OF ELECTRICAL ENGINEERING	2-1-0-2 (L-T-P-C)

COURSE OBJECTIVES:

- To impart a basic knowledge in Electrical Engineering with an understanding of fundamental concepts.

SYLLABUS:

Module I: (7 hours)

Elementary concepts of electric circuits: Kirchhoff's laws, constant voltage and current sources-Problems; Formation of network equations by mesh current and node voltage methods: matrix representation, solution of network equations by matrix methods- problems; star-delta conversion (resistive networks only-derivation is not needed) -problems.

Module II: (7 hours)

Magnetic Circuits: MMF, field strength, flux density, reluctance (definition only); comparison between electric and magnetic circuits.

Energy stored in magnetic circuits, magnetic circuits with air gap: numerical problems on series magnetic circuits.

Electromagnetic Induction: Faraday's laws, Lenz's laws- statically induced and dynamically induced emf - self inductance and mutual inductance, coefficient of coupling.

Module III: (10 hours)

Alternating Current fundamentals: Generation of alternating voltages-waveforms, frequency, period, average, RMS values and form factor of periodic waveform (pure sinusoidal)-numerical problems.

AC Circuits: Phasor representation of alternating quantities-rectangular and polar representation, Analysis of simple AC circuits: concept of impedance, power and power factor in ac circuits-active, reactive and apparent power solution of RL, RC and RLC series circuits-numerical problems.

Three phase systems: Generation of three phase voltages advantages of three phase systems, star and delta connection (balanced only), relation between line and phase voltages, line and phase currents three phase power measurement by two wattmeter method (derivation is not required)- numerical problems.

Module IV: (8 hours)

Electric Machines: DC Generator and Motor: Construction, working principle,Back EMF.

Types of motor: shunt, series, compound (short and long), principle of operation of dc motor, applications, numerical problems (voltage - current relations only).

Transformer: Construction of single phase and three phase.
Transformers (core type only): EMF equation and related numerical problems.
Losses and efficiency of transformer for full load– numerical problems (no equivalent circuit).

Module V: (7 hours)

AC Motors: Three phase induction motor-squirrel cage and slip ring induction motor working principle- synchronous speed, slip and related numerical problems (No equivalent circuit).
Power Systems: block diagram of power system, generation of power.
Block schematic representation of generating stations- hydro electric, thermal and nuclear power plants.
Renewable energy sources: solar, wind, tidal, geo thermal (block diagram & working only).

COURSE OUTCOMES:

Students will be able to

- To understand and analyse basic electric and magnetic circuits.
- To study the working principles of electrical machines.
- To get an idea about various schemes of electric power generation.

TEXT BOOKS:

1. Bhattacharya S. K., Basic Electrical & Electronics Engineering, Pearson.
2. Bird J., Electrical Circuit Theory and Technology, Routledge, Taylor & Francis Group.
3. Del Toro V., Electrical Engineering Fundamentals, Prentice Hall of India.
4. Hayt W. H., Kemmerly J. E., and Durbin, S. M., Engineering Circuit Analysis, Tata McGraw Hill.
5. Hughes, Electrical and Electronic Technology, Pearson Education.
6. Mehta V.K. and Mehta R., Basic Electrical Engineering, S. Chand Publishing.
7. Parker and Smith, Problems in Electrical Engineering, CBS Publishers and Distributors.
8. Sudhakar and Syam Mohan, Circuits and Networks Analysis and Synthesis, Tata McGraw Hill.
9. Suresh Kumar K. S, Electric Circuits and Networks, Pearson Education.

REFERENCE BOOKS:

1. D.P Kothari and I.J Nagrath, :Basic electrical Engineering", Tata McGraw Hill, 2010.
2. D.C Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. L.S. Bobrow : Fundamentals of Electrical Engineering, Oxford University Press, 2011.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2).
20% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.
10% - Attendance and Regularity in the class.

University Examination Pattern *(Maximum Marks- 100).*

PART A*: Analytical/problem solving SHORT questions* ***10x 5 marks= 50 marks***

Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B*: Analytical/Problem solving DESCRIPTIVE questions* ***5 x 10 marks= 50 marks***

Two questions from each module with choice to answer one question.

EC19 101	BASICS OF ELECTRONICS ENGINEERING	2-1-0-2 (L-T-P-C)

COURSE OBJECTIVES:

- To get knowledge about types, specification and common values of passive components.
- To understand the working of diodes and transistors.
- To impart knowledge about basic electronic and digital systems
- To familiarize the working of amplifiers and oscillators.
- To give basic ideas about various communication systems (no analysis required in this subject).

SYLLABUS:

Module I: (7 hours)

Passive components: Resistors: concepts of fixed & variable resistors, Carbon composition type resistors, metal film resistors, wire wound resistors, construction, power rating & tolerance.
Capacitors: different types, construction of mica and ceramic capacitors (disc & tubular), colorcode, electrolytic (Teflon) capacitors.
Inductors: construction of single layer, multilayer and variable inductors, principle of low power transformers.
Electro mechanical components: relays and contactors.

Module II: (7 hours)

Semiconductor Physics: Basic concepts, Intrinsic and extrinsic semiconductors, PN Junction diode, Principle of operation, V-I characteristics, principle of working of Zener diode, Photo diode, LED and Solar cell. Bipolar Junction Transistors, PNP and NPN structures, Principle of operation, input and output characteristics of common emitter configuration (NPN only).

Module III: (9 hours)

Digital Systems: logic expressions, Boolean laws, duality, De-Morgan's law, logic functions and gates, adders and subtractors.
Block diagram description of a dc power supply, half wave and full wave (including bridge) rectifiers, capacitor filter, working of simple zener voltage regulator.

Module IV: (7 hours)

Amplifiers and Oscillators: principle of electronic amplifiers, circuit diagram and working of common emitter amplifier, working principles of oscillators, concepts of feedback, circuit diagram & working of RC phase shift oscillator, Functional block diagram of operational amplifier, ideal operational amplifier, inverting and non-inverting amplifier.

Module V: (9 hours)

Radio Communication: modulation, principle of AM & FM, block diagrams of transmitters, waveforms, band width, principle of AM & FM demodulation, comparison of AM & FM, principle of super heterodyne receiver, block diagram.

Mobile communication: basic principles of cellular communications, concepts of cells, frequency reuse.

Optical communication: block diagram of the optical communication system, principle of light transmission through fiber, advantages of optical communication systems.

COURSE OUTCOMES:

Students will be able to

1. List the basic electronic components such as passive and electro mechanical components.
2. Illustrate the basic concept of different types of diodes and transistors.
3. Develop simple circuits using diodes and transistors.
4. Analyze simple circuits on operational amplifiers and digital gates.
5. Explain about the basic communication systems.

TEXT BOOKS:

1. Bell D. A., Electronic Devices and Circuits, Oxford University Press.
2. Tomasy W., Advanced Electronic Communication system, PHI Publishers.

REFERENCE BOOKS:

1. Boylested R. L. and Nashelsky L., Electronic Devices and Circuit Theory, Pearson Education.
2. Frenzel L. E., Principles of Electronic Communication Systems, McGraw Hill.
3. Kennedy G. and Davis B., Electronic Communication Systems, McGraw Hill.
4. Rajendra Prasad, Fundamentals of Electronic Engineering, Cengage Learning.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2).

20% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.

10% - Attendance and Regularity in the class.

University Examination Pattern *(Maximum Marks-100).*

PART A*: Analytical/problem solving SHORT questions* ***10x 5 marks= 50 marks***

Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B*: Analytical/Problem solving DESCRIPTIVE questions* ***5 x 10 marks= 50 marks***

Two questions from each module with choice to answer one question.

CE19 101	BASICS OF CIVIL ENGINEERING	2-1-0-2 (L-T-P-C)

COURSE OBJECTIVES:

The main objective of the course fundamentals of civil engineering is:

- To satisfy the technical requirement of understanding various principles associated with civil Engineering.
- To make the students persuade the civil engineering works that is an integral part of Engineering professional's life irrespective of the discipline.
- To give a broad perspective to the students to identify the oldest branch of engineering providing basic infrastructure for development.

SYLLABUS:

Module I: Scope of Civil Engineering. (8 hours)

Overview of Civil Engineering : Civil Engineering contributions to the welfare of society; specialized sub-disciplines in Civil Engineering: structural, construction, geotechnical, environmental, transportation and water resources engineering. Introduction to types of buildings as per NBC: selection of site for buildings, structural components of a residential building and their functions.

Module II: Building Planning. (8 hours)

Introduction to planning of residential buildings: site plan, orientation of a building, open space requirements, position of doors and windows, size of rooms.; Introduction to the various building area terms: computation of plinth area / built up area; floor area / carpet area- for a simple single storeyed building; setting out of a building.
Building drawing: plan, section and elevation of a single room building with RCC roof (sketching in the paper/note book only is expected).

Module III: Introduction to Surveying. (8 hours)

Surveying: objects, classification, principles; Brief description of the following instruments: (i) chain and accessories (ii) Dumpy level (iii) Theodolite. Use of levelling instrument for determining reduced levels of various stations: simple problems on leveling, use of theodolite for measuring horizontal angles (only brief description is required). Modern tools of surveying and mapping: total station, global positioning system, remote sensing and geographic information system.

Module IV: Civil Engineering Materials & Building Construction. (8 hours)

Brief description of Engineering properties and applications of the construction materials: bricks, stones, sand, cement, concrete, steel, timber, modern materials (Study on laboratory tests & detailed manufacturing processes of materials are not required).
Cement mortar and cement concrete: properties and applications: reinforced cement concrete fundamentals (only brief description is required).

Module V: Building Construction. *(7 hours)*

Foundations: types of foundations (sketches only), bearing capacity and settlement (definition only), functions of foundations, requirement of good foundations.

Stone and brick masonry construction: bonds used in general constructions, elevation and plan (one brick thick walls only).

Geometric, structural, and functional features of roads, bridges and dams.

COURSE OUTCOMES:

- The students will get an overview of surveying, building planning, water resources and transportation engineering.
- The course provides an essential tool to understand the basics of civil engineering works that an engineer come across in professional as well as personal life.
- The students learn to prepare the layouts of buildings and other infrastructures, obtain understanding of the basic elements of the transportation system, techniques for water conservation, to prepare layouts of different buildings.

TEXT BOOKS:

1. Surveying Vol. I, II by Dr. B.C. Punamia.
2. Building planning, designing and scheduling by Gurcharan Singh.
3. Building Construction.,Rangwala, S. C. and Dalal, K. B.,Charotar Publishing house.
4. Basic Civil Engineering., S.S Bhavikatti., New Age International Pvt.Ltd,Publishers.

REFERENCE BOOKS:

1. Surveying Vol. I, II by Dr. B.C. Punamia.
2. Surveying and Levelling Vol. I and II by T.P Kanetkar and S.V Kulkarni.
3. Surveying Theory and Practice (Seventh Edition) by James M. Anderson, Edward M. Mikhail.
4. Remote sensing and Image interpretation by T.M Lillesand, R.W Kiefer. And J.W Chipman 5th edition.
5. Building Science and Planning by S.V.Doedhar.
6. Principles of Town planning by Keeble Lewis.
7. Rangwala, S. C., Essentials of Civil Engineering, Charotar Publishing House.
8. Rangwala, S. C. and Dalal, K. B., Engineering Materials, Charotar Publishing house.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2)

20% -Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.

10% - Regularity in the class.

University Examination Pattern *(Maximum Marks-100).*

PART A**: Analytical/problem solving SHORT questions **10 x 5 marks= 50 marks

Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B**: Analytical/Problem solving DESCRIPTIVE questions **5 x 10 marks= 50 marks

Two questions from each module with choice to answer one question.

ME19 101	BASICS OF MECHANICAL ENGINEERING	2-1-0-2 (L-T-P-C)

COURSE OBJECTIVES:

To expose the students to the thrust areas in Mechanical Engineering and their relevance by conveying the fundamental concepts.

SYLLABUS:

Module I: (8 hours)

Thermodynamic processes: isobaric, isochoric, isothermal, adiabatic and polytropic : workdone and P-V diagrams; Laws of Thermodynamics, entropy, enthalpy; Ideal and real gas equations; Analysis of Carnot cycle, Otto cycle , Diesel cycle and Dual cycle; Efficiency of these cycles.

Module II: (8 hours)

Engines: major components and their functions (description only); Working principle of two stroke and four stroke I.C. Engines (diesel and petrol), comparison; MPFI & CRDI Engines. Power Transmission Devices: Belts and belt drives; chain drive, rope drive. Gears and gear trains: friction clutch (cone and single plate), brakes (types and applications only).

Module III: (8 hours)

Refrigeration: vapour compression and vapour absorption refrigeration systems, COP, Study of household refrigerator, energy efficiency rating; Refrigerants and their impact on environment.

Hydraulic turbines: Pelton, Francis and Kaplan turbines (applications only).

Pumps: introduction, classification, reciprocating and centrifugal (brief description and working only).

Module IV: (8 hours)

Sources of Energy: introduction, classification; Non-renewable energy: fossil fuels, solid, liquid and gaseous, calorific value; Renewable energy: hydroelectric, solar, wind, biomass, biogas, ocean thermal, tidal, wave and geothermal energy.

Power Plants: introduction, layout and working of diesel, nuclear, thermal and hydel power plants.

Module V: (7 hours)

Machine Tools: basic elements, Working principle and types of operations; lathe, drilling machine, shaper, planer, slotter, milling machine, grinding machine. Introduction to NC and CNC machines.
Engineering materials: classification, properties, alloys and their applications
Manufacturing process: introduction, elementary ideas of rolling and extrusion machining operations, turning, shaping, milling and drilling.

COURSE OUTCOMES:

- At the end of the course, the students will have exposed to the different areas of Mechanical Engineering.
- Gained idea about nature, scope and applications of Mechanical Engineering principles.

TEXT BOOKS / REFERENCE BOOKS:

1. Balachandran, Basic Mechanical Engineering, Owl Books.
2. Benjamin, J., Basic Mechanical Engineering, Pentex Books.
3. Clifford, M., Simmons, K. and Shipway, P., An Introduction to Mechanical Engineering Part I – CRC Press.
4. Crouse, Automobile Engineering, Tata Mc-Graw-Hill, New Delhi.
5. Gill, Smith and Zuirys, Fundamentals of IC Engines, Oxford and IBH publishing company Pvt. Ltd. New Delhi. Crouse, Automobile Engineering, Tata Mc-Graw-Hill, New Delhi.
6. Nag, P. K., Basic and Applied Thermodynamics, Tata McGraw-Hill.
7. Pravin Kumar, Basic Mechanical Engineering.
8. Roy and Choudhary, Elements of Mechanical Engineering, Media Promoters & Publishers Pvt. Ltd.,Mumbai.
9. Sawhney, G. S., Fundamentals of Mechanical Engineering, PHI.
10. V Ganeshan Internal combustion engines, Mc-Graw-Hill.
11. R K Rajput Thermal Engineering,Laxmi Publications, 2010.
12. R K Bansal A Text Book of Fluid mechanics and hydraulic machines, Laxmi Publications.
13. P C Sharma Production Technology, S Chand publications.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2).

20% -Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.

10% - Regularity in the class.

University Examination Pattern (*Maximum Marks-100).*

PART A**: Analytical/problem solving SHORT questions **10 x 5 marks= 50 marks

Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B**: Analytical/Problem solving DESCRIPTIVE questions **5 x 10 marks= 50 marks

Two questions from each module with choice to answer one question.

GROUP F

ES19 100	ENVIRONMENTAL SCIENCE	2-1-0-2 (L-T-P-C)

COURSE OBJECTIVES:

- To understand the problems of pollution, deforestation, solid waste disposal, degradation of environment, loss of biodiversity and other environmental issues at local and global levels.
- To create awareness among the students to address these issues and conserve the environment in a better way.

SYLLABUS:

Module I: Resources (9 hours)

The multidisciplinary nature of environmental science: definition scope and importance,

need for public awareness.

Natural resources: renewable and non-renewable resources; natural-associated problems.

Forest resources: use and over-exploitation; deforestation: case studies- timber extraction, mining, dams and their effects on forests and tribal people.

Water resources: use and over utilization of surface and ground water; floods, drought, and conflicts over water; dams (benefits and problems).

Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources- case studies.

Food resources: world food problems, changes caused by agriculture over grazing-, effects of modern agriculture fertilizer, pesticide problems, water logging, and salinity- case studies.

Energy resources: growing energy needs, renewable and non-renewable energy resources , use of alternate energy resources.

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

Module II: Ecosystems (8 hours)

Concept of an ecosystem: structure and function of an ecosystem; producers, consumers and decomposers; Energy flow in the ecosystem: food chains and food webs, ecological pyramids, ecological succession.

Different Ecosystems: introduction, types, characteristics, features, structure; Function of the ecosystems: forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystem (ponds, streams, lakes, rivers, ocean , and estuaries).

Module III: Biodiversity (8 hours)

Introduction: definition, genetic, species and ecosystem diversity; Biogeographical classification of India.

Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values; Biodiversity at global, national, and local level; India as mega-diversity nation; Hot spot of biodiversity.

Threats to biodiversity: habitat loss, poaching of wild life, and man-wild life conflicts; Endangered and endemic species of India; Conservation of biodiversity (In-situ and Ex- situ conservation of biodiversity).

Module IV: Environmental Pollution. (7 hours)

Definition, causes, effects and control measures of air pollution; Water pollution; Soil pollution; Marine pollution; Noise pollution; Thermal pollution; Nuclear hazards.

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

Waste management: role of an individual in prevention of pollution, pollution case studies.

Disaster management: floods, earth-quake, cyclone and landslides.

Module V: Environment and Sustainable Development. (7 hours)

Sustainable use of natural resources; Conversion of renewable energy resources into other forms; Problems related to energy and energy auditing- case studies.

Water conservation: rain water harvesting and watershed management- case studies.

Climate change: global warming, acid rain and ozone layer depletion- case studies.

Nuclear accidents and holocaust- case studies.

Waste land reclamation: consumerism and waste products: reduce, reuse and recycle concept of products; Value education.

COURSE OUTCOMES:

- Develop concepts and methods from surroundings and their application in environmental problem solving.
- Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

TEXT BOOKS:

1. Daniels and Krishnaswamy, Environmental studies, Wiley India Pvt Ltd, 2009.
2. Raman Sivakumar, Introduction to environmental science and engineering, 2nd edn, . Tata McGraw Hill, 2010.
3. AninditaBasak, Environmental Studies, Pearson Education, 2009.
4. Suresh K.D, Environmental Engineering and Management, Katson Books, 2007.
5. Benny Joseph, Environmental studies, 2nd edn, McGraw Hill, 2009.

REFERENCE BOOKS:

1. Raghavan Nambiar, K Text book of Environmental Studies, Scitech Publishers(India) Pvt. Ltd.
2. S.P Misra, S.N Pandey, Essential Environmental studies, Ane books, Pvt Ltd, 2009.
3. P N Palanisamy, P Manikandan, A Geetha, Manjula Rani, Environmental Science, Pearson Education, 2012.
4. D.L. Manjunath, Environmental Studies, Pearson Education, 2011.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2).

20% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.

10% - Attendance and Regularity in the class.

University Examination Pattern *(Maximum Marks-100).*

PART A*: Analytical/problem solving SHORT questions* ***10x 5 marks= 50 marks***

Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B*: Analytical/Problem solving DESCRIPTIVE questions* ***5 x 10 marks= 50 marks***

Two questions from each module with choice to answer one question.

DE19 200	CONCEPT BASED ENGINEERING	2-1-0-2 (L-T-P-C)

COURSE OBJECTIVES:

- To excite the student on creative design and its significance.
- To make student aware of the processes involved in the design.
- To make the student understand the interesting interaction of various segments of humanities, science and engineering in the evolution of a design.
- To get an exposure as how to engineer a design.

SYLLABUS:

Module I: (8 hours)

Introduction: example of different kinds of designs and designers, design problems; Definition of design; engineering design and research: importance, role of science, engineering and technology in design, design constraints, design functions, design means and design form, functional and strength designs. design form, function and strength; initiation of creative designs; initiating the thinking process for designing a product of daily use. need identification; problem statement; market survey- customer requirements; design attributes and objectives; ideation; brain storming approaches; arriving at solutions; Closing on to the Design needs.

Module II: (8 hours)

Product life cycle: morphology of design, introduction to system design process, stage models, design process- different stages in design and their significance; define problem, concept generation and evaluation, detailed design process, defining the design space; analogies, quality function deployment: meeting what the customer wants; evaluation and choosing of a design.

Module III: (8 hours)

Design for X; covering quality, reliability, safety, manufacturing/construction, assembly, maintenance, logistics, handling; disassembly; recycling; re-engineering etc. design communication; realization of the concept into a configuration, drawing and model. design for function and strength. design detailing- material selection, design visualization- solid modeling; detailed 2D drawings.

Module IV: (8 hours)

Prototyping- rapid prototyping; testing and evaluation of design; design modifications; freezing the design; cost analysis. engineering the design from prototype to product. planning; scheduling; supply chains; inventory; handling; manufacturing/construction operations; storage; packaging; shipping; marketing; feed-back on design. list out the standards organizations. Prepare a list of standard items used in any engineering specialization.

Module V: *(7 hours)*

Product centred and user centred design. product centred attributes and user centred attributes. bringing the two closer. example: smart phone. aesthetics and ergonomics. value engineering, concurrent engineering, reverse engineering in design; culture based design; architectural designs; motifs and cultural background; tradition and design; design as a marketing tool; intellectual property rights, trade secret; patent; copy-right; trademarks; product liability.

COURSE OUTCOMES:

The student will be able to:

1. Initiate process and component elements in good and optimal design.
2. Design process stages and evaluation of the different steps involved.
3. Visualize models by combining all interdisciplinary fields.
4. Testing and evaluate the models while considering non engineering attributes.
5. Improve product quality by design survey and obtaining the patent for the product.

TEXT BOOKS/REFERENCE BOOKS:

1. Pahl G, and Beitz, W. Engineering Design: A Systematic Approach, 3rd Ed., Springer, 2007.
2. Cross N. Engineering Design Methods: Strategies for Product Design (4th edition), John Wiley and Sons Ltd., Chichester, 2008.
3. Roozenburg N.F.M., Eekels J. Product Design, Fundamentals and Methods, Wiley, Chichester, 1995.
4. James A Senn, Analysis and Design of Information system, McGraw Hill 2003.

Internal Continuous Assessment *(Maximum Marks-50).*

70% - Tests (minimum 2).

20% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.

10% - Attendance and Regularity in the class.

University Examination Pattern *(Maximum Marks-100).*

PART A*: Analytical/problem solving SHORT questions* ***10x 5 marks= 50 marks***

Candidates have to answer TEN questions out of FIFTEEN. There shall be THREE questions from each module with total FIFTEEN questions.

PART B*: Analytical/Problem solving DESCRIPTIVE questions* ***5 x 10 marks= 50 marks***

Two questions from each module with choice to answer one question.

GROUP G

CH19 100 (P)	ENGINEERING CHEMISTRY LAB	0-0-2-1 (L-T-P-C)

COURSE OBJECTIVES:

- To equip the students with the working knowledge of chemical principles, nature and transformation of materials and their applications.
- To develop analytical capabilities of students so that they can understand the role of chemistry in the field of Engineering and Environmental Sciences.

SYLLABUS:

List of Exercises / Experiments

1. Preparation of urea–formaldehyde and phenol–formaldehyde resin.
2. Estimation of total hardness in a given sample of water using EDTA.
3. Estimation of chloride ions in domestic water.
4. Determination of dissolved oxygen present in a given sample of water.
5. Determination of available chlorine in a sample of bleaching powder.
6. Estimation of copper in a given sample of brass.
7. Estimation of iron in a sample of iron ore.
8. Estimation of iron in Mohr's salt using standard $K_2Cr_2O_7$.
9. Determination of flash point and fire point of an oil.
10. Preparation of buffers and standardization of pH meter.

EXPECTED OUTCOME:

- The student will be able to apply and demonstrate the theoretical concepts of Engineering Chemistry.

TEXT BOOK:

1. Dr.Sunita Rattan, Experiments in Applied Chemistry, S.K. Kataria and Sons, New Delhi.

REFERENCE BOOK:

1.Vogel, A Text Book of Quantitative Analysis, ELBS, London.

Internal Continuous Assessment *(Maximum Marks-100).*

60% - Laboratory practical, record and Viva voce.

30% - Tests.

10% - Regularity in the lab.

PH19 100 (P)	ENGINEERING PHYSICS LAB	0-0-2-1 (L-T-P-C)

COURSE OBJECTIVES:

This course is designed

- To impart practical knowledge about some of the phenomena they have studied in the Engineering Physics course.
- To develop the experimental skills of the students.

SYLLABUS:

List of experiments

(Minimum 10 experiments out of 20)

1. Characteristics of Zener diode.
2. Determination of band gap energy in a semi-conductor.
3. Voltage regulation using Zener diode.
4. Static characteristics of a transistor in common emitter configuration.
5. Characteristics of photodiode.
6. Characteristics of a LED and wavelength of emitted radiation.
7. Draw the aerial and illumination characteristics of a solar cell.
8. Draw the power load and current-voltage characteristics of a solar cell.
9. Wavelength of mercury spectral lines using diffraction grating and spectrometer.
10. Dispersive power using diffraction grating and spectrometer.
11. Diameter of a thin wire or thickness of a thin wire by Air-wedge method.
12. Wavelength of sodium light by Newtons Ring method.
13. Refractive index of given liquid by Newtons Ring method.
14. Specific rotation of cane sugar solution using polarimeter.
15. Wavelength of laser using Grating. Standardise the Grating using sodium light.
16. Resolving power using diffraction grating and spectrometer.
17. To determine the angular divergence of a laser beam.
18. To measure the numerical aperture of an optical fibre.
19. Melde's string apparatus. Measurement of frequency in the transverse and longitudinal mode.
20. Wavelength and velocity of ultrasonic waves using ultrasonic diffractometer.

REFERENCE BOOKS*:*

1. Avadhanulu M. N., Dani A. A. and Pokley P. M., Experiments in Engineering Physics, S. Chand & Co.
2. Gupta S. K., Engineering Physics Practicals, Krishna Prakashan Pvt Ltd.
3. Koser A. A., Practical Engineering Physics, Nakoda Publishers and Printers India Ltd.
4. Rao, B. S. and Krishna, K. V., Engineering Physics Practicals, Laxmi Publications Sasikumar, P. R. Practical Physics, PHI.

Internal Continuous Assessment *(Maximum Marks-100).*

60% - Laboratory practical, record and Viva voce.

30% - Tests.

10% - Regularity in the lab.

GROUP H

EE19 100 (P)	**ELECTRICAL ENGINEERING WORKSHOP**	**0-0-2-1 (L-T-P-C)**

COURSE OBJECTIVES:

- To impart a basic knowledge of electrical circuits, machines and power systems.

SYLLABUS:

List of experiments

1. Familiarization of various types of service mains:wiring installations, accessories and house hold electrical appliances.
2. Methods of earthing: measurement of earth resistance, testing of electrical installations, precautions against and cure from electric shock.
3. Practice of making different joints: britannia, married and T-joints on copper/aluminium.
4. Wiring practice of a circuit to control two lamps by two SPST switches.
5. Wiring practice of a circuit to control one lamp by two SPDT switches.
6. Wiring practice of a circuit to control one fluorescent lamp and one three pin plug socket.
7. Wiring practice of a main switch board consisting of ICDP switch, DB, MCB‘s and ELCB‘s.
8. Familiarization of various parts of electrical motors and wiring of three phase and single phase motor with starter.
9. Familiarization of energy meter and measurement of energy consumption by a single phase load.
10. Familiarization of various electrical and electronic components such as transformers, resistors, AF and RF chokes, capacitors, transistors, diodes, IC‘s and PCB.

COURSE OUTCOMES:

At the end of the course the students will be able to

- Familiarize with the important electrical components and their working.
- Get an idea of electrical protective devices.
- Practice simple electrical wirings and installations.

Internal Continuous Assessment *(Maximum Marks-100)*

60% - Laboratory practical, record and Viva voce

30% - Tests

10% - Regularity in the lab.

EC19 100 (P)	ELECTRONICS ENGINEERING WORKSHOP	0-0-2-1 (L-T-P-C)

COURSE OBJECTIVES:

The objective of this course is to familiarize the students about electronic components, measuring instruments, bread board assembling, soldering tools and components etc.

SYLLABUS:

List of Exercises / Experiments

(Minimum 10 experiments out of 11)

1. Familiarization/identification of electronic components.
2. Draw electronic circuit diagram using IEEE standard symbols.
3. Familiarization/application of instruments and equipment: multimeter, power supply, CRO, function generator.
4. Assembling of electronic circuit on general purpose bread board: Fixed voltage power supply with transformer, rectifier diode, capacitor filter, zener regulator.
5. Bread board assembling: Common emitter amplifier.
6. Introduction to soldering practice: study of soldering components, solders, tools, heat sink.
7. PCB assembly and testing of full wave rectifier circuit diagram.
8. PCB assembly and testing of inverting amplifier circuit.
9. Familiarization of setting up of a PA system with different microphones, loud speakers, mixer etc.
10. Assembling and dismantling of desktop computer/laptop/mobile phones.
11. Introduction to robotics: familiarization of components (motor, sensors, battery etc.) used in robotics and assembling of simple robotic configurations.

COURSE OUTCOMES:

The student will be able to

- Identify and test various active and passive components.
- Make use of various testing instruments and commonly used tools. Build electronic circuits on breadboard.
- Solder electronic circuits on PCB.
- Identify various subsystems of electronic systems like PA Systems and desktop computers.

Internal Continuous Assessment *(Maximum Marks-100).*

60% - Laboratory practical, record and Viva voce.

30% - Tests.

10% - Regularity in the lab.

CE19 100 (P)	CIVIL ENGINEERING WORKSHOP	0-0-2-1 (L-T-P-C)

COURSE OBJECTIVES:

- To provide experience on plotting, measuring/determining horizontal distances, level differences between stations and horizontal angles.
- To provide experience on setting out for small buildings, masonry construction and model making.

SYLLABUS:

List of Exercises / Experiments

1. Setting out of a building: the student should set out a building (single room only) as per the given building plan using tape only.
2. Setting out of a building: the student should set out a building (single room only) as per the given building plan using tape and cross staff.
3. Chain surveying : study of chain and accessories, plotting one side of a building/ five or six points in the field using chain and cross-staff.
4. Horizontal measurements: study of compass, plotting one side of a building/five or six points in the field using compass; Find the area of an irregular polygon set out on the field.
5. Levelling: study of levelling instruments, determination of reduced levels of five or six points in the field.
6. Theodolite: study of theodolite, measuring horizontal angles.
7. Theodolite: study of theodolite, measuring vertrical angles.
8. Brick Masonry.
9. Plumbing: demonstration of plumbing fixtures, exercise in joints
10. Model making of simple solids.

COURSE OUTCOMES:

The student will be able

- To get an overview of surveying, building planning, plumbing, leveling.
- To understand the basics of civil engineering works.

Internal Continuous Assessment *(Maximum Marks-100).*

60% - Laboratory practical, record and Viva voce.

30% - Tests.

10% - Regularity in the lab.

ME19 100 (P)	MECHANICAL ENGINEERING WORKSHOP	0-0-2-1 (L-T-P-C)

COURSE OBJECTIVES:

- To inculcate engineering aptitude, confidence and experience towards technical skills.
- To train the students mentally and physically for industries.
- To impart knowledge and technical skills on basic manufacturing methods.

SYLLABUS:

List of Exercises / Experiments

1. Carpentry: study of tools and joints, planning, chiseling, marking and sawing practice, different joints, use of power tools.
2. Fitting: study of tools, chipping, filing, cutting, drilling, tapping, male and female joints and stepped joints.
3. Smithy: study of tools, forging of square prism, hexagonal bolt.
4. Foundry: study of tools, sand preparation, moulding practice.
5. Sheet Metal work: study of tools, selection of different gauge sheets, types of joints, trays and containers.
6. Welding**:** study of tools, different types of joints, practice.

COURSE OUTCOMES:

The student will be able to

- Understand modern manufacturing operations, their capabilities, limitations, and to design economically.
- To assess the working conditions of machining process.

Internal Continuous Assessment *(Maximum Marks-100).*

60% - Laboratory practical, record and Viva voce.

30% - Tests.

10% - Regularity in the lab.

IT 19 100 (P)	INTRODUCTION TO COMPUTING AND PROBLEM SOLVING LAB	0-0-2-1 (L-T-P-C)

COURSE OBJECTIVES:

1. To familiarize students with basic computer hardware and software components.
2. To learn implementation of various structures and algorithms using Python.

SYLLABUS

List of Experiments
(*A maximum of* ***25*** *programs have to be practiced)*

1. Familiarization of hardware components of a desktop computer and its assembling.
2. Familiarization of operating systems and various open source tools.
3. Python programs to implement the following concepts:

- Programs like factorial of a number, power of a number, minimum and maximum elements in a set etc. to understand the concepts of decision making, iteration and control structures.
- Functions: user defined functions, built-in functions, function calls, math functions, parameter passing, recursion.
- Strings: traversal, searching, comparisons.
- Creation and maintenance of List, Tuples, Dictionaries.
- Creating, opening, reading, copying, writing and closing Files.

COURSE OUTCOMES:

The student will be able to

1. Write, Test and Debug Python Programs.
2. Implement Conditionals and Loops for Python Programs.
3. Use functions and represent Compound data using Lists, Tuples and Dictionaries.
4. Read and write data from and to files in Python.

Internal Continuous Assessment *(Maximum Marks-100).*

60% - Laboratory practical, record and Viva voce.

30% - Tests.

10% - Regularity in the lab.

PT19 100 (P)	PRINTING TECHNOLOGY WORKSHOP	0-0-2-1 (L-T-P-C)

OBJECTIVES:

- To provide basic exposure to various printing technologies.
- To impart a basic knowledge about various printing related equipment and terminologies.

SYLLABUS:

List of Experiments

1. Basics of computer for graphics designing process.

2. Identification of parts of a desk top system.

3. Identification of films, papers types used in a printing press.

4. Familiarization of various originals: line original and continuous tone.

5. Familiarization of type face and different types of font.

6. Study of color theory: draw and demonstrate the concept on paper/chart.

7. Study of paper jogging for printing.

8. Familiarize basics printing process and demonstration.

9. Demonstration: Letter press offset and Screen printing.

10. Familiarize with offset machine.

COURSE OUTCOMES:

The student will be able to

- inculcate engineering aptitude, confidence and experience towards technical skills.
- introduce the students mentally and physically for printing industries.
- impart knowledge and technical skills on basic printing methods.
- know and understand the basic concepts of printing.

Internal Continuous Assessment *(Maximum Marks-100).*

60% - Laboratory practical, record and Viva voce.

30% - Tests.

10% - Regularity in the lab.

GROUP I

CM19 100	COMMUNICATIVE ENGLISH	2-0-0-0 (L-T-P-C)

COURSE OBJECTIVES:

- To adapt the employability and career requirements of the industry.
- To adapt students with ease to the Industry environment by equipping with communication skills.
- To focus on overall capability in communicating ideas in an effective manner, apart from gaining academic competence.

SYLLABUS:

Module I: (4 hours)

Communication: definition, communication process; types of communication: formal and informal. Relevance of body language; verbal and non-verbal effective communication; communication breakdown: how to overcome communication barriers.

Module II: (7 hours)

Listening skills: listening and typing, focused listening, listening and sequencing of sentences, fill in the blanks, listening and answering questions. Reading comprehension: questions and answers, close exercises; Vocabulary building tasks: vocabulary trees, learning words through situations, word formation, roots, prefixes and suffixes, derivatives, synonyms and antonyms, phrasal verbs, homonyms.

Module III: (8 hours)

Parts of speech with special focuses on nouns & pronouns, verbs, adverbs, adjectives. subject- verb agreement. Speaking skills: linguistic and phonetics; vowels and Consonants; 44 phonetic symbols, Diphthongs, syllables, phonemes; stress and rhythm in connected speech: intonations and voice modulations, weak forms and strong forms, production of speech sounds in connected speech, shifting the stress for emphasis, relevance of correct pronunciation, face to face conversation of telephonic conversation.

Module IV: (3 hours)

Writing skills: C.V, effective resume, report, memo, business letters, structuring a report and e-mail communication.

Module V: (4 hours)

Developing self-esteem: presentation skills, facing the interview board, group discussions and debating skills; soft skills and time management; Psychometrics and stress management; emotional quotient.

COURSE OUTCOME:

At the end of the course the student will be able to heighten their awareness of correct usage of English grammar in writing and speaking. Students will acquire basic proficiency in English including comprehension, writing, and speaking skills.

REFERENCE BOOKS*:*

1. Meenakshi Raman and Sangeeta Sharma., Technical Communication- Principles and Practice, Oxford University press.
2. R C Bhatia, Business Communication, Ane Books Pvt. Ltd, 2009.
3. Sunita Mishra and C Muralikrishna, Communication Skills for Engineers, Pearson Education.
4. Jovan van Emden and Lucinda Becker, Effective Communication for Arts and Humanities Students, Palgrave macmillam, 2009.
5. Sanjay Kumar and Pushpalata , Communication skills, Oxford University Press, 2011.
6. Practical English Usage. Michael Swan. OUP. 1995.
7. Remedial English Grammar. F.T. Wood. Macmillan, 2007.
8. On Writing Well. William Zinsser. Harper Resource Book. 2001.
9. Study Writing. Liz Hamp- Lyons and Ben Heasly. Cambridge University Press. 2006.
10. Communication Skills. Sanjay Kumar and PushpLata. Oxford.
11. T M Farhathullah, Communication Skills for Technical Students, Orient Longman, Hyderabad.

LL19 200	LANGUAGE LAB	0-0-2-0 (L-T-P-C)

COURSE OBJECTIVES:

- To enhance the linguistic skill of the students, keeping in view of the necessity of imparting employability skills of engineering graduates
- To Provide with a software platform which has functions like Listen- Respond- Intercommunicate-Monitor- Teacher call etc.
- To focus on the students overall ability in using English as a tool for communication.
- To overcome the inhibition factor while using English and equip them to adapt themselves to the industry environment with ease and confidence, bringing about a sort of transformation in each student.

LAB SESSIONS

1. Sessions on introduction to Linguistics and Phonetics: speech sounds and phonetic symbols; Syllables and phonemes.
2. Training to develop sharp listening skills: focused listening with emotional content; Relevance of correct pronunciation.
3. Sessions beginning with two minutes Oral Presentation on topics of their choice;
   Role plays: students take on roles and engage in dialogues/ conversations.
4. The art of effective communication: effective presentation skills; presentation tools, voice modulations, word accent, rhythm and intonation; audience analysis.
5. Vocabulary building tasks: fun games in English.
6. Relevance of body language, how to face an interview board; mock interviews; group discussions with special focus on a candidate's etiquette; debates and the art of exhibiting the interpersonal skills; public speaking.
7. Soft-skills; Emotional quotient; Training sessions; Stress Management.

COURSE OUTCOMES:

- Training sessions in the language lab acted as a ' facilitation' and 'confidence booster' to enhance the linguistic skill of the students.
- Equip the students to face the interview board with confidence, making them aware of the nuisances and methodology involved in this area; help them to activily participate in debates and group discussions.
- Make an effective presentation in front of a selected audience.

SUGGESTED SOFTWARE:

1. Cambridge Advanced Learners' English Dictionary with CD.
2. The Rosetta Stone English Library.

3. Clarity Pronunciation Power.
4. Mastering English in Vocabulary, Grammar, Spellings, Composition.
5. Dorling Kindersley series of Grammar, Punctuation, Composition etc.
6. Language in Use, Foundation Books Pvt Ltd with CD.
7. Learning to Speak English - 4 CDs.
8. Microsoft Encarta with CD.
9. Murphy's English Grammar, Cambridge with CD.

REFERENCE BOOKS:

1. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
2. English Pronouncing Dictionary Daniel Jones Current Edition with CD.
3. Spoken English- R. K. Bansal and J. B. Harrison, Orient Longman 2006 Edn.
4. A Practical course in English Pronunciation, (with two Audio cassettes) by J. Sethi, Kamlesh Sadanand & D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.