Study & Evaluation Scheme

of

Bachelor of Technology
(Electronics & Communication Engineering)

[Applicable for Academic Session 2018-19]

[Approved by Hon'ble VC dated August 08, 2017]

[With revision approved by VC date July 23, 2018, August 14, 2018, January 23, 2019 & November 29, 2019]

TEERTHANKER MAHAVEER UNIVERSITY

N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001

Website: www.tmu.ac.in

TEERHANKER MAHAVEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)

Delhi Road, Bagarpur, Moradabad (U.P)

Study & Evaluation Scheme
Bachelor of Technology
SUMMARY

Programme	:	B.Tech (Electronics & Communication Engineering)
Duration	:	Four-year full time (Eight Semesters)
Medium	:	English
Minimum Required Attendance	:	75 %
Credit	:	
Maximum Credit	:	196
Minimum credit required for the degree	:	188

Assessment :

Internal	External	Total
40	60	100

Internal Evaluation (Theory Papers)

Class Test I	Class Test II	Class Test III	Assignment(s)	Attendance	Total
Best two out of three					
10 Marks	10 Marks	10 Marks	10 Marks	10 Marks	40 Marks

Project Phase-I :

Internal	External	Total
100	-	100

Evaluation of Practical/Industrial Training/ Project Phase-II :

Internal	External	Total
50	50	100

Duration of Examination :

External	Internal
3 hrs.	hrs

(To qualify the course a student is required to secure a minimum of 45% marks in aggregate in each course including the semester-end examination and the teacher's continuous evaluation shall be essential for passing the course and earning its assigned credits. A candidate, who secures less than 45% marks in a course, shall be deemed to have failed in that course.)

Question Paper Structure

1. *The question paper shall consist of six questions. All six are compulsory. First question shall be of short answer type (not exceeding 50 words). Question No. 1 shall contain 8 parts representing all units of the syllabus and students shall have to answer any five (weightage 2 marks each).*
2. *Remaining five questions will be one from each unit with internal choice. The student has to answer one of the two in each question. The weightage of Question No. 2 to 6 shall be 10 marks each.*
3. *Usually each question in the examination should be designed to have a numerical component, where part of syllabus.*

Note 1:

Evaluation Scheme for MOOC, Short Term Courses:

University allows students to undertake additional subjects/course(s) (In-house offered by the university through collaborative efforts or courses in the open domain by various internationally recognized universities) and to earn additional credits on successful completion of the same. Each course will be approved in advance by the University following the standard procedure of approval and will be granted credits as per the approval.

Keeping this in mind the Academic Council in its 10th meeting on February 13, 2016, approved the University proposal and allowed a maximum of two credits to be allocated for MOOC courses. In the pilot phase it is proposed that a student undertaking and successfully completing a MOOC course through edX, Coursera, IIRS and NPTEL could be given a maximum credit of two with 1 credit for credit with 30-60 contact hours and 2 credits for courses having more than 60 credit hours.

For smooth functioning and monitoring of the scheme the following shall be the guidelines for MOOC courses, Add-on courses carried out by the College from time to time.

1. There shall be a MOOC co-ordination committee in the College with a faculty at the level of Professor heading the committee and all Heads of the Department being members of the Committee.
2. The Committee will list out courses to be offered during the semester, which could be requested by the department or the students and after deliberating on all courses finalise a list of courses to be offered with credits defined for each course and the mode of credit consideration of the student. The complete process including the approval of the Vice Chancellor shall be obtained by the College before end of June and end of December for Odd and Even semester respectively of the year in which the course is being offered. In case of MOOC course the approval will be valid only for the semester on offer.
3. A student can opt for a maximum of two MOOC courses for credit during the complete duration of the course other than offered under SWAYAM.
4. College can offer upto 20% credit through courses offered by SWAYAM. However, if the college is offering courses on other MOOC platforms, the total credit offered under MOOC will not exceed 20% including those offered under SWAYAM.
5. Students will register for the course and the details of the students enrolling under the course along with the approval of the Vice Chancellor will be forwarded to the Examination department within fifteen days of start of the semester by the Co-ordinator MOOC through the Principal of the College.

6. Where the MOOC course or Add-on on courses are only offering certificate of successful completion, and credit has been assigned to the course, the University examination division will conduct a MCQ examination for the course with 50 MCQ with 100 marks to facilitate inclusion of the courses in CPI computation.
7. College will define whether the credits are regular credits or to be considered only in case a student fails to secure minimum required credits then the additional subject(s) shall be counted for calculating the minimum credits required for the award of degree.
8. In case the College wants the additional course to be shown in the mark sheet as additional course completed by the students the same shall also be mentioned by the College and the student will opt for the same at the time of taking admission to the course.

Study & Evaluation Scheme

Semester I

S. No	*Course Code*	*Subject*	*Periods*			*Credit*	*Evaluation Scheme*		
			L	*T*	*P*		*Internal*	*External*	*Total*
1	EAS116	Engineering Mathematics-I	3	1	-	4	40	60	100
2	EAS112/212	Engineering Physics-I	3	1	-	4	40	60	100
	EAS113/213	Engineering Chemistry							
3	EEE117/217	Basic Electrical Engineering	3	1	-	4	40	60	100
	EEC111/211	Basic Electronics Engineering							
4	TMU101	Environmental Studies	1	2	-	2	40	60	100
5	EHM199/ BHM199	English communication and soft skills – I	1	1	2	2	50	50	100
6	EAS162/262	Engineering Physics (Lab)	-	-	2	1	50	50	100
	EAS163/263	Engineering Chemistry (Lab)							
7	EEE161/261	Basic Electrical Engineering (Lab)	-	-	2	1	50	50	100
	EEC161/261	Basic Electronics Engineering (Lab)							
8	EME161/261	Engineering Drawing (Lab)	-	-	4	2	50	50	100
	EME162/262	Workshop Practice (Lab)							
9	EGP111	Discipline & General Proficiency	**-**	**-**	**-**	**-**	100	-	100
		Total	**11**	**6**	**10**	**20**	**460**	**440**	**900**

Semester II

S. No	*Course Code*	*Subject*	*Periods*			*Credit*	*Evaluation Scheme*		
			L	*T*	*P*		*Internal*	*External*	*Total*
1	EAS211	Engineering Mathematics-II	3	1	-	4	40	60	100
2	EAS212/112	Engineering Physics-I	3	1	-	4	40	60	100
	EAS213/113	Engineering Chemistry							
3	EEE217/117	Basic Electrical Engineering	3	1	-	4	40	60	100
	EEC211/111	Basic Electronics Engineering							
4	ECS212/ BCS111	Computer System & Programing in C++	3	-	-	3	40	60	100
5	EHM249/ BHM249	English communication and soft skills – II	1	1	2	2	40	60	100
6	EAS262/162	Engineering Physics (Lab)	-	-	2	1	50	50	100
	EAS263/163	Engineering Chemistry (Lab)							
7	EEE261/161	Basic Electrical Engineering (Lab)	-	-	2	1	50	50	100
	EEC261/161	Basic Electronics Engineering (Lab)							
8	ECS262/ BCS161	Computer System & Programing in C++ (Lab)	-	-	2	1	50	50	100
9	EME261/161	Engineering Drawing (Lab)		-	4	2	50	50	100
	EME262/162	Workshop Practice (Lab)							
10	EGP211	Discipline & General Proficiency	**-**	**-**	**-**	**-**	100	-	100
		Total	**13**	**4**	**12**	**22**	**500**	**500**	**1000**

Semester III

S. No.	*Subject Code*	*Subject*	*Periods*			*Credits*	*Evaluation Scheme*		
			L	*T*	*P*		*Internal*	*External*	*Total*
1	EEC311	Engineering Electromagnetics	3	1	-	4	40	60	100
2	EEC312	Digital Logic & Circuits	3	1	-	4	40	60	100
3	EEC315	Signals & Systems	3	1	-	4	40	60	100
4	EEC313	Instruments & Measurements	3	-	-	3	40	60	100
5	EHM349/ EHM449/ BHM349	English communication and soft skill-III	1	1	2	2	40	60	100
6	ECS312/ ECS412	Object oriented Programming using JAVA	3	1	-	4	40	60	100
7	EEC361	Digital Logic & Circuit (Lab)	-	-	3	2	50	50	100
8	EEC362	Instruments & Measurements (Lab)	-	-	3	2	50	50	100
9	ECS361/ ECS461	Object oriented Programming using JAVA (Lab)	-	-	3	2	50	50	100
10	EGP311	Discipline & General Proficiency	-	-	-	1	100	-	100
		Total	**16**	**5**	**11**	**28**	**490**	**510**	**1000**

Following additional Course for Lateral Entry Students with B.Sc. background to be taken in III semester and all should pass with minimum of 45% marks for obtaining the degree: credits will not be added

1	EME161/261	Engineering Drawing (Lab)	-	-	4	-	50	50	100

Semester IV

S. No.	*Subject Code*	*Subject*	*Periods*			*Credits*	*Evaluation Scheme*		
			L	*T*	*P*		*Internal*	*External*	*Total*
1	EEC411	Analog Communication System	3	-	-	3	40	60	100
2	EEC412	Electronic Devices & Circuits	3	-	-	3	40	60	100
3	EEE413	Network Analysis & Synthesis	3	1	-	4	40	60	100
4	EEE414/ EEE512	Power Electronics	3	1	-	4	40	60	100
5	ECS411/ 511/611/ MSC014/ BCS311	Database Management System	3	1	-	4	40	60	100
6	EEC461	Analog Communication System (Lab)	-	-	3	2	50	50	100
7	EEC462	Electronics Devices & Circuits (Lab)	-	-	3	2	50	50	100
8	EEE463	Network Analysis & Synthesis (Lab)	-	-	3	2	50	50	100
9	EEE464/ EEE562	Power Electronics (Lab)	-	-	3	2	50	50	100
10	EGP411	Discipline & General Proficiency	**-**	**-**	**-**	1	100	-	100
		Total	**15**	**3**	**12**	**27**	**500**	**500**	**1000**

Following additional Courses for Lateral Entry Students with B.Sc. background to be taken in IV semester and all should pass with minimum of 45% marks for obtaining the degree: credits will not be added

1	EME162/262	Workshop Practice (Lab)	-	-	4	-	50	50	100

Semester V

S. No.	*Subject Code*	*Subject*	*Periods*			*Credits*	*Evaluation Scheme*		
			L	*T*	*P*		*Internal*	*External*	*Total*
1	EEC511	Microprocessor & Applications	3	1	-	4	40	60	100
2	EEC512	Microwave Techniques	3	1	-	4	40	60	100
3	EEC513	Digital Communication Systems	3	-	-	3	40	60	100
4	EEE511	Control Systems	3	1	-	4	40	60	100
5	EHM599 EHM699/ BHM499	English Communication and Soft Skills-IV	1	1	2	2	50	50	100
6	EEC561	Microprocessor & Applications (Lab)	-	-	3	2	50	50	100
7	EEC562	Microwave Techniques (Lab)	-	-	3	2	50	50	100
8	EEC563	Digital Communication Systems (Lab)	-	-	3	2	50	50	100
9	MOOC01	MOOC Program -I (Optional)	-	-	-	1/2	-	100	100
10	EGP511	Discipline & General Proficiency	-	-	-	1	100	-	100
		Total	**13**	**4**	**11**	**24**	**460**	**440**	**1000**

Semester VI

S. No.	*Subject Code*	*Subject*	*Periods*			*Credits*	*Evaluation Scheme*		
			L	*T*	*P*		*Internal*	*External*	*Total*
1	EEC612	Embedded System	3	1	-	4	40	60	100
	EEC617	Microcontroller Hardware, Programming & its Application (Arduino)	2	2	-				
2	EEC613	Analog and Digital Integrated Electronics	3	-	-	3	40	60	100
3	EEC614	Antenna & Wave Propagation	3	1	-	4	40	60	100
4	EEC615	Telecommunication Switching Systems	3	-	-	3	40	60	100
5	EEC616	Mobile and cellular communication	3	-	-	3	40	60	100
6	EEC661	Analog and Digital Integrated Electronics (Lab)	-	-	3	2	50	50	100
7	EEC662	Antenna & Wave Propagation (Lab)	-	-	3	2	50	50	100
8	MOOC02	MOOC Program -II (Mandatory)	-	-	-	1/ 2	-	100	100
9	EGP611	Discipline & General Proficiency	-	-	-	1	100	-	100
		Total	**15/ 14**	**2/ 3**	**6**	**23/24**	**400**	**500**	**900**

Semester VII

S. No.	*Subject Code*	*Subject*	*Periods*			*Credit*	*Evaluation Scheme*		
			L	*T*	*P*		*Internal*	*External*	*Total*
1	EEC711	Digital Signal Processing	3	1		4	40	60	100
2	**Departmental Elective-I**								
	EEC712	Robotics & Automation	3	-		3	40	60	100
	EEC713	Satellite Communication							
3	**Open Elective-I**								
	FOE011	Principle of Management	3	1	-	4	40	60	100
	FOE012	Artificial Neural Network							
	FOE013	Industrial Sociology							
	FOE014	Organizational Behaviour							
	FOE015	Engineering and Managerial Economics							
	FOE016	Network security & cryptography							
4	EEC763	Digital Signal Processing (Lab)	-	-	2	1	50	50	100
5	EEC 764	Electronic Workshop & PCB Lab	-	-	3	2	50	50	100
6	EEC714	Information theory & Coding	2	-	-	2	40	60	100
	EEC762/ BAS464	Design and installation of Solar Photovoltaic System	-	2	2		50	50	100
7	EEC792	Industrial Training & Presentation (6 weeks)	-	-	-	4	50	50	100
8	EEC798	Project Work Phase-I (Synopsis, Literature Survey & Presentation & 30% Project completion)	-	-	8	4	100	-	100
9	MOOC03	MOOC Program -III (Mandatory)	-	-	-	1/ 2	-	100	100
10	EGP711	Discipline & General Proficiency	-	-	-	1	100	-	**100**
		Total	**11**	**2/4**	**13/15**	**26/27**	**510/520**	**490/480**	**1000**

Semester VIII

S. No	*Subject Code*	*Subject*	*Periods*			*Credits*	*Evaluation Scheme*		
			L	*T*	*P*		*Internal*	*External*	*Total*
1	EEC811	VLSI Design & Technology	3	-	-	3	40	60	100
2	EEC812	Optical Fiber Communication	3	-	-	3	40	60	100
3	EEC862	VLSI Design & Technology (Lab)	-	-	3	2	50	50	100
4	EEC863	Optical Fiber Communication (Lab)	-	-	3	2	50	50	100
5	**Departmental Elective-II**								
	EEC813	Biomedical Instrumentation	2	-	0	2	40	60	100
	EEC861	PLC Programming Lab	-	-	4		50	50	
6	**Open Elective-II**								
	FOE021	Machine learning & Data Analytics	3	1	-	4	40	60	100
	FOE022	Total Quality Management							
	FOE023	Entrepreneurship							
	FOE024	Big Data & Hadoop							
	FOE025	Financial Management							
7	EEC898	Project Work Phase -II (100 % working condition, report analysis, plagiarism check report analysis Simulation, and Presentation)	-	-	14	7	50	50	100
8	MOOC04	MOOC Program -IV (Optional)	-	-	-	1/2	-	100	100
9	EGP811	Discipline & General Proficiency	-	-	-	1	100	-	100
		Total	**11/9**	**1**	**20/24**	**24**	**410/420**	**390/380**	**900**

Semester I
Engineering Mathematics-I

Course Code: EAS116 **L T P C**
3 1 0 4

Objective:

- To familiarize the basics of matrices, differential calculus, multiple integrals and vector calculus.
- To solve all problems related to matrices, calculus and vectors.

Unit A (Unit A is for building a foundation and shall not be a part of examination)

Some general theorem on deviation-Derivative of the sum or difference of two function, Derivative of product of two functions, Derivative of quotient, Derivative of Trigonometry function, Derivative of inverse Trigonometry function, Logarithms differential, Integration of 1/x, e^x, Integration by simple substitution. Integrals of the type f' (x), $[f(x)]^n$, $\frac{f'(x)}{f(x)}$, Integration of 1/x, e^x, tan x, cot x, sec x, cosec x , Integration by parts, Integration using partial fractions.

Course Contents-

Unit I **(Lectures 08)**

Determinants- Rules of computation; Linear Equations and Cramer's rule.

Matrices: Elementary row and column transformation; Rank of matrix; Linear dependence; Consistency of linear system of equations; Characteristic equation; Cayley-Hamilton Theorem (without proof); Eigen values and Eigen vectors; Complex and Unitary matrices.

Unit II **(Lectures 08)**

Differential Equation--First order first degree Differential equation: variable separable, Homogeneous method, Linear differential equation method, Exact Differential equation.

Unit III **(Lectures 08)**

Differential Calculus: Leibnitz theorem; Partial differentiation; Euler's theorem; Change of variables; Expansion of function of several variables. Jacobians, Error function.

Unit IV **(Lectures 08)**

Multiple Integrals: Double integral, Triple integral, Beta and Gamma functions; Dirichlet theorem for three variables, Liouville's Extension of Dirichlet theorem.

Unit V **(Lectures 08)**

Vector Differentiation:

Vector function, Differentiation of vectors, Formulae of Differentiation, Scalar and Vector point function, Geometrical Meaning of Gradient, Normal and Directional Derivative, Divergence of a vector function, Curl of a vector

Vector Integration:

Green's theorem, Stokes' theorem; Gauss' divergence theorem.

Text Books-

1. Grewal B.S., *Higher Engineering Mathematics*, Khanna Publishers.
2. Prasad C., *Engineering Mathematics for Engineers*, Prasad Mudralaya.
3. Dass H.K., Engineering Mathematics Vol-I, S. Chand.

Reference Books-

1. Kreyszig E., *Advanced Engineering Mathematics*, Wiley Eastern.
2. Piskunov N, *Differential & Integral Calculus*, Moscow Peace Publishers.
3. Narayan Shanti, *A Text book of Matrices*, S. Chand

***Latest editions of all the suggested books are recommended.**

Semester I
Engineering Physics-I

Course Code: EAS112/212 **L T P C**
3 1 0 4

Objective: To understand the fundamentals of physics like interference of light, diffraction, Polarization, elements of material science, special theory of relativity etc.

Unit A (Unit A is for building a foundation and shall not be a part of examination)
Optics- Properties of light, Lance, Mirror, Focal length, Intensity, Power, Eye-piece, Work, Energy and its types, Waves, longitudinal and transverse waves, Time period, Frequency

Course Contents-

Unit-I **(08 Lectures)**

Interference of Light: Introduction, Principle of Superposition, Interference due to division of wavefront: Young's double slit experiment, Theory of Fresnel's Bi-Prism, Interference due to division of amplitude: parallel thin films, Wedge shaped film, Michelson's interferometer, Newton's ring.

Unit-II **(08 Lectures)**

Diffraction: Introduction, Types of Diffraction and difference between them, Condition for diffraction, difference between interference and diffraction. **Single slit diffraction**: Quantitative description of maxima and minima with intensity variation, linear and angular width of central maxima. **Resolving Power**: Rayleigh's criterion of resolution, resolving power of diffraction grating and telescope.

Unit-III **(08 Lectures)**

Polarization: Introduction, production of plane polarized light by different methods, Brewster's and Malus Law. Quantitative description of double refraction, Nicol prism, Quarter & half wave plate, specific rotation, Laurent's half shade polarimeter.

Unit-IV **(08 Lectures)**

Elements of Material Science: Introduction, Bonding in solids, Covalent bonding and Metallic bonding, Classification of Solids as Insulators, Semi-Conductor and Conductors, Intrinsic and Extrinsic Semiconductors, Conductivity in Semiconductors, Determination of Energy gap of Semiconductor. **Hall Effect:** Theory, Hall Coefficients and application to determine the sign of charge carrier, Concentration of charge carrier, mobility of charge carriers.

Unit-V **(08 Lectures)**

Special Theory of Relativity: Introduction, Inertial and non-inertial frames of Reference, Postulates of special theory of relativity, Galilean and Lorentz Transformations, Length contraction and Time Dilation, Relativistic addition of velocities, Variation of mass with velocity, Mass-Energy equivalence.

Text Books:

1. Elements of Properties of Matter, D. S. Mathur, S. Chand & Co.
2. Engineering Physics, Bhattacharya & Tandon, Oxford University Press.
3. Optics, Ajay Ghatak, Tata Mc Graw-Hill.
4. H. K. Malik & A.K. Singh, Engineering Physics, McGraw-Hill, latest edition.

Reference Books:

1. F. A. Jenkins and H. E. White, Fundamentals of Optics, McGraw-Hill.
2. Concept of Modern Physics, Beiser, Tata McGraw-Hill.
3. R. Resnick, Introduction to Special Relativity, John Wiley, Singapore.

***Latest editions of all the suggested books are recommended.**

Semester I
Engineering Chemistry

Course Code: EAS113/213 **L T P C**
3 1 0 4

Objective:

The basic objective of Engineering Chemistry is to educate the students about the chemical aspects of engineering and to provide leadership in advanced studies of engineering, in industry, academia and government.

Course Contents:

UNIT I **(Lecture 08)**

Water and Its Industrial Applications: Sources, Impurities, Hardness and its units, Industrial water, characteristics, softening of water by various methods (External and Internal treatment), Boiler trouble causes effects and remedies, Characteristic of municipal water and its treatment, Numerical problem based on water softening method like lime soda, calgon etc.

UNIT II **(Lecture 08)**

Fuels and Combustion: Fossil fuel and classification, calorific value, determination of calorific value by Bomb and Jumker's calorimeter, proximate and ultimate analysis of coal and their significance, calorific value computation based on ultimate analysis data, Combustion and its related numerical problems carbonization manufacturing of coke, and recovery of byproduct, knocking relationship between knocking and structure and hydrocarbon, improvement ant knocking characteristic IC Engine fuels, Diesel Engine fuels, Cetane Number.

UNIT III **(Lecture 08)**

Lubricants: Introduction, mechanism of lubrication, classification of lubricant, properties and testing of lubricating Oil Numerical problem based on testing methods. **Cement and Refractories:** Manufacture, IS code, Setting and hardening of cement, Portland cement Plaster of Paris, **Refractories.** Introduction, classification and properties of refractories.

UNIT IV **(Lecture 08)**

Polymers: Introduction, types and classification of polymerization, reaction mechanism, Natural and synthetic rubber, Vulcanization of rubber, preparation, properties and uses of the following Polythene, PVC, PMMA, Teflon, Polyacrylonitrile, PVA, Nylon 6, Terylene, Phenol Formaldehyde, Urea Formaldehyde Resin, Glyptal, Silicones Resin, Polyurethanes, Butyl Rubber, Neoprene, Buna N, Buna S.

UNIT V **(Lecture 08)**

A. Instrumental Techniques in chemical analysis: Introduction, Principle, Instrumentation and application of IR, NMR, UV, Visible, Gas Chromatography, Lambert and Beer's Law.

B. Water Analysis Techniques: Alkalinity, Hardness (Complexometric), Chlorides, Free Chlorine, DO, BOD, and COD, Numerical Problem Based on above techniques.

Text Books:

1. Agarwal R. K., Engineering Chemistry, Krishna Prakashan.
2. Lee I.D., Inorganic Chemistry.
3. Chawla Shashi, Engineering Chemistry, Dhanpat Rai Publication.

Reference Books:

1. Morrison & Boyd, Organic Chemistry, Prentice Hall
2. Barrow Gordon M., Physical Chemistry, McGraw-Hill.
3. Manahan Stanley E., Environmental Chemistry, CRC Press.

***Latest editions of all the suggested books are recommended.**

Semester I
Basic Electrical Engineering

Course Code: EEE117/217 **L T P C**
3 1 0 4

Objective- To understand the fundamental concept of Electrical Engineering like D.C. Network, A.C. Network, Measuring Instruments, Energy Conversion Devices etc.

Course Contents-

Unit I **(Lectures 10)**

D.C. Network Theory: Passive, active, bilateral, unilateral, linear, nonlinear element, Circuit theory concepts-Mesh and node analysis; Voltage and current division, source transformation, Network Theorems- Superposition theorem, Thevenin's theorem, Norton's theorem, and Maximum Power Transfer theorem, Star-delta & delta-star conversion.

Unit II **(Lectures 10)**

Steady State Analysis of A.C. Circuits: Sinusoidal and phasor representation of voltage and Current; Single phase A.C. circuit behavior of resistance, inductance and capacitance and their Combination in series & parallel; Power factor; Series and parallel resonance; Band width and Quality factor.

Unit III **(Lectures 06)**

Basics of Measuring Instruments: Introduction to voltmeter, ammeter, Wattmeter & Energy meter.

Unit IV **(Lectures 06)**

Single phase Transformer: Principle of operation; Types of construction; Phasor diagram; Equivalent circuit; Efficiency and losses.

Unit V **(Lectures 08)**

Three Phase A.C. Circuits: Line and phase voltage/current relations; three phase power, power measurement using two wattmeter method. Introduction to earthing and electrical safety.

Text Books-

1. V. Del Toro, Principles of Electrical Engineering, Prentice-Hall International.
2. W.H. Hayt & J.E. Kemmerly, Engineering Circuit Analysis, McGraw Hill.
3. Nagrath I.J., Basic Electrical Engineering, Tata McGraw Hill.

Reference Books-

1. Fitzgerald A.E & Higginbotham., D.E., Basic Electrical Engineering, McGraw Hill.
2. A Grabel, Basic Electrical Engineering, McGraw Hill.
3. Cotton H., Advanced Electrical Technology, Wheeler Publishing.

***Latest editions of all the suggested books are recommended.**

Semester I
Basic Electronics Engineering

Course Code: EEC111/211 **L T P C**
3 1 0 4

Objective- To understand the basic concept of Electronics Engineering like p-n Junction, Bipolar Junction Transistor, Field Effect Transistor, Operational Amplifier and switching theory.

Course Contents

UNIT I **(Lectures 08)**

p-n Junction: Energy band diagram in materials, Intrinsic & Extrinsic Semiconductor, Introduction to PN-Junction, Depletion layer, V-I characteristics, p-n junction as rectifiers (half wave and full wave), calculation of ripple factor of rectifiers, clipping and clamping circuits, Zener diode and its application as shunt regulator.

UNIT II **(Lectures 08)**

Bipolar Junction Transistor (BJT): Basic construction, transistor action; CB, CE and CC configurations, input/output characteristics, Relation between α, β & γ, Biasing of transistors: Fixed bias, emitter bias, potential divider bias.

UNIT III **(Lectures 08)**

Field Effect Transistor (FET): Basic construction of JFET; Principle of working; concept of pinch-off condition & maximum drain saturation current; input and transfer characteristics; Characteristics equation; fixed and self-biasing of JFET amplifier; Introduction of MOSFET; Depletion and Enhancement type MOSFET- Construction, Operation and Characteristics.

UNIT IV **(Lectures 08)**

Operational Amplifier (Op-Amp): Concept of ideal operational amplifier; ideal and practical Op-Amp parameters; inverting, non-inverting and unity gain configurations, Applications of Op-Amp as adders, difference amplifiers, integrators and differentiator.

UNIT V **(Lectures 08)**

Switching Theory: Number system, conversion of bases (decimal, binary, octal and hexadecimal numbers), Addition & Subtraction, BCD numbers, Boolean algebra, De Morgan's Theorems, Logic gates and truth table- AND, OR & NOT, Seven segment display & K map.

Text Books-

1. Robert Boylestad & Louis Nashelsky, Electronic Circuit and Devices, Pearson India.
2. Millman & Halkias, Integrated Electronics, McGraw Hill.
3. Millman & Halkias, Electronics Devices and Circuits, McGraw Hill.
4. Morris Mano M., Digital Design, Prentice Hall.

Reference Books-

1. Sedra and Smith, Microelectronic Circuits, Oxford University Press.
2. Gayakwad, R A, Operational Amplifiers and Linear Integrated circuits, Prentice Hall of India Pvt. Ltd.
3. Chattopadhyay D and P C Rakshit, Electronics Fundamentals and Applications, New Age International.

***Latest editions of all the suggested books are recommended.**

Semester I
Environmental Studies

[TMU101 amended vide approval dt. August 14, 2018 of V.C]

Course Code: TMU101 **L T P C**
1 2 0 2

Objective: To create awareness among students about environment protection.

Course Content:

Unit I **(Lectures 08)**

Definition and Scope of environmental studies, multidisciplinary nature of environmental studies, Concept of sustainability & sustainable development.

Ecology and Environment: Concept of an Ecosystem- its structure and functions, Energy Flow in an Ecosystem, Food Chain, Food Web, Ecological Pyramid & Ecological succession, Study of following ecosystems: Forest Ecosystem, Grass land Ecosystem & Aquatic Ecosystem & Desert Ecosystem.

Unit II **(Lectures 08)**

Natural Resources: Renewable & Non-Renewable resources; Land resources and landuse change; Land degradation, Soil erosion & desertification. **Deforestation**: Causes & impacts due to mining, Dam building on forest biodiversity & tribal population. **Energy Resources**: Renewable & Non-Renewable resources, Energy scenario & use of alternate energy sources, Case studies.

Biodiversity: Hot Spots of Biodiversity in India and World, Conservation, Importance and Factors Responsible for Loss of Biodiversity, Biogeographical Classification of India

Unit III **(Lectures 08)**

Environmental Pollutions: Types, Causes, Effects & control; Air, Water, soil & noise pollution, Nuclear hazards & human health risks, Solid waste Management; Control measures of urban & industrial wastes, pollution case studies

Unit IV **(Lectures 08)**

Environmental policies & practices: Climate change & Global Warming (Greenhouse Effect), Ozone Layer - Its Depletion and Control Measures, Photochemical Smog, Acid Rain Environmental laws: Environment protection Act; air prevention & control of pollution act, Water Prevention & Control of Pollution Act, Wild Life Protection Act, Forest Conservation Acts, International Acts; Montreal & Kyoto Protocols & Convention on biological diversity, Nature reserves, tribal population & Rights & human wild life conflicts in Indian context

Unit V **(Lectures 08)**

Human Communities & Environment:

Human population growth; impacts on environment, human health & welfare, Resettlement & rehabilitation of projects affected person: A case study, Disaster Management; Earthquake, Floods & Droughts, Cyclones & Landslides, Environmental Movements; Chipko, Silent Valley, Vishnoi's of Rajasthan, Environmental Ethics; Role of Indian & other regions & culture in environmental conservation, Environmental communication & public awareness; Case study

Field Work:

1. Visit to an area to document environmental assets; river/forest/flora-fauna etc.
2. Visit to a local polluted site: urban/ rural/industrial/agricultural.
3. Study of common plants, insects, birds & basic principles of identification.
4. Study of simple ecosystem; pond, river etc.

Text Books:

1. "Environmental Chemistry", De, A. K., New Age Publishers Pvt. Ltd.
2. "Introduction to Environmental Engineering and Science", Masters, G. M., Prentice Hall India Pvt. Ltd.
3. "Fundamentals of Ecology", Odem, E. P., W. B. Sannders Co.

Reference Books:

1. "Biodiversity and Conservation", Bryant, P. J., Hypertext Book
2. "Textbook of Environment Studies", Tewari, Khulbe & Tewari, I.K. Publication

***Latest editions of all the suggested books are recommended.**

Semester I
English Communication and Soft Skills – I

[EHM199/BHM199 amended vide approval dt. July 23, 2018 of V.C]

Course Code: EHM199/BHM199

L	T	P	C
1	1	2	2

Objectives:

1. To remove the phobia of conversing in English.
2. To make the learners enable to express themselves among peers & teachers.
3. To enable students, improve their vocabulary.
4. To introduce them with basic communicative skills in real life situations

Course Contents:

Unit – I Fear of Failure, Reasons of Fear of Failure & How to overcome it (12 hours)

- Self-Introduction
- Identifying strengths and weakness
- Fear of Failure: Signs of Fear of Failure, Reasons of Fear of Failure, Strategies to overcome Fear of Failure
- Positive Attitude
- Motivation
- Building Self Confidence

Unit – II Confidence, Presentability, Etiquettes & Manners (10 hours)

- Body Language: Facial Expression, Eye Contact, Gesture, Posture, Tips to have appropriate body language
- Grooming & Dressing Sense
- Etiquette & Manners: Social Etiquettes, Telephonic Etiquettes, Dining Etiquettes, Etiquettes to handle cultural differences, Etiquettes of Effective Conversation.
- Problem Sounds (s-sh,j-z,v-b)

Unit – III Conversation Practice, commonly made mistake & Initiating a conversation (10 hours)

- Vocabulary of commonly used words (50 Words)
- Conversation Practice: At College, At Bank, At Ticket Counter (Railway Station & Movie Theatre)
- How to initiate a conversation
- Commonly made mistakes in conversation
- Basic of Communication: 7Cs of Communication

Unit – IV Application writing (08 hours)

- Format & Style of Application Writing
- Practice of Application writing on common issues.

Reference Books:

- Mitra, Barun. K. "*Personality Development and Soft skills*" New Delhi: Oxford University Press.
- Kumar, Sanjay. &Pushp Lata. "*Communication Skills"* New Delhi: Oxford University Press.

- Carnegie Dale. "*How to win Friends and Influence People*" New York: Simon & Schuster.
- Harris, Thomas. A. "*I am ok, You are ok*" New York: Harper and Row.
- Coleman, Daniel. "*Emotional Intelligence*" Bantam Book.

Methodology:

1. Language Lab software.
2. The content will be conveyed through Real life situations, Pair Conversation, Group Talk and Class Discussion.
3. Conversational Practice will be effectively carried out by Face to Face & Via Media (Telephone, Audio-Video Clips)
4. Modern Teaching tools (PPT Presentation, Tongue-Twisters & Motivational videos with sub-titles) will be utilized.

Note:

- 2 words per class will be taught with meaning, usage & correct pronunciation to ensure progressive learning in sentence formation.
- ***Suggested words are*** : *Abbreviation, Abide, Arbitrary, Assertive, Bran, Chaotic, Coma, Commanding, Communicate, Competent, Confront, Conventional, Convince, Cruel, Demise, Descriptive, Despondent, Determine , Dictatorial, Empathize, Etiquette, Examine, Fierce, Flakes, Gullible, Hostility, Idleness, Immature, Insanity, Insensible, Intent, Isolate, Lad, Lurk, Naïve, Phrase, Preliminary, Realm, Retract ,Sarcasm, Satisfied, Talkative, Typically, Wit , Rectify, Candid, Embellish, Iterate, Netizen, Effigy*
- Class (above 30 students) will be divided in to two groups for effective teaching.
- For effective conversation practice, groups will be changed weekly.

Evaluation Scheme

Internal Evaluation		External Evaluation		Total Marks
50 Marks		50 Marks		100
40 Marks (Progressive Evaluation) After each unit-completion: Assignments /Oral Presentation	10 Marks (Attendance)	25 Marks Midway external assessment (Viva)*	25 Marks (External Viva)**	

Note: *Midway external assessment of 25 marks will be submitted and consider with external evaluation with a total of 50 marks.*

*Parameters of Midway external assessment (Viva)

Content	Dressing sense & Grooming	Confidence	Pronunciation	Question responsiveness	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	05 Marks	25 Marks

Note: *To take corrective actions, midway assessment will be conducted by 2-member committee of Director's nominee (not by the faculty teaching English courses) and average of the two would be the 25 marks obtained by the students.*

**Parameters of External Viva

Content	Dressing sense & Grooming	Confidence	Pronunciation	Question responsiveness	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	05 Marks	25 Marks

***Note**: External Viva will be conducted by 3-member committee comprising*

- ***a)*** *Faculty teaching the class*
- ***b)*** *English faculty from other college of the University.*
- ***c)*** *T&P officer of other colleges of the University.*

Each member will evaluate on a scale of 25 marks and the average of three would be the 25 marks obtained by the students.

Semester I
Engineering Physics (Lab)

Course Code: EAS162/262 **L T P C**
0 0 2 1

LIST OF EXPERIMENTS:

Note: Select any ten experiments from the following list.

1. To determine the wavelength of monochromatic light by Newton's ring.
2. To determine the wavelength of monochromatic light by Michelson-Morley experiment.
3. To determine the wavelength of monochromatic light by Fresnel's Bi-prism.
4. To determine the Planck's constant using LEDs of different colours.
5. To determine the specific rotation of cane sugar solution using Polarimeter.
6. To verify Stefan's Law by electrical method.
7. To study the Hall Effect and determine Hall coefficient and mobility of a given semiconductor material using Hall-effect set up.
8. To determine the Frequency of an Electrically Maintained Tuning Fork by Melde's experiment.
9. To compare Illuminating Powers by a Photometer.
10. To determine the frequency of A.C. mains by means of a Sonometer.
11. To determine refractive index of a prism material by spectrometer.
12. To determine the Flashing & Quenching of Neon bulb.
13. Determination of Cauchy's constant by using spectrometer.
14. To study the PN junction characteristics.
15. To determine the resolving power and dispersive power by a prism.
16. To determine the value of Boltzmann Constant by studying Forward Characteristics of a Diode.
17. Study the characteristics of LDR.
18. To study the characteristics of a photo-cell.

Books:

1. B.Sc. Practical Physics, Gupta and Kumar, Pragati Prakashan.
2. B.Sc. Practical Physics, C.L. Arora, S. Chand & Company Pvt. Ltd.

***Latest editions of all the suggested books are recommended.**

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I
Engineering Chemistry (Lab)

Course Code: EAS163/263 **L T P C**
0 0 2 1

LIST OF EXPERIMENTS

Note: Select any ten experiments from the following list.

1. Determination of Total Hardness of a given water sample.
2. Determination of mixed alkalinity (a) Hydroxyl & Carbonate (b) Carbonate & Bicarbonate
3. To determine the pH of the given solution using pH meter and pH-metric titration.
4. Determination of dissolved oxygen content of given water sample.
5. To find chemical oxygen demand of waste water sample by potassium dichromate
6. Determination of free chlorine in a given water sample.
7. To determine the chloride content in the given water sample by Mohr's method.
8. To prepare the Bakelite resin polymer.
9. To determine the concentration of unknown sample of iron spectrophotometrically.
10. To determine the viscosity of a given sample of a lubricating oil using Redwood Viscometer.
11. To determine the flash & fire point of a given lubricating oil.
12. Determination of calorific value of a solid or liquid fuel.
13. Determination of calorific value of a gaseous fuel.
14. Determination of % of O_2, CO_2, % CO in flue gas sample using Orsat apparatus.
15. Proximate analysis of coal sample.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I
Basic Electrical Engineering (Lab)

Course Code: EEE161/261 **L T P C**
0 0 2 1

List of Experiments-

Note: Select any ten experiments from the following list.

1. To verify the Kirchhoff's current and voltage laws.
2. To study multimeter.
3. To verify the Superposition theorem.
4. To verify the Thevenin's theorem.
5. To verify the Norton's theorem.
6. To verify the maximum power transfer theorem.
7. To verify current division and voltage division rule.
8. To measure energy by a single-phase energy meter.
9. To measure the power factor in an RLC by varying the capacitance
10. To determine resonance frequency, quality factor, bandwidth in series resonance.
11. To measure the power in a 3-phase system by two-wattmeter method
12. To measure speed for speed control of D.C. Shunt Motor.
13. To determine the efficiency of single-phase transformer by load test.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I
Basic Electronics Engineering (Lab)

Course Code: EEC161/261 **L T P C**
0 0 2 1

List of Experiments:

Note: Minimum eight experiments should be performed-

1. To study the V-I characteristics of p-n junction diode.
2. To study the diode as clipper and clamper.
3. To study the half-wave rectifier using silicon diode.
4. To study the full-wave rectifier using silicon diode.
5. To study the Zener diode as a shunt regulator.
6. To study transistor in Common Base configuration & plot its input/output characteristics.
7. To study the operational amplifier in inverting & non-inverting modes using IC 741.
8. To study the operational amplifier as differentiator & integrator.
9. To study various logic gates & verify their truth tables.
10. To study half adder/full adder & verify their truth tables.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I
Engineering Drawing (Lab)

Course Code: EME161/261 **L T P C**
0 0 4 2

LIST OF EXPERIMENTS- [All to be performed]

1. To write all Numbers (0 to 9) and alphabetical Letters (A to Z) as per the standard dimensions.
2. To draw the types of lines and conventions of different materials.
3. To draw and study dimensioning and Tolerance.
4. To construction geometrical figures of Pentagon and Hexagon
5. To draw the projection of points and lines
6. To draw the Orthographic Projection of given object in First Angle
7. To draw the Orthographic Projection of given object in Third Angle
8. To draw the sectional view of a given object
9. To draw the development of the lateral surface of given object
10. To draw the isometric projection of the given orthographic projection.

Evaluation Scheme of Practical Examination:
Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the drawing sheet by the students and a Viva taken by the faculty concerned. The marks shall be given on the drawing sheet & regard maintained by the faculty.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Drawing Sheet (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Note: The drawing sheet could be manual or in Auto CAD.

Semester I
Workshop Practice (Lab)

Course Code: EME162/262 **L T P C**
0 0 4 2

List of Experiments:
(Perform any ten experiments selecting at least one from each shop.)

Carpentry Shop:
1. To prepare half-lap corner joint.
2. To prepare mortise & tenon joint.
3. To prepare a cylindrical pattern on woodworking lathe.

Fitting Bench Working Shop:
1. To prepare a V-joint fitting
2. To prepare a U-joint fitting
3. To prepare a internal thread in a plate with the help of tapping process

Black Smithy Shop:
1. To prepare a square rod from given circular rod
2. To prepare a square U- shape from given circular rod

Welding Shop:
1. To prepare a butt and Lap welded joints using arc welding machine.
2. To prepare a Lap welded joint Gas welding equipment.
3. To prepare a Lap welded joint using spot welding machine.

Sheet-metal Shop:
1. To make round duct of GI sheet using 'soldering' process.
2. To prepare a tray of GI by fabrication

Machine Shop:
1. To study the working of basic machine tools like Lathe m/c, Shaper m/c, Drilling m/c and Grinding m/c.
2. To perform the following operations on Centre Lathe:
Turning, Step turning, Taper turning, Facing, Grooving and Knurling
3. To perform the operations of drilling of making the holes on the given metallic work-piece (M.S.) by use of drilling machine.

Foundry Shop:
1. To prepare core as per given size.
2. To prepare a mould for given casting.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester I
DISCIPLINE & GENERAL PROFICIENCY

Course Code: EGP111

There shall be continuous evaluation of the student on the following broad parameters:

1. Observance of dress code.

2. Participation in Conferences /Workshops / Seminars.

3. Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

5. Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

6. Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Semester II
Engineering Mathematics- II

Course Code: EAS211 **L T P C**
3 1 0 4

Objective:

To familiarize the basic concept of Differential Equations, Laplace Transform, Fourier series etc.

Course Contents-

Unit I **(Lectures 08)**

Differential Equations: Linear Differential Equation, Linear Differential Equation with constant coefficient: Complementary functions and particular integrals, Linear Differential Equation with variable coefficient: Removal method, changing independent variables, Method of variation of parameters, Homogeneous Linear Differential Equation, Simultaneous linear differential equations.

Unit II **(Lectures 08)**

Series Solutions: Power Series solutions of ODE, Ordinary Point, Singular Points, Frobenius Method. **Special Functions:** Legendre equation and Polynomial, Legendre Function, Rodrigue's formula, Laplace definite integral for first and second kind, Bessel equation and Polynomial, Bessel Function, Orthogonal properties and Recurrence Relation for Legendre and Bessel function.

Unit III **(Lectures 08)**

Partial differential equations – Method of separation of variables for solving partial differential equations; Wave equation up to two dimensions; Laplace equation in two-dimensions; Heat conduction equations up to two-dimensions; Equations of transmission Lines.

Unit IV **(Lectures 08)**

Fourier Series: Periodic functions, Trigonometric series; Fourier series; Dirichlet's conditions, Determination of fourier coefficient by Euler's formulae; Fourier series for discontinuous functions, Even and odd functions, Half range sine and cosine series.

Unit V **(Lectures 08)**

Laplace Transform: Laplace transform; Existence theorem; Laplace transform of derivatives and integrals; Inverse Laplace transform; Unit step function; Diratch delta function; Laplace transform of periodic functions; Convolution theorem.

Text Books-

1. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers.

2. Prasad C., Engineering Mathematics for Engineers, Prasad Mudralaya.

3. Das H.K., Engineering Mathematics Vol-II, S. Chand.

Reference Books-

1. Kreyszig E., Advanced Engineering Mathematics, Wiley Eastern.
2. Piskunov N, Differential & Integral Calculus, Moscow Peace Publishers.
3. Narayan Shanti, A Text book of Matrices, S. Chand
4. Bali N.P., Engineering Mathematics-II, Laxmi Publications.

***Latest editions of all the suggested books are recommended.**

Semester II
Engineering Physics-I

Course Code: EAS212/112 **L T P C**
3 1 0 4

Objective: To understand the fundamentals of physics like interference of light, diffraction, Polarization, elements of material science, special theory of relativity etc.

Unit A (Unit A is for building a foundation and shall not be a part of examination)
Optics- Properties of light, Lance, Mirror, Focal length, Intensity, Power, Eye-piece, Work, Energy and its types, Waves, longitudinal and transverse waves, Time period, Frequency

Course Contents-

Unit-I **(08 Lectures)**

Interference of Light: Introduction, Principle of Superposition, Interference due to division of wavefront: Young's double slit experiment, Theory of Fresnel's Bi-Prism, Interference due to division of amplitude: parallel thin films, Wedge shaped film, Michelson's interferometer, Newton's ring.

Unit-II **(08 Lectures)**

Diffraction: Introduction, Types of Diffraction and difference between them, Condition for diffraction, difference between interference and diffraction. **Single slit diffraction**: Quantitative description of maxima and minima with intensity variation, linear and angular width of central maxima. **Resolving Power**: Rayleigh's criterion of resolution, resolving power of diffraction grating and telescope.

Unit-III **(08 Lectures)**

Polarization: Introduction, production of plane polarized light by different methods, Brewster's and Malus Law. Quantitative description of double refraction, Nicol prism, Quarter & half wave plate, specific rotation, Laurent's half shade polarimeter.

Unit-IV **(08 Lectures)**

Elements of Material Science: Introduction, Bonding in solids, Covalent bonding and Metallic bonding, Classification of Solids as Insulators, Semi-Conductor and Conductors, Intrinsic and Extrinsic Semiconductors, Conductivity in Semiconductors, Determination of Energy gap of Semiconductor. **Hall Effect:** Theory, Hall Coefficients and application to determine the sign of charge carrier, Concentration of charge carrier, mobility of charge carriers.

Unit-V **(08 Lectures)**

Special Theory of Relativity: Introduction, Inertial and non-inertial frames of Reference, Postulates of special theory of relativity, Galilean and Lorentz Transformations, Length contraction and Time Dilation, Relativistic addition of velocities, Variation of mass with velocity, Mass-Energy equivalence.

Text Books:

1. Elements of Properties of Matter, D. S. Mathur, S. Chand & Co.
2. Engineering Physics, Bhattacharya & Tandon, Oxford University Press.
3. Optics, Ajay Ghatak, Tata Mc Graw-Hill.
4. H. K. Malik & A.K. Singh, Engineering Physics, McGraw-Hill, latest edition.

Reference Books:

1. F. A. Jenkins and H. E. White, Fundamentals of Optics, McGraw-Hill.
2. Concept of Modern Physics, Beiser, Tata McGraw-Hill.
3. R. Resnick, Introduction to Special Relativity, John Wiley, Singapore.

***Latest editions of all the suggested books are recommended.**

Semester II
Engineering Chemistry

Course Code: EAS213/113 **L T P C**
3 1 0 4

Objective:

The basic objective of Engineering Chemistry is to educate the students about the chemical aspects of engineering and to provide leadership in advanced studies of engineering, in industry, academia and government.

Course Contents:

UNIT I **(Lecture 08)**

Water and Its Industrial Applications: Sources, Impurities, Hardness and its units, Industrial water, characteristics, softening of water by various methods (External and Internal treatment), Boiler trouble causes effects and remedies, Characteristic of municipal water and its treatment, Numerical problem based on water softening method like lime soda, calgon etc.

UNIT II **(Lecture 08)**

Fuels and Combustion: Fossil fuel and classification, calorific value, determination of calorific value by Bomb and Jumker's calorimeter, proximate and ultimate analysis of coal and their significance, calorific value computation based on ultimate analysis data, Combustion and its related numerical problems carbonization manufacturing of coke, and recovery of byproduct, knocking relationship between knocking and structure and hydrocarbon, improvement ant knocking characteristic IC Engine fuels, Diesel Engine fuels, Cetane Number.

UNIT III **(Lecture 08)**

Lubricants: Introduction, mechanism of lubrication, classification of lubricant, properties and testing of lubricating Oil Numerical problem based on testing methods. **Cement and Refractories:** Manufacture, IS code, Setting and hardening of cement, Portland cement Plaster of Paris, **Refractories.** Introduction, classification and properties of refractories.

UNIT IV **(Lecture 08)**

Polymers: Introduction, types and classification of polymerization, reaction mechanism, Natural and synthetic rubber, Vulcanization of rubber, preparation, properties and uses of the following Polythene, PVC, PMMA, Teflon, Polyacrylonitrile, PVA, Nylon 6, Terylene, Phenol Formaldehyde, Urea Formaldehyde Resin, Glyptal, Silicones Resin, Polyurethanes, Butyl Rubber, Neoprene, Buna N, Buna S.

UNIT V **(Lecture 08)**

A. Instrumental Techniques in chemical analysis: Introduction, Principle, Instrumentation and application of IR, NMR, UV, Visible, Gas Chromatography, Lambert and Beer's Law.

B. Water Analysis Techniques: Alkalinity, Hardness (Complexometric), Chlorides, Free Chlorine, DO, BOD, and COD, Numerical Problem Based on above techniques.

Text Books:

1. Agarwal R. K., Engineering Chemistry, Krishna Prakashan.
2. Lee I.D., Inorganic Chemistry.
3. Chawla Shashi, Engineering Chemistry, Dhanpat Rai Publication.

Reference Books:

1. Morrison & Boyd, Organic Chemistry, Prentice Hall
2. Barrow Gordon M., Physical Chemistry, McGraw-Hill.
3. Manahan Stanley E., Environmental Chemistry, CRC Press.

***Latest editions of all the suggested books are recommended.**

Semester II
Basic Electrical Engineering

Course Code: EEE217/117 **L T P C**
3 1 0 4

Objective- To understand the fundamental concept of Electrical Engineering like D.C. Network, A.C. Network, Measuring Instruments, Energy Conversion Devices etc.

Course Contents-

Unit I **(Lectures 10)**

D.C. Network Theory: Passive, active, bilateral, unilateral, linear, nonlinear element, Circuit theory concepts-Mesh and node analysis; Voltage and current division, source transformation, Network Theorems- Superposition theorem, Thevenin's theorem, Norton's theorem, and Maximum Power Transfer theorem, Star-delta & delta-star conversion.

Unit II **(Lectures 10)**

Steady State Analysis of A.C. Circuits: Sinusoidal and phasor representation of voltage and current; Single phase A.C. circuit behavior of resistance, inductance and capacitance and their Combination in series & parallel; Power factor; Series and parallel resonance; Band width and Quality factor.

Unit III **(Lectures 06)**

Basics of Measuring Instruments: Introduction to voltmeter, ammeter, Wattmeter & Energy meter.

Unit IV **(Lectures 06)**

Single phase Transformer: Principle of operation; Types of construction; Phasor diagram; Equivalent circuit; Efficiency and losses.

Unit V **(Lectures 08)**

Three Phase A.C. Circuits: Line and phase voltage/current relations; three phase powers, power measurement using two wattmeter methods. Introduction to earthing and electrical safety.

Text Books-

1. V. Del Toro, Principles of Electrical Engineering, Prentice-Hall International.
2. W.H. Hayt & J.E. Kemmerly, Engineering Circuit Analysis, McGraw Hill.
3. Nagrath I.J., Basic Electrical Engineering, Tata McGraw Hill.

Reference Books-

1. Fitzgerald A.E & Higginbotham., D.E., Basic Electrical Engineering, McGraw Hill.
2. A Grabel, Basic Electrical Engineering, McGraw Hill.
3. Cotton H., Advanced Electrical Technology, Wheeler Publishing.

***Latest editions of all the suggested books are recommended.**

Semester II
Basic Electronics Engineering

Course Code: EEC211/111 **L T P C**
3 1 0 4

Objective- To understand the basic concept of Electronics Engineering like p-n Junction, Bipolar Junction Transistor, Field Effect Transistor, Operational Amplifier and switching theory.

Course Contents:

UNIT I **(Lectures 08)**

p-n Junction: Energy band diagram in materials, Intrinsic & Extrinsic Semiconductor, Introduction to PN-Junction, Depletion layer, V-I characteristics, p-n junction as rectifiers (half wave and full wave), calculation of ripple factor of rectifiers, clipping and clamping circuits, Zener diode and its application as shunt regulator.

UNIT II **(Lectures 08)**

Bipolar Junction Transistor (BJT): Basic construction, transistor action; CB, CE and CC configurations, input/output characteristics, Relation between α, β & γ, Biasing of transistors: Fixed bias, emitter bias, potential divider bias.

UNIT III **(Lectures 08)**

Field Effect Transistor (FET): Basic construction of JFET; Principle of working; concept of pinch-off condition & maximum drain saturation current; input and transfer characteristics; Characteristics equation; fixed and self-biasing of JFET amplifier; Introduction of MOSFET; Depletion and Enhancement type MOSFET- Construction, Operation and Characteristics.

UNIT IV **(Lectures 08)**

Operational Amplifier (Op-Amp): Concept of ideal operational amplifier; ideal and practical Op-Amp parameters; inverting, non-inverting and unity gain configurations, Applications of Op-Amp as adders, difference amplifiers, integrators and differentiator.

UNIT V **(Lectures 08)**

Switching Theory: Number system, conversion of bases (decimal, binary, octal and hexadecimal numbers), Addition & Subtraction, BCD numbers, Boolean algebra, De Morgan's Theorems, Logic gates and truth table- AND, OR & NOT, Seven segment display & K map.

Text Books-

1. Robert Boylestad & Louis Nashelsky, Electronic Circuit and Devices, Pearson India.
2. Millman & Halkias, Integrated Electronics, McGraw Hill.
3. Millman & Halkias, Electronics Devices and Circuits, McGraw Hill.
4. Morris Mano M., Digital Design, Prentice Hall.

Reference Books-

1. Sedra and Smith, Microelectronic Circuits, Oxford University Press.
2. Gayakwad, R A, Operational Amplifiers and Linear Integrated circuits, Prentice Hall of India Pvt. Ltd.
3. Chattopadhyay D and P C Rakshit, Electronics Fundamentals and Applications, New Age International.

***Latest editions of all the suggested books are recommended.**

Semester II
Computer System & Programming in C++

Course Code: ECS212/BCS111 **L T P C**
3 0 0 3

Objective: To learn the basics of computers & C++ programming language.

Course Contents:

Unit I **(Lectures 08)**

Problem Solving: Phases of problem solving, Algorithms, Structure Chart, Flow chart, Practice of solving Sequence Problems, Selection Problems, Repetition problem.
Statements for problem solving: if, switch, while, for, do, break, continue, go to statements.

Unit II **(Lectures 08)**

Concepts in Computer Application: Generations, Characteristic and Application of Computers, Functional Component of Computer: CPU, I/O devices, Type of Memory.
Translators: Assembler, Compiler, and Interpreter; Number System: Decimal, Octal, Binary and Hexadecimal &their Conversions; Various Codes: BCD, ASCII and EBCDIC and Gray Code.

Unit III **(Lectures 08)**

Concepts in Operating System: Purpose, Services, Types, Functions.
Data Communication & Networks: Types, Topology, IP address classes.
C++ Basics: Data types, Variables, Constants, Keywords, Identifiers, Types of Operators, Memory Allocation operators, Expressions, Pre-processor directives, Introduction to Array, Pointers, Structures and Strings.

Unit IV **(Lectures 08)**

Functions: Scope of variables; Parameter passing; Default arguments; Inline functions; Recursive functions; Pointers to functions.
C++ Classes and Data Abstraction: Class Structure, Objects; this pointer; Friend function; Static class members; Constructors and Destructors; Data abstraction.
Inheritance: Types, Access to the base class members; Virtual base class.

Unit V **(Lectures 08)**

Polymorphism: Function overloading; Operator overloading; Static Binding and Dynamic bindings; Virtual function: Definition, Call mechanism, Pure virtual functions; Virtual destructors; Abstract Classes.
C++ I/O: Stream classes hierarchy; Stream I/O; File streams; Overloading << and >> operators; File Modes, Reading and Writing to a file; Formatted I/O.

Text Books-

1. Bjarne Stroutrup, The C++ Programming Languge, Adison Wesley.
2. Object-Oriented Programming with C++, Balagurusamy, TMH
3. C++ The Complete Reference, Schildt, TMH
4. Programming in C++, Shah & Thaker, ISTE/EXCEL

Reference Books-

1. Beginning C++, The Complete Language, Horton,SPD/WROX
2. Programming with C++, Radhaganesan, Scitech
3. Projects using C++, Varalaxmi, Scitech
4. Object Oriented modelling & Design, RumBaugh, PHI

***Latest editions of all the suggested books are recommended.**

Semester II
English Communication and Soft Skills-II

[EHM249/BHM249 amended vide approval dt. July 23, 2018 of V.C]

Course Code: EHM249/BHM249 **L T P C**
1 1 2 2

Objectives:

1. To enhance the vocabulary of learners to address competitive exams like GATE
2. To develop ability of sentence construction.
3. To enhance learner's writing ability.
4. To make the learner effective in presenting himself/herself.

Course Contents:

Unit – I Vocabulary & Grammar (14 hours)

- Homophones, Homonyms, Synonyms, Antonyms and One-word substitution.
- Parts of Speech, Modals, Tenses and Simple sentence construction.

Unit – II Listening Skills (05 hours)

- Difference between listening & hearing, Types of Listening, Process
- Importance and Barriers to listening

Unit – III Writing Skills (08 hours)

- Letters and Email writing
- Story Narration

Unit – IV Strategies & Structure of Presentation and Problem Sounds (13 hours)

- Managing Time, Audience & Locale, Structure and Organization of Content and 5 W's
- Problem Sounds: S- Sh, J-Z and V-B

Reference Books:

- Nesfield J.C. "*English Grammar Composition & Usage*" Macmillan Publishers
- Sood Madan "*The Business letters"* Goodwill Publishing House, New Delhi
- Kumar Sanjay &Pushplata "*Communication Skills*" Oxford University Press, New Delhi.

Methodologies:

1. Words and exercises, usage in sentences.
2. Sentence construction on daily activities and conversations.

3. Format and layout to be taught with the help of samples and preparing letters on different subjects.
4. JAM sessions and Picture presentation.
5. Tongue twisters, Newspaper reading and short movies.

Note:

- 2 words per class will be taught with meaning, usage & correct pronunciation to ensure progressive learning in sentence formation.
- ***Suggested words are*** : *Collateral, Default, Accord, Evident, Commit, Establish, Scarce, Apparent, Circumstances, Constitute, Render, Appeal, Campaign, League, Dwell, Yield, Wander, Convince, Inspire, Venture, Intimate, Assert, Scheme, Liberal, Despair, Manifest, Notion, Persist, Contempt, Attribute, Exert, Oppress, Contend, Stake, Perish, Notwithstanding, Heed, Esteem, Ascertain, Frontier, Flourish, Conspicuous, Sanction, Proceeding, Commendable, Equivocal, Juvenile,Onus, Unsolicited, Abstain*
- Class (above 30 students) will be divided in to two groups for effective teaching.
- For effective conversation practice, groups will be changed weekly.
- Repeated practice of sound.

Evaluation Scheme

Internal Evaluation		External Evaluation		Total Marks
40 Marks		60 Marks		100
30 Marks (Progressive Evaluation) After each unit-completion: Assignments /Oral Presentation	10 Marks (Attendance)	20 Marks Midway external assessment (Viva) *	40 Marks (Written Examination)	

*Parameters of Midway external assessment (Viva)

Content	Pronunciation	Body Language & Dressing Sense	Question responsiveness	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	20 Marks

Note:

Midway Assessment*: To take corrective actions, midway assessment will be conducted by 2-member committee of Director's nominee (not by the faculty teaching English courses) and average of the two would be the 20 marks obtained by the students after two units are completed. The marks in sealed envelope will be sent to Examination Department.*

Written Examination*: There would be four questions with internal choice one from each unit of 10 marks.*

Semester II
Engineering Physics (Lab)

Course Code: EAS262/162

L	T	P	C
0	0	2	1

LIST OF EXPERIMENTS:

Note: Select any ten experiments from the following list.

1. To determine the wavelength of monochromatic light by Newton's ring.
2. To determine the wavelength of monochromatic light by Michelson-Morley experiment.
3. To determine the wavelength of monochromatic light by Fresnel's Bi-prism.
4. To determine the Planck's constant using LEDs of different colours.
5. To determine the specific rotation of cane sugar solution using Polarimeter.
6. To verify Stefan's Law by electrical method.
7. To study the Hall Effect and determine Hall coefficient and mobility of a given semiconductor material using Hall-effect set up.
8. To determine the Frequency of an Electrically Maintained Tuning Fork by Melde's experiment.
9. To compare Illuminating Powers by a Photometer.
10. To determine the frequency of A.C. mains by means of a Sonometer.
11. To determine refractive index of a prism material by spectrometer.
12. To determine the Flashing & Quenching of Neon bulb.
13. Determination of Cauchy's constant by using spectrometer.
14. To study the PN junction characteristics.
15. To determine the resolving power and dispersive power by a prism.
16. To determine the value of Boltzmann Constant by studying Forward Characteristics of a Diode.
17. Study the characteristics of LDR.
18. To study the characteristics of a photo-cell.

Books:

1. B.Sc. Practical Physics, Gupta and Kumar, Pragati Prakashan.
2. B.Sc. Practical Physics, C.L. Arora, S.Chand & Campany Pvt. Ltd.

***Latest editions of all the suggested books are recommended.**

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester II
Engineering Chemistry (Lab)

Course Code: EAS263/163

L	T	P	C
0	0	2	1

LIST OF EXPERIMENTS

Note: Select any ten experiments from the following list.

1. Determination of Total Hardness of a given water sample.
2. Determination of mixed alkalinity (a) Hydroxyl & Carbonate (b) Carbonate & Bicarbonate
3. To determine the pH of the given solution using pH meter and pH-metric titration.
4. Determination of dissolved oxygen content of given water sample.
5. To find chemical oxygen demand of waste water sample by potassium dichromate
6. Determination of free chlorine in a given water sample.
7. To determine the chloride content in the given water sample by Mohr's method.
8. To prepare the Bakelite resin polymer.
9. To determine the concentration of unknown sample of iron spectrophotometrically.
10. To determine the viscosity of a given sample of a lubricating oil using Redwood Viscometer.
11. To determine the flash & fire point of a given lubricating oil.
12. Determination of calorific value of a solid or liquid fuel.
13. Determination of calorific value of a gaseous fuel.
14. Determination of % of O_2, CO_2 % CO in flue gas sample using Orsat apparatus.
15. Proximate analysis of coal sample.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester II
Basic Electrical Engineering (Lab)

Course Code: EEE261/161 **L T P C**
0 0 2 1

LIST OF EXPERIMENTS-

Note: Select any ten experiments from the following list.

1. To verify the Kirchhoff's current and voltage laws.
2. To study multimeter.
3. To verify the Superposition theorem.
4. To verify the Thevenin's theorem.
5. To verify the Norton's theorem.
6. To verify the maximum power transfer theorem.
7. To verify current division and voltage division rule.
8. To measure energy by a single-phase energy meter.
9. To measure the power factor in an RLC by varying the capacitance
10. To determine resonance frequency, quality factor, bandwidth in series resonance.
11. To measure the power in a 3-phase system by two-wattmeter method
12. To measure speed for speed control of D.C. Shunt Motor.
13. To determine the efficiency of single-phase transformer by load test.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	INTERNAL (50 MARKS)

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester II
Basic Electronics Engineering (Lab)

Course Code: EEC261/161 **L T P C**
0 0 2 1

LIST OF EXPERIMENTS

Note: Minimum eight experiments should be performed-

1. To study the V-I characteristics of p-n junction diode.
2. To study the diode as clipper and clamper.
3. To study the half-wave rectifier using silicon diode.
4. To study the full-wave rectifier using silicon diode.
5. To study the Zener diode as a shunt regulator.
6. To study transistor in Common Base configuration & plot its input/output characteristics.
7. To study the operational amplifier in inverting & non-inverting modes using IC 741.
8. To study the operational amplifier as differentiator & integrator.
9. To study various logic gates & verify their truth tables.
10. To study half adder/full adder & verify their truth tables.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester II
Computer System & Programming in C++ (Lab)

Course Code: ECS262/BCS161 **L T P C**
0 0 2 1

LIST OF EXPERIMENTS:

Note: Minimum 15 experiments should be performed from the following:

1. Write a Program (WAP) to calculate Sum & average of N numbers.
2. WAP to convert integer arithmetic to a given number of day and month.
3. WAP to find maximum and minimum out of 3 numbers a, b & c.
4. WAP to find factorial of positive integer.
5. WAP to find sum of series up to n number, 2+5+8+…..+n.
6. WAP to print all the number between 1 to 100 which are dividing by 7.
7. WAP to generate Fibonacci series up to n.
8. WAP to calculate area of circle using Functions.
9. WAP to calculate factorial of given number using Recursion function.
10. WAP to find whether number is prime or not.
11. WAP to find that the enter character is a letter or digit.
12. WAP to find addition of two matrix of n*n order.
13. WAP to find multiplication of two matrix of n*n order.
14. WAP to find even or odd up to a given limit n.
15. WAP to find whether a given no is palindrome or not.
16. WAP to Swap two numbers using third Variable and without using third variable.
17. WAP to Swap two numbers using call by value and call by reference.
18. WAP illustrating overloading of various operators.
19. WAP illustrating use of Friend.
20. WAP illustrating use of Inline Function.
21. WAP illustrating use of destructor and various types of constructor.
22. WAP illustrating various forms of Inheritance.
23. WAP illustrating use of virtual functions, virtual Base Class.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester II
Engineering Drawing (Lab)

Course Code: EME261/161 **L T P C**
0 0 4 2

LIST OF EXPERIMENTS- [All to be performed]

1. To write all Numbers (0 to 9) and alphabetical Letters (A to Z) as per the standard dimensions.
2. To draw the types of lines and conventions of different materials.
3. To draw and study dimensioning and Tolerance.
4. To construction geometrical figures of Pentagon and Hexagon
5. To draw the projection of points and lines
6. To draw the Orthographic Projection of given object in First Angle
7. To draw the Orthographic Projection of given object in Third Angle
8. To draw the sectional view of a given object
9. To draw the development of the lateral surface of given object
10. To draw the isometric projection of the given orthographic projection.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the drawing sheet by the students and a Viva taken by the faculty concerned. The marks shall be given on the drawing sheet & regard maintained by the faculty.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

Drawing Sheet (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Note: The drawing sheet could be manual or in Auto CAD.

Semester II
Workshop Practice (Lab)

Course Code: EME262/162 **L T P C**
0 0 4 2

List of Experiments:
(Perform any ten experiments selecting at least one from each shop.)
Carpentry Shop:
1. To prepare half-lap corner joint.
2. To prepare mortise & tenon joint.
3. To prepare a cylindrical pattern on woodworking lathe.
Fitting Bench Working Shop:
1. To prepare a V-joint fitting
2. To prepare a U-joint fitting
3. To prepare a internal thread in a plate with the help of tapping process
Black Smithy Shop:
1. To prepare a square rod from given circular rod
2. To prepare a square U- shape from given circular rod
Welding Shop:
1. To prepare a butt and Lap welded joints using arc welding machine.
2. To prepare a Lap welded joint Gas welding equipment.
3. To prepare a Lap welded joint using spot welding machine.
Sheet-metal Shop:
1. To make round duct of GI sheet using 'soldering' process.
2. To prepare a tray of GI by fabrication
Machine Shop:
1. To study the working of basic machine tools like Lathe m/c, Shaper m/c, Drilling m/c and Grinding m/c.
2. To perform the following operations on Centre Lathe:
Turning, Step turning, Taper turning, Facing, Grooving and Knurling
3. To perform the operations of drilling of making the holes on the given metallic work-piece (M.S.) by use of drilling machine.
Foundry Shop:
1. To prepare core as per given size.
2. To prepare a mould for given casting.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester II
DISCIPLINE & GENERAL PROFICIENCY

Course Code: EGP211

There shall be continuous evaluation of the student on the following broad parameters:

1. Observance of dress code.

2. Participation in Conferences /Workshops / Seminars.

3. Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

5. Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

6. Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Semester III
Engineering Electromagnetics

Course Code: EEC311 **L T P C**
3 1 0 4

Objective:

- To study the electromagnetic field theory comprising of electrostatics, electrodynamics, plane waves, waveguides, transmission line & cavity resonators.

Course Contents:

UNIT I **(Lectures 08)**

Coordinate systems and transformation: Cartesian coordinates, Cylindrical coordinates, Spherical coordinates; Vector calculus: Differential length, area and volume; Line, surface and volume integrals; Del operator; Gradient of a scalar; Divergence; Curl, Stokes' theorem, green's theorem,

UNIT II **(Lectures 10)**

Electrostatics: Electrostatic fields; Coulomb's law and field intensity; Electric field due to charge distribution; Electric flux density; Gauss' Law; Electric dipole and flux lines; energy density in electrostatic fields.

Electric field in material space: Properties of materials; Convection and conduction currents; Conductors; Polarization in dielectrics; Dielectric constants; Continuity equation and relaxation time; Boundary conditions.

UNIT III **(Lectures 08)**

Plane Waves: Maxwell's equations; Wave equation in an isotropic homogeneous medium and its solution, Phasor notation, Polarization of waves, Reflection and refraction of plane waves at plane Boundaries, Pointing vector.

Unit IV **(Lectures 06)**

Waveguides: Electromagnetic fields: Parallel-plate, Rectangular and circular waveguides; TE and TM modes; Wave impedance; Wave velocities; Attenuation in waveguides.

Unit V **(Lectures 08)**

Planar Transmission Line: Electromagnetic fields: Strip-lines, Micro-strip-lines, Co-planar Waveguides, Transmission line parameters; Transmission line equations; Input impedance; Standing wave ratio and power;

Cavity Resonators: Rectangular and cylindrical resonators.

Text books:

1. E.C. Jordan, K.G. Balmain, E. M. Waves & Radiating Systems, Pearson Education.
2. William H. Hayt, John A. Buck, Engineering Electromagnetics, McGraw-Hill Publishing Co..
3. Kraus, J.D. and Fleisch, D.A., Electromagnetics with Applications, McGraw Hill.
4. Matthew N.O. Sadiku, Principles of Electromagnetics, Oxford University Press.

Reference Book:

1. Kaduskar, Principles of Electromagnetics, Wiley India
2. Ida, N., Engineering Electromagnetics, Springer
3. Kodali, Engineering Electromagnetic Compatibility, John Wiley & sons.

***Latest editions of all the suggested books are recommended.**

Semester III
Digital Logic & Circuits

Course Code: EEC312

L	T	P	C
3	**1**	**0**	4

Objective:

- To study the various aspects of switching theory & learn about logic family circuits, flip flop, sequential circuits also study the memory details.

Course Contents:

UNIT I **(Lectures 06)**

Codes: BCD codes, 8421 code, Excess-3 code, Gray code, error detection and correction, Hamming code.

UNIT II **(Lectures 10)**

SR, JK, D, T flip-flops & latches, Master-Slave flip-flop. Flip-flop excitation table, Classification of sequential circuits, Registers, Counters, Sequence Detector and Sequence Generator, state diagram and state reduction assignment.

UNIT III **(Lectures 06)**

RTL, DTL, TTL, IIL and ECL working and their characteristics, Propagation delay, Fan-In, Fan-Out, Noise Margin.

UNIT IV **(Lectures 10)**

Binary adder and subtractor, Multiplexers, Decoders, Demultiplexers, Implementation of Combinatorial Logic using these devices.

UNIT V **(Lectures 08)**

Semiconductor Memories, RAM, SRAM, DRAM, ROM, PROM, EPROM and EEPROM. Memory System design, Charged-Coupled device memory, PLA, PAL.

Text Books:

1. Godse A.P, Switching Theory Technical Publication.
2. M. Morris Mano, Digital Design, Prentice Hall of India.
3. Thomas Downs and Mark F Schulz, Logic Design with Pascal, Van Nostrand Reinhold.

Reference Books:

1. Malvino and Leach, Digital principle and applications, McGraw Hill
2. Cheung, Modern digital systems design (WPC)

***Latest editions of all the suggested books are recommended.**

Semester III
Signals & Systems

[EEC315 amended vide approval dt. November 29, 2019 of V.C]

Course Code: EEC315 **L T P C**

3 1 0 4

Objective:
To learn the main techniques of continuous time signals analysis using Laplace Transform & Fourier-Transform and the analysis of systems in time & frequency domain.

Course contents:

UNIT I **(Lectures 08)**

Signals: Definition, Continuous time signals, Periodic and non-periodic, Even and odd, Energy and power, Deterministic and random, continuous time signals & discrete time signals, one-dimensional & multi-dimensional; Unit impulse, Unit step, Unit ramp, Rectangular, Exponential, Sinusoidal; Operations on continuous time signals.

UNIT II **(Lectures 08)**:
Continuous time systems**,** causal and non-causal, linear and non-linear; Time-invariance, static and dynamic systems, Impulse response and properties, Characterization of Linear-Time invariant (LTI) systems, Step response of discrete time systems; BIBO Stability, Convolution integral, Co-relations.

UNIT III **(Lectures 08)**

Laplace-Transform (LT): One-sided LT and Bilateral LT of some common signals, properties and important theorems of LT, Regions of convergence (ROC) and its properties, Inverse LT.

UNIT IV **(Lectures 08)**

Continuous Time Fourier Transforms (CTFT): Definition, Conditions of existence of CTFT, Properties, Magnitude and phase spectra, Some important CTFT theorems, Parseval's theorem, Inverse FT, Relation between LT and FT

UNIT V **(Lectures 08)**

Z-Transform: One sided and two-sided Z-transforms, properties and theorems, Parseval's theorem, ROC and its properties, Z-transform of some common signals.

Text Book:

1. P. Ramakrishna Rao, "Signal and Systems", Tata McGraw Hill, New Delhi.

Reference Books:

1. Chi-Tsong Chen, `Signals and Systems', 3rd Edition, Oxford University Press.
2. V. Oppenheim, A.S. Willsky and S. Hamid Nawab, "Signals & Systems", Pearson Education.

***Latest editions of all the suggested books are recommended.**

Semester III
Instruments & Measurements

Course Code: EEC313

L	T	P	C
3	0	0	3

Objective:

- To study electrical instruments like ammeters, voltmeters, wattmeter, AC Potentiometer, CRO etc.
- To gain knowledge potential and current transformers.
- To understand the working principles and constructions of digital instruments.
- To study the various display devices and recorders.

Course Contents:

Unit I **(Lectures 08)**

Philosophy of Measurement: Methods of Measurement, Measurement Systems; classification of Instruments; Characteristic of Instruments & Measurement systems; Errors in Measurement.

Unit II **(Lectures 08)**

Analog Measurement of Electrical Quantities: Galvanometer& its types, Electrodynamic type Ammeters, Voltmeters & Wattmeter, Three Phase Wattmeter, Power in three Phase System, Errors in Wattmeter.

Potential Transformer (PT) & Current Transformer (CT): Phase Angle and Ratio errors; Construction and design considerations; Applications.

Unit III **(Lectures 08)**

Measurement of Resistance, Capacitance and Inductance: Measurement of resistances, Inductance & Capacitance ; Q Factor Measurement.

AC Potentiometer: Polar type & Co-ordinate type AC potentiometers; Applications of AC Potentiometers in Electrical Measurement.

Unit IV **(Lectures 08)**

Cathode Ray Oscilloscope: Basic CRO circuit (Block Diagram), Cathode ray tube (CRT) &its principal of operation, its component, Application of CRO and Lissajous Patterns in measurement.

Digital Instruments and Measurements: Concept of Digital Measurement, Block Diagram: Digital Voltmeter, Frequency meter, multi-meter and their applications.

Unit V **(Lectures 08)**

Transducers: Classification and selection of transducers; Measurement of mechanical variables: Displacement, Force, Strain, Measurement of temperature, pressure, flow and level.

Display Devices and recorders: Display devices: LED, LCD, & 7 Segment Display, Analogue recorders: Strip chart, u-v light and x-y Recorders, their tracings and marking mechanisms.

Text Book:

1. A.K. Sawhney, "Electrical & Electronic Measurement & Instrument", Dhanpat Rai & Sons, India.

2. E.W. Golding & F.C. Widdis, "Electrical Measurement & Measuring Instrument", A. W. Wheeler & Co. Pvt Ltd. India.

Reference Books:

1**.** Forest K. Harries, "Electrical Measurement", Willey Eastern Pvt Ltd. India.

2.W.D. Cooper, "Electronic Instrument & Measurement Technique", prentice hall International.

3. Rajendra Prashad, "Electrical Measurement &Measuring Instrument", Khanna Publisher.

4. J. B Gupta., "A Course in Electronic and Electrical Measurements & Instrumentation", S.K. Kataria & Sons.

5. T.S Rathore," Digital Measurement Techniques" Narosa Publishing House.

***Latest editions of all the suggested books are recommended.**

Semester-III
English Communication and Soft Skills-III

[EHM349 amended vide approval dt. July 23, 2018 & January 23, 2019 of V.C]

Course Code: EHM349/449/BHM349 **L T P C**
1 1 2 2

Objectives:

1. To enable the learners to upgrade their knowledge of grammar and vocabulary to address competitive exams like GATE.
2. To enable the learner to improve their listening.
3. To enable the learners to improvise their voice modulation in reading and speaking.
4. To enable the learners to enhance their writing and comprehensive skills in English
5. To enable the learners to proactively participate in activities in situational context.

Course Contents:

Unit – I Grammar & Vocabulary **(14 hours)**

- Correction of Common Errors (with recap of English Grammar with its usage in practical context.)
- Transformation of sentences
- Commonly used Idiom & Phrases (Progressive learning whole semester)

Unit – II Essence of Effective listening & speaking **(12 hours)**

- Listening short conversation/ recording (TED talks / Speeches by eminent personalities) *Critical Review of these abovementioned*
- Voice Modulation: Five P's - Pace, Power, Pronunciation, Pause, and Pitch.
- Impromptu
- Power Point Presentation (PPt) Skills**:** Nuances of presenting PPTs

Unit – III Reading and Comprehension Skills **(08 hours)**

- Strategies of Reading comprehension: Four S's
- How to solve a Comprehension (Short unseen passage: 150-200 words)
- Reading Newspaper (Progressive learning whole semester)

Unit – IV Writing Skills **(06 hours)**

- Essentials of a paragraph
- Paragraph writing (100-120 words)

Reference Books:

1. Allen, W. *"Living English Structure*" Pearson Education, New Delhi.

2. Joseph, Dr C.J. & Myall E.G. "*A Comprehensive Grammar of Current English*" Inter University Press, Delhi
3. Wren & Martin "*High School English Grammar and Composition*" S. Chand & Co. Ltd., New Delhi.
4. Norman Lewis "*Word Power Made Easy*" Goyal Publications & Distributers, New Delhi.
5. Chaudhary, Sarla "Basic Concept of Professional Communication" Dhanpat Rai Publication, New Delhi.
6. Kumar Sanjay & Pushplata "*Communication Skills*" Oxford University Press, New Delhi.
7. Agrawal, Malti "*Professional Communication*" Krishana Prakashan Media (P) Ltd. Meerut.

Methodologies:

1. Idiom & Phrases and exercises, usage in sentences.
2. Sentence transformation on daily activities and conversations.
3. Power Point presentation.
4. Newspaper reading, short articles from newspaper to comprehend and short movies.
5. https://youtu.be/j_mMowcN0Fs

Note:

- For effective communication practice, groups will be changed weekly
- Class (above 30 students) will be divided in to two groups for effective teaching.

Evaluation Scheme

Internal Evaluation		External Evaluation		Total Marks
40 Marks		60 Marks		100
30 Marks (Progressive Evaluation) After each unit-completion: Assignments / PPt Presentation *(Best three assignments)*	10 Marks (Attendance)	20 Marks Midway external assessment (viva) *	40 Marks (Written Examination)	

Note: *Midway external assessment of 20 marks will be submitted and consider with external evaluation with a total of 60 marks.*

*** Parameters of Midway external assessment Viva**

Content	Voice Modulation	Body Language	Question responsiveness	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	20 Marks

Note:

***Midway Assessment**: To take corrective actions, midway assessment will be conducted by 2-member committee of Director's nominee (not by the faculty teaching English courses) and average of the two would be the 20 marks obtained by the students after two units are completed. The marks in sealed envelope will be sent to Examination Department.*

***Written Examination**: There will be questions only from Unit-I, III & IV*

Semester III
Object Oriented Programming using JAVA

Course Code: ECS312/ECS412 **L T P C**
3 1 0 4

Objective:

- This course provides an introduction to object oriented programming (OOP) using the Java programming language.
- Its main objective is to teach the basic concepts and techniques which form the object-oriented programming paradigm.

Course Contents:

Unit I **(Lecturer 8)**

Introduction to Java: Advantages of Java, Byte Code, Java Virtual Machine, Data types, Variables, Control Statements: if, else, switch, loops; Methods & Classes, Inheritance, Package and Interface, Exception Handling, Multithread programming, Synchronization, String handling,

Unit II **(Lecturer 8)**

Applets: Configuring applets, Applet capabilities and restrictions
Abstract Window Toolkit (AWT): Controls, Layout managers, Menus, Images, Graphics.
Java Class: Structure of a Class, Constructors, Polymorphism: Overloading and overriding methods, Garbage collection, Making methods and classes final, Abstract classes and methods.

Unit III **(Lecturer 8)**

Java Swing: Creating a Swing Applet and Application, Programming using Panes, Pluggable Look and feel, Labels, Text fields, Buttons, Toggle buttons, Checkboxes, Radio Buttons, View ports, Scroll Panes, Scroll Bars, Lists, Combo box, Progress Bar, Menus and Toolbars, Layered Panes, Tabbed Panes, Split Panes, Layouts, Windows, Dialog Boxes, Inner frame.

Unit IV **(Lecturer 8)**

Packages: Package access.
Basic concepts of networking: Working with URLs, Concepts of URLs, Sockets Cloning objects, **Wrapper classes:** Enumeration interface.

Unit V **(Lecturer 8)**

JDBC: Connectivity Model, JDBC/ODBC Bridge, java. sql package, Connectivity to remote database, navigating through multiple rows retrieved from a database.

Reference books:

1. Kogent, "Object Oriented Programming Methodology" Kogent Learning Solutions Inc.
2. Booch Grady, "Object-Oriented Analysis & Design with Applications"
3. Jana, "Java and Object-Oriented Programming Paradigm.

***Latest editions of all the suggested books are recommended.**

Semester III
Digital Logic & Circuits (Lab)

Course Code: EEC 361

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS-

Note: Minimum eight experiments should be performed.

1. To verify truth tables of various Gates AND, OR, NOT, NAND, NOR, Ex-OR and Ex-NOR.
2. To verify truth table of half adder and full adder.
3. To verify truth table of half subtractor and full subtractor.
4. To study Multiplexer, Demultimplexer.
5. To study encoder, decoder.
6. To study flip flops.
7. To study magnitude comparator.
8. To study registers, counters.
9. To study BCD to binary converter.
10. To study & test the digital IC by automatic digital IC trainer.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester III
Instruments & Measurements (Lab)

Course Code: EEC362 **L T P C**
0 0 3 2

LIST OF EXPERIMENTS

Note: Minimum eight experiments should be performed.

1. To calibrate the ammeter and voltmeter.
2. To measure the self-inductance by Maxwell's Bridge.
3. To measure the self-inductance by Hay's Bridge.
4. To measure the self-inductance by Anderson's Bridge.
5. To measure the self-inductance by Owen's Bridge.
6. To measure the self-capacitance by Schering Bridge.
7. To measure the self-capacitance by De-Saudy's Bridge.
8. To measure the low resistance by Kelvin's Double Bridge.
9. To trace out the transient response of RLC series circuits using storage type CRO.
10. To trace out the transient response of RLC parallel circuits using storage type CRO

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester III
Object Oriented Programming using JAVA (Lab)

Course Code: ECS361/ECS461 **L T P C**

0 0 3 2

List of Experiments:

1. To write a program in Java for illustrating overloading.
2. To write a program in Java for illustrating over riding.
3. To write a program in Java for illustrating Inheritance.
4. To write programs to create packages and multiple threads in Java.
5. To write programs in Java for event handling Mouse and Keyboard events.
6. To create different applications using Layout Manager.
7. To write programs in Java to create and manipulate Text Area, Canvas, Scroll Bars, Frames and Menus using swing/AWT.
8. To create Applets using Java.
9. To write program for Client Server Interaction with stream socket connections.
10. To write a program in java to read data from disk file.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester III
DISCIPLINE & GENERAL PROFICIENCY

Course Code: EGP311 **C-1**

There shall be continuous evaluation of the student on the following broad parameters:

1. Observance of dress code.

2. Participation in Conferences /Workshops / Seminars.

3. Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

5. Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

6. Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Semester IV
Analog Communication System

Course Code: EEC411

L	T	P	C
3	0	0	3

Objective:

- To study the concepts of analog communication, compare the various communication techniques.
- **Course Contents:**

UNIT I **(Lectures 06)**

Introduction: Basics of Communication, Basic elements of communication system, Definition of modulation, Need of modulation, Basic concept of demodulation.

UNIT II **(Lectures 10)**

Amplitude Modulation: General expressions and waveforms of Double side band with Carrier (DSB-C), Double side band suppressed Carrier (DSB-SC),Single Side Band (SSB) modulation, AM spectrum, DSB-SC, DSB-C, SSB Modulators and Demodulators, Total power in AM, Vestigial Side Band (VSB) modulation, Quadrature Amplitude Modulator.

UNIT III **(Lectures 08)**

Angle Modulation: Basic definition of Frequency Modulation, Classification of FM on the basis of modulation index, General expression of Narrow band FM, Power of Narrow band FM, Carson's rule, Generation of FM by direct and indirect methods, Demodulation of FM by slope detector, Basic definition of Phase Modulation.

UNIT IV **(Lectures 10)**

Pulse Modulation & Digital Transmission of Analog Signals: Sampling Theorem, Pulse Amplitude Modulation (PAM), Pulse Width Modulation, Pulse Position Modulation, Their generation and Demodulation, Introduction to Pulse Code Modulation (PCM) , Issues in digital transmission: Frequency Division Multiplexing, Time Division Multiplexing.

UNIT V **(Lectures 06)**

Noise: Sources of Noise: External, Internal, Shot noise, Partition noise, Flicker noise, Resistor noise, Noise temperature, Concept of signal to noise ratio, Noise figure.

Text Book:

1. H. Taube, D L Schilling, Goutam Saha, "Principles of Communication", 3rd Edition, Tata McGraw-Hill Publishing Company Ltd.

Reference Books:

1. B.P. Lathi, "Modern Digital and Analog Communication Systems", 3rd Edition, Oxford University Press.

2. Simon Haykin, "Communication Systems",4th Edition, Wiley India.

3. H. P. HSU & D. Mitra, "Analog and Digital Communications", 2nd Edition, Tata McGraw-Hill Publishing Company Ltd.

***Latest editions of all the suggested books are recommended.**

Semester IV
Electronic Devices & Circuits

Course Code: EEC412

L	T	P	C
3	0	0	3

Objective:

- To study& do the analysis about electronic devices like diodes, LED, JFET, MOSFET, Amplifiers & Oscillators.

Course Contents:

UNIT-I **(Lectures06)**

Concept of Fermi level, Charge carriers in semiconductors, Carrier concentrations, Diffusion and drift basics, Conductivity and mobility concept, population inversion.

UNIT-II **(Lectures 10)**

Small signal low frequency transistor amplifier circuits: Q point, h-parameter representation of transistor, Analysis of single stage & two stages transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance, Feedback Amplifiers: Concept of feedback, Classification of feedback amplifiers, General characteristics of negative feedback amplifiers,

UNIT-III **(Lectures 10)**

Class A, Class B, Class AB, Class C operation in amplifiers. Efficiency of Class B power amplifier, transformer coupled class-A amplifier and single ended transistor class-A amplifier, Class-B Pushpull amplifier, Harmonic distortions.

UNIT-IV **(Lectures 08)**

Positive feedback in amplifier, Barkhausen criterion; Wein bridge oscillator, RC-phase shift oscillator with BJT; Hartley and Colpitts oscillators; Crystal oscillators; Frequency and amplitude stability of oscillators.

UNIT-V **(Lectures 06)**

Construction and Working principles of Tunnel diode, Varactor diode, Photo diode, LED, Solar cell, pin diode, LCD, Laser diode. .

Text Books:

1. J.Millman, C. C. Halkias, and Satyabratha Jit, ,Electronic Devices and Circuits, Tata McGraw Hill.
2. R.L. Boylestad and Louis Nashelsky, Electronic Devices and Circuits, Pearson, Prentice Hall.

Reference Books:

1. T.F. Bogart Jr., J. S. Beasley and G. Rico, Electronic Devices and Circuits, Pearson Education.
2. S. G. Burns and P. R. Bond, Principles of Electronic Circuits, Galgotia Publications.
3. Millman and Grabel, Microelectronics, Tata McGraw Hill.

4. ***Latest editions of all the suggested books are recommended.**

Semester IV

Network Analysis and Synthesis

Course Code: EEE413 **L T P C**
3 1 0 4

Objective: To gain the knowledge about network theorems, network functions, filters etc.

Course Contents

Unit I **(Lectures 08)**

Graph Theory: Graph of a Network, Definitions, Tree, Co-tree, Link, Basic loops and basic cut sets, Incidence matrix, Cut set matrix, Tie set matrix, Duality, Loop and Node methods of analysis.

Unit II **(Lectures 08)**

Superposition theorem; Thevenin‟s theorem; Norton‟s theorem; Maximum power transfer theorem; Reciprocity theorem; Millman‟s theorem; Compensation theorem; Tellegen‟s theorem.

Unit III **(Lectures 08)**

Network Functions: Concept of Complex frequency; Transform Impedances; Network functions of one-port and two-port networks; Concept of poles and zeros; Properties of driving point and transfer functions; Time response and stability from pole zero plot; Frequency response and Bode plots.

Unit IV **(Lectures 08)**

Two Port Networks: Characterization of LTI two-port networks Z, Y, ABCD and h parameters; Reciprocity and Symmetry; Inter-relationships between the parameters; Inter-connections of two port networks; Image parameters and characteristic impedance; Ladder and Lattice networks; T & π representation.

Unit V **(Lectures 08)**

Network Synthesis: Positive real function, Definition and properties; Properties of LC, RC and RL driving point functions; Synthesis of LC, RC and RL driving point immittance functions using Foster and Cauer first and second forms. Filters: Fundamentals of Passive and active filters; Low pass, High pass, Band pass, and Band elimination filters.

Text Books:

1. M.E. Van Valkenburg “Network Analysis”, Prentice Hall of India
2. D. Roy Choudhary “Networks and Systems”, Wiley Eastern Ltd.
3. Donald E. Scott “An Introduction to Circuit analysis: A System Approach”, McGraw Hill Book Company.
4. A. Chakrabarti “Circuit Theory”, Dhanpat Rai & Co.

Reference Books:

1. M.E. Van Valkenburg “An Introduction to Modern Network Synthesis”, Wiley Eastern Ltd.
2. W.H. Hayt & Jack E-Kemmerly “Engineering Circuit analysis”, Tata McGraw Hill.
3. Soni, Gupta “Circuit Analysis”, Dhanpat Rai & Sons.

***Latest editions of all the suggested books are recommended.**

Semester IV
Power Electronics

Course Code: EEE414/EEE512 **L T P C**
3 1 0 4

Objective:

- To create an awareness of the general nature of power electronic equipment.
- To study the principles of operation of power electronic devices.
- To understand the applications of power electronic devices as converters, inverters etc.

Course Contents:

Unit I **(Lectures 08)**

Power Semiconductor Devices: Types of power semiconductor devices, their symbols and static characteristics; Characteristics and specifications of switches; Types of power electronic Circuits; BJT operation: Steady state and switch characteristics, Switching limits; Operation and steady state characteristics of MOSFET and IGBT; Thyristor operation: V-I characteristics, Two transistor model, Methods of turn-on; Operation of GTO, MCT and TRIAC.

Unit II **(Lectures 08)**

Power Semiconductor Devices (Contd.): Protection of devices; Series and parallel operation of thyristors; Commutation techniques of thyristor; DC-DC Converters: Principles of step-down chopper, step down chopper with R-L load, Principle of step-up chopper, Operation with RL load, classification of choppers.

Unit III **(Lectures 08)**

Phase Controlled Converters: Single-phase half-wave controlled rectifier with resistive and inductive loads, Effect of freewheeling diode; Single-phase fully-controlled and half-controlled bridge converters.

Unit IV **(Lectures 08)**

AC Voltage Controllers: Principle of on-off and phase control single-phase ac voltage controller with resistive and inductive loads; Three-phase ac voltage controllers (various configurations and comparison); Single-phase transformer tap changer; Cyclo Converters: Basic principle of operation, Single-phase to single-phase, Three-phase to single-phase and three-phase to three-phase cyclo converters, output voltage equation.

Unit V **(Lectures 08)**

Inverters: Single phase series resonant inverter; Single phase bridge inverters; Three phase bridge inverters; Voltage control of inverters; Harmonics reduction techniques; Single phase and three phase current source inverters.

Text Books:

1. M. H. Rashid, "Power Electronics: Circuits, Devices & Applications", Prentice Hall of India, Ltd., 2004.

2. M.D. Singh & K.B. Khanchandani, "Power Electronics", Tata McGraw Hill, 2005

Reference Books:

1. M.S Jamil Asghar, "Power Electronics", Prentice Hall of India Ltd., 2004

2. A Chakrabarti, "Fundamentals of Power Electronics & Drives", Chanpat Rai & Co.

3. Babu K.Hari, "Power Electronics", Switch Publications.

***Latest editions of all the suggested books are recommended.**

Semester IV

Database Management System

Course Code: ECS411/511/611/MSC014/BCS311	L	T	P	C
	3	1	0	4

Objective: Introducing the fundamental concepts necessary for designing, using, and implementing database systems and applications. The goal of this course is for students to become well-grounded in basic concepts necessary for understanding DB and their users, DBMS concepts, architecture , the concepts of the Entity Relationship(ER) model, the data abstraction and semantic modeling concepts leading to EER data model, describe the basic relational model, its integrity constraints and update operations, and the operation of relational algebra, describe relational schema design, and it covers the normalization and functional dependency algorithm.

Course Contents:

Unit I: **(Lectures 08)**

Introduction: Scope and purpose of database system, view of data, relational databases, database architecture, transaction management, database system Vs filesystem, Database system concept and architecture, data definitions language, DML.

Data Models: The importance of data models, Basic building blocks, Business rules, The evolution of data models, Degrees of data abstraction

Unit II: **(Lectures 08)**

Database design and ER Model: overview, ER-Model, Constraints, ER-Diagrams, ERD Issues, weak entity etc, Codd's rules, Relational Schemas, Introduction to UML, Relational database model: Logical view of data, keys, integrity rules.

Relational Database design: features of good relational database design, atomic domain and Normalization (1NF, 2NF, 3NF, BCNF)

Unit III: **(Lectures 08)**

Relational data Model and Language: Relational algebra: introduction, Selection and projection, set operations, renaming, Joins, Division, syntax, semantics. Operators, grouping and ungrouping, Relational comparison. Calculus: Tuple relational calculus, Domain relational Calculus, calculus vs algebra, Computational capabilities, constraints, Views.

Introduction on SQL: Characteristics of SQL, advantage of SQL. SQL data type and literals. Types of SQL commands. SQL operators and their procedure. Tables, views and indexes. Queries

and sub queries. Aggregate functions. Insert, update and delete operations, Joins, Unions, Intersection, Minus, Cursors, Triggers, and Procedures in SQL/PL SQL.

Unit IV: **(Lectures 08)**

Usage of Oracle:

1. Installing oracle
2. Creating Entity-Relationship Diagram using case tools.
3. Writing SQL statements Using ORACLE
4. MYSQL: a) Writing basic SQL SELECT statements.
   b) Restricting and sorting data.
   c) Displaying data from multiple tables.
   d) Aggregating data using group function.
   e) Manipulating data.
   f) Creating and managing tables.
5. Normalization in ORACLE.
6. Creating cursor in oracle.
7. Creating procedure and functions in oracle.
8. Creating packages and triggers in oracle.

Unit V: **(Lectures 08)**

Transaction management: ACID properties, serializability and concurrency control Lock based concurrency control (2PL, Deadlocks), Time stamping methods, optimistic methods, database recovery management.

Text Books:

1. Elmasri, R., Navathe, S., Fundamentals of Database Systems, Addison-Wesley.
2. G. K. Gupta, "Data Base Management", Tata Mc Graw Hill.
3. Atul Kahate, "Introduction to Database Management Systems" Pearson Education, New Delhi, 2006.

***Latest editions of all the suggested books are recommended.**

Semester IV
Analog Communication System (Lab)

Course Code: EEC461

L	T	P	C
0	0	3	2

List of Experiments:

Note: **Minimum eight experiments should be performed**

1. To study amplitude modulation.
2. To study amplitude demodulation
3. To study Frequency modulation.
4. To study the generation of DSB- SC signal.
5. To study generation of single side band signal.
6. To study and detect the FM signal using PLL.
7. To study and measure the noise figure using a noise generator.
8. To study Pulse Width Modulation.
9. To study Pulse Position Modulation.
10. To study sampling and reconstruction of Pulse Amplitude modulation system.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester IV
Electronics Devices & Circuits (Lab)

Course Code: EEC462

L	T	P	C
0	0	3	2

List of Experiments:

Note: Select any 08 out of the following list of experiments.

1. To Study the lab equipment and components: CRO, Multimeter, Function Generator, Power supply, Active, Passive Components & Bread Board.
2. To study wave shape of the electrical signal of the half wave rectifier using bread board and discrete components.
3. To study wave shape of the electrical signal of the full wave (centre-tapped and bridge) rectifiers using bread board and discrete components.
4. To study & plot input and output characteristics for common base, common emitter configurations.
5. To study & plot frequency response curve of FET.
6. To study & plot frequency response curve of R-C coupled common emitter amplifier.
7. To study & determine voltage gain, current gain, input impedance and output impedance of common emitter amplifier.
8. To study the R-C Phase shift, Wein Bridge oscillator and verify experimentally the frequency of oscillation.
9. To study BJT as a switch.
10. To study the common collector configuration-emitter follower using Darlington pair.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester IV

Network Analysis & Synthesis (Lab)

Course Code: EEE463 **L T P C**

0 0 3 2

List of Experiments:

Note: Minimum ten experiments should be performed from the following:

1. To verify the superposition theorem with DC and AC sources.
2. To verify the Thevenin's theorem with DC and AC sources.
3. To verify the Norton's theorem with DC and AC sources.
4. To verify the Maximum power transfer theorem with DC & AC sources.
5. To verify the Tellegen's theorem for two networks of the same topology.
6. To verify the reciprocity theorem in a given network.
7. To plot the pole-zero diagram of the given network.
8. To determine the transient response for RL and RC circuits with step voltage input, under critically damped and over damped cases.
9. To determine the frequency response for RLC (series& parallel) circuits with sinusoidal AC input Signal.
10. To Study loading effect in the cascade connected Networks.
11. To determine the frequency response of a Twin – T notch filter.
12. To determine attenuation characteristics of a low pass/high pass active filters.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester IV
Power Electronics (Lab)

Course Code: EEE464/EEE562 **L T P C**
0 0 3 2

List of Experiments:

Note: A minimum of 10 experiments has to be performed out of which at least three should be from software based experiments.

1. To study V-I characteristics of SCR and measure latching and holding currents.

2. To study UJT trigger circuit for half wave and full wave control.

3. To study single-phase half wave controlled rectifier with (i) Resistive load (ii) Inductive load with and without freewheeling diode.

4. To study single phase (i) Fully controlled rectifier (ii) Half controlled bridge rectifier with resistive and inductive loads.

5. To study three-phase (i) Fully controlled rectifier (ii) Half controlled bridge rectifier with resistive and inductive loads.

6. To study single-phase AC voltage regulator with resistive and inductive loads.

7. To study single phase Cyclo-converter.

8. To study triggering of (i) IGBT (ii) MOSFET (iii) Power Transistor

9. To study operation of (i) IGBT (ii) MOSFET with Chopper circuit

10. To study MOSFET/IGBT based single-phase series-resonant inverter.

11. To study MOSFET/IGBT based single-phase bridge inverter.

SOFTWARE BASED EXPERIMENTS (PSPICE/MATLAB)

1. To simulate single-phase fully-controlled bridge rectifier using SCR and draw load voltage and load current waveforms for inductive load/RL load.

2. To simulate single-phase fully-controlled bridge rectifier using GTO and draw load voltage and load current waveforms for inductive load/RL load.

3. To simulate single-phase fully-controlled bridge rectifier using IGBT and draw load voltage and load current waveforms for inductive load/RL load.

4. To simulate single-phase full-wave AC voltage controller SCR and draw load voltage and load current waveforms for inductive load/RL load.

5. To simulate single-phase full-wave AC voltage controller MOSFET and draw load voltage and load current waveforms for inductive load/RL load.

6. To simulate step down dc chopper with L-C output filter for inductive load and determine steady-state values and ripple contents of output voltage.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester IV
DISCIPLINE & GENERAL PROFICIENCY

Course Code: EGP411 **C-1**

There shall be continuous evaluation of the student on the following broad parameters:

1. Observance of dress code.

2. Participation in Conferences /Workshops / Seminars.

3. Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

5. Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

6. Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Semester V
Microprocessor & Applications

Course Code: EEC511 **L T P C**

3 1 0 4

Objective

- To study the evolution of microprocessors & how to do assembly language programming with the help of interfacing.

Course Contents

Unit I **(Lectures 08)**

Introduction to Microprocessor: 8085 Evolution of Microprocessor, Register Structure, ALU, Bus Organization, Timing and Control, instruction set. Architecture of 16-bit Microprocessors: Architecture of 8086; (Bus Interface Unit, Execution unit) Register Organization, Bus operation, Memory segmentation.

Unit II **(Lectures 08)**

Assembly Language Programming: Addressing Modes and instruction set of 8086, Arithmetic and Logic instructions, Program Control Instructions (jumps, conditional jumps, subroutine call), Loop and string instructions, Assembler Directives.

Unit III **(Lectures 08)**

CPU Module: Signal Description of pins of 8086 and 8088, Clock generator, Address and Data bus Demultiplexing, Buffering Memory Organization, Read and Write cycle Timings, Interrupt Structures, Minimum Mode and Maximum Mode Operations.

Unit IV **(Lectures 08)**

Peripheral Interfacing: Programmed I/O, Interrupt Driven, I/O, DMA, Parallel I/O, (8255-PPI, Parallel port), 8253/8254 programmable Timer/Counter Interfacing with ADC.

Unit V **(Lectures 08)**

Peripheral Interfacing (Contd.): 8259 Programmable Interrupt controller, 8237 DMA controller Concept of Advanced 32 bit Microprocessors: Pentium Processor.

Text Books:

1. Gaonkar Ramesh S., "Microprocessor Architecture, Programming, and Applications with the 8085", Pen Ram International Publishing.
2. Ray, A.K. & Burchandi, K. M. "Advanced Microprocessors and Peripherals: Architecture Programming and Interfacing", Tata McGraw Hill.
3. Hall D.V, "Microprocessors Interfacing", Tata McGraw Hill.
4. B.P. Singh & Renu Singh, "Microprocessors and Microcontrollers", New Age International.
5. U.S. Shah, "Microprocessor" Tech Max Publications

Reference Books:

1. Liu and Gibson G.A., "Microcomputer Systems: The 8086/8088 Family", Prentice Hall (India).
2. Brey, Barry B., "INTEL microprocessors", Prentice Hall (India).
3. Ram B., "Advanced Microprocessor & Interfacing", Tata McGraw Hill.

***Latest editions of all the suggested books are recommended.**

Semester V
Microwave Techniques

[EEC512 amended vide approval dt. January 23, 2019 of V.C]

Course Code: EEC512

L	T	P	C
3	1	0	4

Objective:

- To study microwave tubes such as reflex klystron, perform the analysis of microwave networks & also study in detail the microwave semiconductor devices.

Course Contents:

UNIT I **(Lectures 08)**

Microwave Tubes: Design considerations for microwave tubes, principle of operation of Two cavity and reflex klystron, magnetron and traveling wave tube.

UNIT II **(Lectures 08)**

Microwave Network Analysis: Equivalent voltages and currents, concept of impedance, impedance and admittance matrices of microwave junctions, scattering matrix representation of microwave networks, ABCD parameters, excitation techniques for waveguides.

UNIT III **(Lectures 08)**

Power Dividers and Couplers: Scattering matrix of 3- and 4-portjunctions, T-junction power divider, Wilkinson power divider, and qualitative description of two-hole and multi-hole waveguide couplers, hybrid junctions.

UNIT IV **(Lectures 08)**

Ferromagnetic Components: Permeability tensor of ferrites, plane wave propagation in ferrites, Faraday rotation, ferrite circulators, isolators and phase shifters.

UNIT V **(Lectures 08)**

Microwave Semiconductor Devices: Operation and circuit applications of Gunn diode, IMPATT diode, PIN Diode, and Schottky barrier diode; Microwave BJT, MESFET, HEMT and their applications.

Text Books:

1. Pozar, D.M., "Microwave Engineering", John Wiley & Sons.
2. Liao, S.Y., "Microwave Devices and Circuits", Prentice-Hall of India.
3. Collin, R.E., Collin, R.E., "Foundations for Microwave Engineering", John Wiley & Sons.

References Books:

1. Streetman, B.G. and Banerjee, S.K., "Solid-state Electronic Devices", Prentice-Hall of India.
2. Sze, S.M. and Ng, K.K., "Physics of Semiconductor Devices", John Wiley & Sons.
3. Bahl, I. and Bhartia, P., "Microwave Solid State Circuit Design", John Wiley & Sons.

***Latest editions of all the suggested books are recommended.**

Semester V
Digital Communication Systems

Course Code: EEC513

L	T	P	C
3	0	0	3

Objective:

- To study the digital communication, information theory, coding techniques & digital modulation multiplexing.

Course Contents:

UNIT I **(Lectures 06)**

Information Rate; Properties of Information, Properties of Entropy, Conditional Entropy and Redundancy; Source Coding; Source Coding Theorem.

UNIT II **(Lectures 10)**

Coding Techniques: PCM, DM, DPCM, ADPCM; Line Coding and its properties, NRZ & RZ Types; Signaling Format for Unipolar, Polar, Bipolar (AMI) & Manchester Coding; Shannon-Fano and Huffman Coding; Optimum Filter; Matched Filter Receiver.

UNIT III **(Lectures 08)**

Digital Modulation Techniques: Types of Digital Modulation, Wave forms for Amplitude, Frequency and Phase Shift Keying; Method of Generation and Detection of Coherent & Non-Coherent Sources Shift keying techniques: ASK, FSK, PSK, Differential PSK & Quadrature Modulation Technique (QPSK).

UNIT IV **(Lectures 08)**

Digital Multiplexing: Fundamentals of Time Division Multiplexing (TDM), Frequency Division Multiplexing (FDM), Comparison & Bit-Byte Interleaving between TDM & FDM, T1 Carrier System, Synchronization, Signaling& Hierarchy of T1, TDM & PCM.

UNIT V **(Lectures 08)**

Error Control Coding: Error Free Communication over a Noise Channel, Error Correcting Capability; Linear Block Codes; Encoding and Syndrome Decoding; Cyclic Codes; Encoder and Decoder for Cyclic Codes; Convolution Codes; Tree diagram, state diagram and Trellis diagram.

Text Book:

1. Haykin, Simon, Communication Systems, John Wiley, 4th Ed.

References Books:

1. Singh, R.P. & Sapre, S. D., Communication Systems: Analog & Digital, Tata McGraw-Hill.
2. Lathi, B.P, Modern Digital & Analog Communication Systems, Oxford University Press
3. Simon Haykin, Digital Communication, John Wiley.

***Latest editions of all the suggested books are recommended.**

Semester V
Control Systems

Course Code: EEE511 **L T P C**

3 1 0 4

Objective:

- To learn about the open and closed loop control systems.
- To understand the time response analysis, frequency response analysis and study control system component etc.

Course Contents

Unit I **(Lectures 08)**

Control Systems: Open loop & closed control; Servomechanism; Physical examples; Transfer functions: Block diagram algebra, and Signal flow graph, Mason's gain formula; Reduction of parameter variation and effects of disturbance by using negative feedback.

Unit II **(Lectures 08)**

Time Response Analysis: Standard test signals; Time response of first and second order systems; Time response specifications; Steady state errors and error constants; Design specifications of second order systems; Derivative errors, Derivative output, Integral error and PID compensation; Design specifications for higher order systems; Performance indices.

Unit III **(Lectures 08)**

Control System Components: Constructional and working concept of AC Servomotor; Synchronous and stepper motor; Stability and Algebraic Criteria, Concept of stability and necessary conditions; Routh-Hurwitz criteria and limitations; Root Locus technique: Root Locus concepts, Construction of Root Loci.

Unit IV **(Lectures 08)**

Frequency response Analysis: Frequency response, Correlation between time and frequency responses; Polar and inverse polar plots; Bode plots; Stability in frequency domain: Nyquist stability criterion, Assessment of relative stability, Gain margin and phase margin; Constant M&N circles.

Unit V **(Lectures 08)**

Introduction to Design: The design problems and preliminary considerations of lead, Lag and Lead-lag networks; Design of closed loop systems using compensation techniques in time and frequency domains.

Review of state variable technique: Review of state variable technique, conversion of state variable model to transfer function model and vice-versa; Diagonalization; Controllability and Observability and their testing.

Text Book:

2. I.J. Nagrath & M. Gopal "Control System Engineering", New age International.
3. K. Ogata "Modern Control Engineering", Prentice Hall of India.

Reference Books:

1. Norman S. Nise "Control System Engineering", Wiley Publishing Co.
2. M. Gopal "Control System; Principle and design", Tata McGraw Hill.
3. M. Gopal "Modern Control system", Tata McGraw Hill.

***Latest editions of all the suggested books are recommended.**

Semester V
English Communication and Soft Skills – IV

[EHM599/EHM699/BHM499 amended vide approval dt. July 23, 2018 of V.C]

Course Code: EHM599/699/BHM499 **L T P C**

1 1 2 2

Objectives:

1. To enable the learners to inculcate the skills of technical writing.
2. To enable the learners to proactively participate in Job Oriented activities.
3. To enable the learners to be aware of corporate Skills.

Course Contents:

Unit – I: Job Oriented Skills **(10 Hours)**

- Cover Letter
- Preparing Resume and Curriculum-Vitae
- Writing Joining Report

Unit – II: Technical Communication **(12 Hours)**

- Technical description of engineering objects
- Data Interpretation: Tables, Charts, & Graphs
- Preparing Agenda & Minutes of the Meeting
- Technical Proposal: Types, Significance, Structure & AIDA
- Report Writing: Types, Structure& Steps towards Report writing

Unit- III: Interview Skills **(10 Hours)**

- Branding yourself
- Interview: Types of Interview, Tips for preparing for Interview and Mock Interview
- Group Discussion: Do's and Don'ts of Group Discussion
- Negotiation skills

Unit – IV: Corporate Skills **(8 Hours)**

- Corporate Expectation
- Service mindset: Selling a product - Ad made shows
- Goal setting
- Team Building & Leadership
- Professional Ethics

Reference Books:

- Raman Meenakshi & Sharma Sangeeta, *"Technical Communication-Principles & Practice"* Oxford University Press, New Delhi.
- Mohan K. & Sharma R.C., "*Business Correspondence of Report Writing",* TMH, New Delhi.
- Chaudhary, Sarla "Basic Concept of Professional Communication" Dhanpat Rai Publication, New Delhi.
- Kumar Sanjay & Pushplata "*Communication Skills*" Oxford University Press, New Delhi.
- Agrawal, Malti "*Professional Communication*" Krishana Prakashan Media (P) Ltd. Meerut.

Methodology:

1. The content will be conveyed through Real life situations, Pair Conversation, Group Talk and Class Discussion.
2. Conversational Practice will be effectively carried out by Face to Face & Via Media (Audio-Video Clips)
3. Modern Teaching tools (PPT Presentation & Motivational videos with sub-titles) will be utilized.

Note:

- For effective communication practice, groups will be changed weekly.
- Class (above 30 students) will be divided in to two groups for effective teaching.

Evaluation Scheme

Internal Evaluation		External Evaluation		Total Marks
50 Marks		50 Marks		100
40 Marks (Progressive Evaluation) After each unit-completion: Assignments /Oral Presentation	10 Marks (Attendance)	25 Marks Midway external assessment (Viva) *	25 Marks (External Viva)* *	

Note: 1. *Midway external assessment of 25 marks will be submitted and considered with external evaluation with a total of 50 marks*.
2. Assignments & Oral Presentation (Progressive Evaluation) will be designed to test learning outcomes unit wise.

*Parameters of Midway external assessment (Viva)

Knowledge of frequently asked questions	Body Language	Communication skills	Confidence	Voice Modulation	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	05 Marks	25 Marks

Note: *To take corrective actions, midway assessment will be conducted by 2-member committee of Director's nominee (not by the faculty teaching English courses) and average of the two would be the 25 marks obtained by the students after two units are completed.*

**Parameters of External Viva

Knowledge of frequently asked questions	Body Language	Communication skills	Confidence	Voice Modulation	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	05 Marks	25 Marks

Note: *External Viva will be conducted by 3-member committee comprising*

a) *Faculty teaching the class*
b) *English faculty from other college of the University (As approved by VC).*
c) *T&P officer of other colleges of the University (As approved by VC).*

Each member will evaluate on a scale of 25 marks and the average of three would be the 25 marks obtained by the students.

Semester V
Microprocessor & Applications (Lab)

Course Code: EEC561

L	T	P	C
0	0	3	2

List of Experiments:

Note: Minimum eight experiments should be performed.

1. Study of 8085 Microprocessor kit.
2. Write a program using 8085 and verify for addition of two 8-bit numbers.
3. Write a program using 8085 and verify for addition of two 8-bit numbers (with carry).
4. Write a program using 8085 and verify for 8-bit subtraction (display borrow).
5. Write a program using 8085 and verify for 16-bit subtraction (display borrow)
6. Write a program using 8085 for multiplication of two 8- bit numbers by successive addition method.
7. Study of 8086 microprocessor kit.
8. Write a program using 8086 for multiplication of two 8- bit numbers.
9. Write a program using 8086 for multiplication of two 16- bit numbers.
10. Write a program using 8086 and verify for finding the smallest number from an array

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester V
Microwave Techniques (Lab)

Course Code: EEC562

L	T	P	C
0	0	3	2

LIST OF EXPERIMENTS

Note: Minimum eight experiments should be performed.

1) To study microwave equipment and components.
2) To study and measure the guide wavelength and frequency of the signal in a rectangular waveguide.
3) To study & measure the VSWR using slotted line.
4) To study the mode characteristics of reflex Klystron and determine the mode number, transit time & electronic tuning sensitivity.
5) To study the characteristics of Gunn oscillator.
6) To study & measure the coupling coefficient and directivity of a directional coupler.
7) To study the insulation & coupling coefficient of a magic T.
8) To study & measure the attenuation.
9) To study the waveguide horn and its radiation pattern and determination of the beam width.
10) To study of microwave power meter.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester V
Digital Communication Systems (Lab)

Course Code: EEC563

L	T	P	C
0	0	3	2

Note: Minimum 8 Experiments to be performed

List of Experiments:

1) To Study the sampling and reconstruction techniques.
2) To Study the Pulse code modulation and demodulation.
3) To Study the delta modulation and demodulation and observe effect of slope overload DCL-07
4) To Study the Adaptive Delta modulation and demodulation
5) To Study the data coding techniques.
6) To Study the amplitude, shift keying modulator and demodulator.
7) To Study the frequency shift keying modulator and demodulator.
8) To Study the phase shift keying modulator and demodulator.
9) To Study the TDM PCM Transmitter and receiver.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester V
DISCIPLINE & GENERAL PROFICIENCY

Course Code: EGP511 **C-1**

There shall be continuous evaluation of the student on the following broad parameters:

1. Observance of dress code.

2. Participation in Conferences /Workshops / Seminars.

3. Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

5. Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

6. Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Semester VI
Embedded system

Course Code: EEC612 **L T P C**

3 1 0 4

Objective:

 To develop aspect of embedded system, architecture, interfacing & programming concepts

Course Contents

Unit I **(Lectures 08)**

Basic difference between microprocessor, microcontroller and embedded, Introduction to AVR**,** General purpose registers in AVR, AVR data memory, AVR status registers.

Unit II **(Lectures 08)**

Instructions with data memory, Branch instructions and looping, call instructions and stack, AVR time delay and instruction pipelining & RISC architecture in AVR

Unit III **(Lectures 08)**

Introduction to AVR assembly programming, Input output programming in AVR, Input output bit manipulation programming, Arithmetic, logic instructions and programmes.

Unit IV **(Lectures 08)**

AVR programming in C: Data types and time delays in C, Input /output programming in C, Logic operations in C, Data conversion programs in C, Data serialization in C, Memory allocation in C.

Unit V **(Lectures 08)**

AVR timer programming in assembly and C programming timers 0,1,2, counter programming, AVR interrupts & programming, AVR serial ports& programming.

Text Books:

1. Muhhmad Ali Mazidi, Sarmad Naimi, Sepehr Naimi. “The AVR Microcontroller and Embedded Systems using Assembly and C”Pearson Education .
2. DR.K.V.K.K. Prasad, Embedded/Real Time System, Dreamtech
3. Iyer, Gupta, Embedded Real Systems Programming, TMH

References Books:

1. Rajkamal Embedded Systems, TMH.
2. David Simon Embedded systems software primer, Pearson
3. Steve Furber, ARM System-on-Chip Architecture, Pearson
4. Jean J Labrose, Micro C/OS-II, Indian Low Price Edition

***Latest editions of all the suggested books are recommended.**

Semester VI

Microcontroller Hardware, Programming & its Application (Arduino)

[EEC617 amended vide approval dt. January 23, 2019 of V.C]

Course Code: EEC 617

L	T	P	C
2	2	0	4

Objective:

- To understand Arduino microcontroller, architecture, interfacing and programming concepts.

Unit-I **(Lectures 08)**

Getting started with Arduino: Introduction and Familiarization to Arduino, pin structure of Arduino Uno, different types of Arduino, Setup your computer to use Arduino, Download and Install the Arduino IDE, Arduino IDE and Sketch Overview, Understanding Arduino Syntax Module, Understanding and Using Variables, Reading Analog Pins and Converting the Input to a Voltage Understanding electronics elements – Resistors, capacitors, transistors, relays. Arduino & LEDs interfacing, Blinking of LEDs, Fading of LED, Circling of LEDs. Blinking of EVEN and ODD states of LEDs, Traffic light system.

Unit-II **(Lectures 08)**

Serial monitoring: Controlling of LEDs from your computer, reading analog and digital inputs, Controlling LED using push button, Switching ON a relay. If-Else Statement, Comparison Operators and Conditions, For Loop Iteration, how to Use Arrays, Switch Case Statement, While Statement.

Unit-III **(Lectures 08)**

Analog inputs: Controlling of LEDs using a joystick, controlling a DC motor, PWM, Changing the brightness of LEDs using potentiometers.

LCD displays: Wiring of LCD screen with Arduino, displaying a message in LCD screen, Screen navigation on LCD, Turn ON a LED by entering the password, Knowing the status of the LED, scrolling of text, Displaying room temperature.

Unit-IV **(Lectures 08)**

Seven segment display: Simple automatic countdown and count up. Increment or decrement a number by using push button. Introduction to servo motor, Controlling Servo Motor with Joystick, Indexing of Servo motor, Direction control of Servo Motor, Synchronizing 2 Servo Motors.

Unit-V **(Lectures 08)**

Interfacing with Sensor modules: HC-SR04 Ultrasonic Module, IR Infrared Obstacle Avoidance Sensor Module, Soil Hygrometer Detection Module Soil Moisture Sensor, Microphone Sensor, Digital Barometric Pressure Sensor Board, Photoresistor Sensor Module Light Detection , Digital Thermal Sensor Module Temperature Sensor Module, MQ-2Gas Sensor Module Smoke Methane Butane Detection, SW-420 Motion Sensor Module Vibration Switch Alarm, Humidity and Rain Detection Sensor Module, Passive Buzzer Module, Speed Sensor Module, IR Infrared Flame Detection Sensor Module, 5V 2-Channel Relay Module, HC-SR501 Pyroelectric Infrared Sensor Module, Accelerometer Module, DHT11 Temperature and Humidity Sensor, HC-05 Bluetooth module.

Text Book:

1. Jeremy Blum "Exploring Arduino", Wiley Publishing Co.
2. Simon Monk "Programming Arduino; Getting started with sketchs", Tata McGraw Hill.

Reference Books:

1.J.M. Hughes "Arduino: A technical reference", O'Reilly Media, Inc.

Note-To introduce experimental and project learning the CT1 evaluation will be based on theoretical and programming knowledge and CT2 ,CT3 evaluation will be based on small working projects.

External exam will be the test for theoretical and programming evaluation on embedded C specific to arduino.

*Tutorial will be programming exercise with hands-on work on small projects.
*Advice- In group of 3 to 5 students will get arduino boards & laptop for practice during tutorial.

Semester VI
Analog and Digital Integrated Electronics

Course Code: EEC613	L	T	P	C
	3	0	0	3

OBJECTIVE:

- To study analog integrated circuits, design and analysis method of analog circuits.

Course Contents:

UNIT I **(Lectures 08)**

Frequency response of op-amp & multivibrators: Frequency response, compensating Networks, Frequency response of internally compensated and uncompensated Op-Amps, equivalent circuit, Astable, Monostable, Bistable multiviberator, Instrumentation Amplifier.

UNIT II **(Lectures 08)**

Nonlinear circuits & regulators: Voltage Comparators, Schmitt Triggers, Precision Rectifiers-half wave, full wave, Analog Switches Peak detectors, sample and hold circuit, Linear Regulators, Switching Regulators,723-general purpose regulator.

UNIT III **(Lectures 08)**

Active filters & converters: First and second order filters-low pass, High pass, Band Pass, band Reject, All Pass filter-I convertors, I-V convertors, Analog to Digital and Digital to Analog Convertors.

UNIT IV **(Lectures 08)**

Nonlinear amplifiers & phase locked loops: Log/Antilog Amplifiers, Analog multipliers, operational Transconductance Amplifiers(OTA), Phase Locked Loops, Monolithic PLLs, Noise in integrated Circuits.

UNIT V **(Lectures 08)**

Introduction of IC 555: Functional block diagram, Implementations of Monostable, Astable Multivibrator, Schmitt trigger, Voltage controlled oscillator, Square & Triangular wave generator.

Text Books:

1. Franco Sergio, Design with operational Amplifiers and integrated Circuits, Tata McGraw Hill.
2. Ramakant A. Gayakwad, Op-Amp and Linear Integrated Circuits, Prentice Hall of India.

Reference Books:

1. Millman J.& Halkias, Integrated Electronics Analog and Digital Circuits & Systems, Tata McGraw, Hill.
2. Soclof. S. Application of Analog Integrated Circuits, Prentice Hall of India.
3. Bell, David A, Operational Amplifiers Linear ICS, Prentice Hall of India.

***Latest editions of all the suggested books are recommended.**

Semester VI
Antenna & Wave Propagation

Course Code: EEC614

L	T	P	C
3	1	0	4

Objective: To develop design aspects and analysis, study of components used in antenna system & develop a frame work for designing wave, antenna used in various systems.

Course Contents:

UNIT I **(Lectures 08)**

Basic Antenna Parameters, Radiation Patterns, Beam Area (or Beam Solid Angle), Radiation Intensity, Directivity and Gain, Directivity and Resolution, Antenna Apertures.

UNIT II **(Lectures 08)**

Introduction of Dipole antenna, Radiated Power, Directivity & Radiation resistance, The Short Electric Dipole: Fields & Radiation Resistance, Half Wave dipole.

UNIT III **(Lectures 06)**

Antenna Arrays: Two element Array, Endfire and Broadside arrays, Pattern multiplication, Binomial and Dolph- Chebyshev arrays.

UNIT IV **(Lectures 08)**

Reflector and Broadband Antennas: Parabolic reflector antenna, Yagi- Uda Antenna, Long-Periodic antenna, Folded Dipole Antenna, Rhombic Antenna, Helical Antenna.

Planar Antennas: Introduction, Radiation from rectangular microstrip patch antennas and feeding techniques, Dual band patch antenna.

UNIT V **(Lectures 10)**

Wave Propagation: Ground Wave, Sky wave, Surface wave, Space Wave, Effects of Imperfect Earth, Effects of Curvature of Earth, Introduction of structural Details of the ionosphere, Refraction and Reflection of Sky Waves by ionosphere, Ray Path, Critical Frequency, MUF, LUF, Virtual Height and Skip Distance.

Text Books:

1. Jordan Edwards C & Balmain Keith G, Electromagnetic Waves and Radiating Systems, PHI
2. John D Krauss, Ronald J Marhefka and Ahmad S. Khan," Antennas and Wave Propagation", Tata McGraw Hill.

Reference Books:

1. Kraus, John D. & Mashefka, Ronald J, Antennas: For All Applications, Tata McGraw Hill,
2. Prasad, K.D, Antennas and Wave Propagation, Khanna Publications.
3. Collin, R, Antennas and Radio Wave Propagation, Tata Mc Graw-Hill.
4. A. R. Harish, M. Sachidananda, Antennas and Wave Propagation, Oxford University Press, 2009.
5. Jordan Edwards C. and Balmain, Keith G., Electromagnetic Waves and Radiating Systems, PHI.

***Latest editions of all the suggested books are recommended.**

Semester VI
Telecommunication Switching Systems

Course Code: EEC615

L	T	P	C
3	0	0	3

Objective: The objective behind this subject is to know about telecommunication network which is helpful in telecommunication system.

Course Contents:

UNIT I **(Lecture 08)**

Telecommunication Switching Systems: Introduction, Evolution of Telecommunications, Elements of a switching system, principles of cross bar switching, Electronic space division switching, Time division switching.

UNIT II **(Lectures 08)**

Telephone Networks: Subscriber loop systems, switching hierarchy and routing, numbering plan, charging plans, Signaling Techniques: In channel signaling, common channel signaling.

UNIT III **(Lectures 08)**

Telecommunication Traffic Engineering: Network traffic load and parameters, grade of service and blocking probability, Incoming Traffic and Service Time Characterization: Birth-death process, pure birth process, pure death process.

UNIT IV **(Lectures 08)**

Blocking models and loss estimates: Introduction to LCC, LCR, LCH models. Delay systems: Introduction to LCD. Public switched data networks, connection oriented & connection less service, Circuit Switching, packet switching concepts, OSI reference model, Repeaters, Bridges, Routers and gate ways.

UNIT V **(Lectures 08)**

Integrated Services Digital Network (ISDN): Introduction, ISDN architecture, DSL Technology: ADSL, Cable Modem, Traditional Cable Networks, HFC Networks, CM &CMTS and DOCSIS. Protocols: TCP/IP& IPV4.

Text Books:

1. Thyagarajan Viswanath, Tele communication switching system and networks, PHI
2. Wayne Tomasi, Advanced electronic communications systems, PHI

Reference Books:

1. J. Bellamy, Digital telephony, John Wiley.
2. Achyut. S. Godbole, Data Communications & Networks, Tata McGraw Hill.
3. H. Taub & D. Schilling, Principles of Communication Systems, Tata McGraw Hill.
4. B.A. Forouzan, Data Communication & Networking, Tata McGraw Hill.
5. J E Flood, Telecommunication switching, Traffic and Networks, Pearson Education

***Latest editions of all the suggested books are recommended.**

Semester VI
Mobile and Cellular Communication

Course Code: EEC616

L	T	P	C
3	0	0	3

Objective:

- To study the cellular system, Spread spectrum multiple access techniques, mobile network layer & the overview of the emerging technologies.

Course Contents

UNIT I **(Lectures 08)**

The Cellular Concept: System design fundamentals, frequency reuse, channel assignment strategies, handoff strategies, Interference system capacity, Improving coverage and capacity in cellular systems. Introduction to Spread spectrum multiple access: FDMA, TDMA, CDMA, SDMA.

UNIT II **(Lectures 08)**

GSM Overview: GSM system for mobile: Services and features, System Architecture, Radio Subsystem Channel types, Frame Structure, Introduction to GPRS.

UNIT III **(Lectures 08)**

Mobile radio propagation (Large scale path loss): Free space propagation model, Two ray propagation model, Fresnel zone geometry, knife edge diffraction model, multiple knife edge diffraction.

UNIT IV **(Lectures 10)**

Mobile radio propagation (small scale fading and multipath): Small scale multipath propagation: factors influencing small scale fading, doppler shift, Small scale multipath measurements: Direct Rf pulse system, spread spectrum sliding correlator channel sounding, frequency domain channel sounding. Parameters of mobile multipath channels, time dispersion parameters, coherence and bandwidth, Doppler spread and coherence time Types of small scale fading: flat fading, frequency selective fading, fast fading, slow fading.

Unit V **(Lectures 06)**

Emerging Technologies: Bluetooth protocol stack, Introduction to wireless networks: 2G, 3G&4G Wireless Standards, Intelligent network, Introduction to WSN.

Text Book

1. T.S. Rappaport, Wireless Communication-Principles and practice, Pearson
2. Haykin S & Moher M., Modern wireless communication, Pearson
3. Schiller, J. Mobile Communication, Pearson Education

Reference Books:

1. Yi-Bing Lin and Imrich Chlamtac Wireless and Mobile Network Architecture, Wiley Publication.
2. Kasera Sumit, Narang Nishit, 3G Networks: Architecture, Protocols and Procedures, TMH.

***Latest editions of all the suggested books are recommended.**

Semester VI
Analog and Digital Integrated Electronics (Lab)

Course Code: EEC661	**L**	**T**	**P**	**C**
	0	**0**	**3**	**2**

List of Experiments:

Note: Minimum eight experiments should be performed.

1. To study the characteristics of operational amplifier to get data for input bias current, measure the output- voltage and reduce it to zero and calculate slew rate.
2. To study the operational amplifier in inverting and non-inverting modes.
3. To study the operational amplifier as scalar and summer.
4. To study the operational amplifier as differentiator and integrator.
5. To study the LPF and HPF using Op-Amp IC741.
6. To study the band pass and band reject active filters using operational amplifier IC 741.
7. To study the oscillators: RC phase shift, Hartley & Colpitts using operational amplifier.
8. To study the astable & monostable multivibrators using IC-555 timer.
9. To study the triangular & square wave generator using 555 timers.
10. To study the amplifier using bipolar junction transistor.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester VI
Antenna and Wave Propagation (Lab)

Course Code: EEC662

L	T	P	C
0	0	3	2

List of Experiments:
Note: Minimum eight experiments should be performed

1. 1.To study, analyze & plot the radiation pattern of Dipole antennas.
2. To study, analyze & plot the radiation pattern of Half Wave Dipole antenna.
3. To study, analyze & plot the radiation pattern of Yagi Antenna.
4. To study, analyze & plot the radiation pattern of Log Periodic Antenna.
5. To study, analyze & plot the radiation pattern of Helix Antenna.
6. To study, analyze & plot the radiation pattern of Microstrip Antenna.
7. To study & measure the VSWR of coaxial line section
8. To calculate & measure the unknown impedance of coaxial line section
9. To study the technique of stub matching in coaxial line section.
10. 10 To study the design & test the RF circuits RF filters (LP, HP, BP)

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester VI
DISCIPLINE & GENERAL PROFICIENCY

Course Code: EGP611 **C-1**

There shall be continuous evaluation of the student on the following broad parameters:

1. Observance of dress code.

2. Participation in Conferences /Workshops / Seminars.

3. Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

5. Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

6. Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Semester VII
Digital Signal Processing

Course Code: EEC711

L	T	P	C
3	1	0	4

Objective:

- The objective behind this subject is to know about DFT, FIR filters their design.

Course Contents

UNIT I **(Lectures 08)**

Causal, anti-causal and non-causal, Static & dynamic, Linear and non-linear, Time-invariance, Characterization of linear time-invariant (LTI) systems, Impulse response, convolution sum, BIBO Stability, de convolution, Step response of discrete time systems.

UNIT II **(Lectures 10)**

DTFT, Inverse DTFT, Convergence, Properties and theorems, Parseval's theorem, DTFT of some elementary discrete time signals.

Frequency domain sampling, Introduction to DFT, Computation methods of discrete Fourier transform, DFT as a linear transformation, Periodicity, Linearity, Symmetry Properties. Multiplication and various methods of circular convolution of two discrete time signals.

UNIT III **(Lectures 06)**

Fast Fourier Transform: Definition, Radix-2 FFT algorithms, Basic butterfly structures of DIT and DIF algorithms, Computation of DFT & IDFT using DIT-FFT and DIF-FFT algorithms.

UNIT IV **(Lectures 08)**

IIR Filter Structures: Signal flow graph, Direct forms (I & II), Cascade and Parallel realizations, Transposed structure.

FIR filter structures: Direct form structure, Linear phase FIR structure, Lattice structure.

UNIT V **(Lectures 8)**

IIR Filter Design by the Bilinear transformation. Symmetric and Anti-symmetric FIR Filters, Design of FIR Filters Using Windows, Design of Linear-Phase. Introduction to Butterworth & Chebyshev filters.

Text Books:

1.Proakis.J.G.& Manolakis. D. G, Digital Signal Processing: Principles Algorithms and Applications, Prentice Hall (India).

Reference Books:

1. Sanjit K. Mitra, Digital Signal Processing, TMH
2. Oppenheim A.V. & Schafer, Ronald W, Digital Signal Processing, Pearson Education.
3. Rabiner, L.R. and Gold B., Theory and applications of DSP, PHI.
4. DeFatta, D.J., Lucas, J.G. & Hodgkiss, W.S., Digital Signal Processing, John Wiley & Sons.

***Latest editions of all the suggested books are recommended.**

Semester VII
Robotics & Automation

Course Code: EEC712

L	T	P	C
3	0	0	3

Objective:
To provide comprehensive knowledge of robotics in the design, analysis and control point of view.

UNIT I **(Lectures 08)**
Basic Concepts: Definition and origin of robotics – different types of robotics – various generations of robots – degrees of freedom – Asimov's laws of robotics – dynamic stabilization of robots.

UNIT II **(Lectures 08)**
Power Sources and Sensors: Hydraulic, pneumatic and electric drives – determination of HP of motor and gearing ratio – variable speed arrangements – path determination – micro machines in robotics – machine vision – ranging – laser – acoustic – magnetic, fiber optic and tactile sensors.

UNIT III **(Lectures 08)**
Manipulators, Actuators and Grippers: Construction of manipulators – manipulator dynamics and force control – electronic and pneumatic manipulator control circuits – end effectors – U various types of grippers – design considerations.

UNIT IV **(Lectures 08)**
Kinematics and Path Planning: Solution of inverse kinematics problem – multiple solution jacobian work envelop – hill climbing techniques – robot programming languages

UNIT V **(Lectures 08)**
Case Studies: Mutiple robots – machine interface – robots in manufacturing and non- manufacturing applications – robot cell design – selection of robot.

Text Books:
1. Mikell P. Weiss G.M., Nagel R.N., Odraj N.G., Industrial Robotics, McGraw-Hill Singapore.
2. Ghosh, Control in Robotics and Automation: Sensor Based Integration, Allied Publishers, Chennai.

References:
1. Deb. S. R., Robotics technology and flexible Automation, John Wiley, USA 1992. 2. Asfahl C.R., Robots and manufacturing Automation, John Wiley, USA.
2. Klafter R.D., Chimielewski T.A., Negin M., Robotic Engineering – An integrated approach, Prentice Hall of India, New Delhi.
3. Mc Kerrow P.J. Introduction to Robotics, Addison Wesley, USA, 1991. 5. Issac Asimov I Robot, Ballantine Books, New York.

***Latest editions of all the suggested books are recommended.**

Semester VII
Satellite Communication

Course Code: EEC713

L	T	P	C
3	0	0	3

Objective:

- To study the basic concepts of satellite communication, wave propagation, polarization, link design, satellite transponder& get an overview of the non-geostationary orbit satellite systems.

Course Contents:

Unit I **(Lectures 08)**

Orbital parameters, orbital perturbations, geostationary orbit, three axis stabilizations, antenna look angles, antenna mount, limits of visibility, Earth eclipse of satellite, sun transit outage, inclined orbits, sun-synchronous orbit, launching of geostationary satellites.

Unit II **(Lectures 08)**

Atmospheric losses, ionospheric effects, rain attenuations, polarization of satellite signals, cross polarization discrimination, Satellite Antenna: Antenna basics, aperture antennas, parabolic reflectors, offset feed, bent pipe system, **F**requency allocations for satellite services

Unit III **(Lectures 08)**

Introduction to link design, transmission losses, link power budget equation, system noise, carrier to noise ratio for uplink and downlink, combined uplink and downlink carrier to noise ratio, Noise figure, Noise temperature, System noise temperature, and G/T ratio, inter modulation noise, Multiple Access Techniques: FDMA, TDMA,CDMA,

Unit IV **(Lectures 08)**

Transponder Model, design considerations, lifetime and reliability, spacecraft sub systems, space segment cost estimates. Earth Stations: Introduction, design considerations, general configuration and characteristics.

Unit V **(Lectures 08)**

INTELSAT Series, INSAT, VSAT, DBS Television and Radio, Remote sensing, Mobile satellite services: GSM and GPS, Satellite navigation system, DTH.

Text book:

1. Timothy Pratt, Charles Bostian, Jeremy Allnut Satellite Communications, John Wiley & Sons.
2. J. Martin - Communication Satellite Systems, PHI Publication.

Reference Books:

1. M. Richharia - Satellite Communications Systems, Mc Millan Publication.
2. Dennis Roddy - Satellite Communications, Mc-Graw Hill publication.
3. Robert M. Gagliardi - Satellite Communication, CBS Publishers and Distributors.

***Latest editions of all the suggested books are recommended.**

Semester VII

Digital Signal Processing (Lab)

Course Code: EEC763

L	T	P	C
0	0	2	1

List of Experiments:

Note: Minimum eight experiments should be performed.

1. Generation of unit step, unit impulse and unit ramp signals
2. Program to implement Phase Modulation.
3. To demonstrate sampling and quantization.
4. To find linear convolution with and without using DFT.
5. To find circular convolution.
6. To verify linearity and time invariance properties of a system.
7. To find FFT of a 4 point sequence by using radix-2 DIT-FFT.
8. To simulate BER performance of communication system using MATLAB script.
9. To simulate BER performance of digital communication system using simulink.
10. To simulate BER performance of digital communication system with cyclic encoder using simulink.

Note: The entire practical's to be performed on MATLAB DSP tool kit.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester VII
Electronic Workshop & PCB Lab

Course Code: EEC764

L T P C
0 0 3 2

List of Experiments:

Note: Minimum eight experiments should be performed.

1. To study winding shop & design a Step-down transformer winding of less than 5VA.
2. To study the PCB design & layout using software's (P-SPICE&SPRINT)
3. To study soldering shop& learn fabrication of DC regulated power supply
4. To study PCB layout of circuits using printing technology.
5. To study artwork, printing of a simple PCB & perform these operations on PCB.
6. To study etching, drilling of PCB& perform these operations on PCB.
7. To study wiring & fitting shop: Fitting of power supply along with a meter in cabinet.
8. To study the testing techniques of regulated power supply fabricated & test the PCB.
9. To study audio amplifier & fabricate/ test the audio amplifier circuit by using above power supply PCB.
10. To study & design a electronic circuit using available software's & perform fabrication using all techniques of electronics workshop & PCB design.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester VII
Information Theory & Coding

Course Code: EEC714

L	T	P	C
2	0	0	2

Objective:
To provide basic knowledge of Information theory and various coding techniques.

UNIT I **(Lectures 05)**
Introduction to Information theory: Information and entropy, properties of information and entropy, source coding theorem, Shannon fano coding, Huffman coding, Symmetric channel ,binary symmetric channel, Basics of mutual information ,channel capacity, channel coding theorem.

UNIT II **(Lectures 05)**
Coding Techniques: Block Code: Block diagram, Parity check code, Weight, Hamming distance, minimum distance, error correction and detection.

UNIT III **(Lectures 05)**
Linear block codes: generator matrix, encoder, parity check matrix, constructing hamming codes, error correction and error detection capabilities.

UNIT IV **(Lectures 05)**
Cyclic codes, systematic cyclic codes, generator polynomial and generator matrix of cyclic codes.

UNIT V **(Lectures 05)**
Convolutional codes: Convolutional encoder, code tree, state diagram, trellis diagram. Basic definitions of BCH and Reed Solomon codes.

Text books:

1. Norman Abramson, Information Theory, John Wiley.
2. Shu Lin, Costello D.J, Fundamentals and Applications, of Error Control Coding, Prentice Hall Inc. Englewood Cliffs.
3. B.P. Lathi, Modern Digital and Analog Communication Systems, Oxford University Press.

Reference books:

1. Simon Haykin, Digital Communications, John Wiley.
2. Taub & Schilling, Principles of Communication System, Tata McGraw Hill.
3. Tomasi, Electronic Communication, Fundamentals Through Advanced, Pearson education.
4. Sklar, Digital Communication, Pearson Education.
5. T. Cover and Thomas, Elements of Information Theory, John Wiley & Sons 1991.

***Latest editions of all the suggested books are recommended.**

Semester VII
Design and Installation of Solar Photovoltaic System

Course Code: EEC762/BAS464 **L T P C**
0 2 2 2

Objective: To learn students-

- Basics of solar energy
- Installation, Maintenance and Service of solar power plant.
- Designing in AutoCAD
- Risk Management and to ensure safety and performance.

Course Contents:

Unit-1 **(T Hrs-4.5, P Hrs - 3.5)**

Basics of PV Technology: What is Solar Energy, Solar Collectors, Photovoltaic Systems, History of Photovoltaics, Photovoltaic Effect, Photovoltaic Cells, PV Modules and Arrays.

Solar PV technology overview: How does PV technology work, Other Types of Photovoltaic Technology, Costs of Solar Photovoltaics, Modern Photovoltaics.

Fundamentals of Solar Components Solar PV System: Solar Radiation, Solar Cell Parameters and Equivalent Circuit, Losses and Efficiency Limits, Crystalline Silicon Solar Cells, Thin-film solar cells, PV System Design.

Site survey, assessment & feasibility study: PV Site Location, Assumptions and Input Data for Analysis, Potential Rate Increases, Conclusions and Recommendations.

Unit-2 **(T Hrs-4, P Hrs -5)**

Assess the customer's Solar PV requirement: pv cost considerations, permits and covenants, stand-alone small solar electric systems, grid-connected small solar electric systems, estimating energy cost savings for net-metered pv system.

Capacity or system sizing approach: Solar PV system sizing, determine power consumption demands, Inverter sizing, Battery sizing, available area for installation of SPV.

Design of SPV Plants: Load estimation, Estimation of number of PV panels, Estimation of battery bank, Cost estimation of the system.

Unit-3 **(T Hrs-4, P Hrs -5)**

Preparation of Bill of Materials (BoM): Mechanical or electrical components used to assemble or integrate major components, Size of the Plant, Type of Roof, Module Make and Specs, Inverter Make and Specs, Whether Remote Monitoring is separately required.

Installation, Maintenance and Service of SPV Plants: Modularity & scalability, Flexible location.

Civil and Mechanical parts of Solar PV System: Get Equipment Foundation constructed, Install Mounting System, Install Photovoltaic modules, Install Battery Bank Stand and Inverter Stand.

Unit-4 **(T Hrs-6, P Hrs -5)**

Electrical components of Solar PV System: Install Array JB, cost effective wiring, Using MCCBs and other essential components.

Advanced Solar Power plant Engineering: Photovoltaic Inverter Topologies for Grid Integration Applications, Advanced Control Techniques for PV Maximum Power Point Tracking, Maximum Power Point Tracking Methods for PV Systems, Photovoltaic Multiple Peaks Power Tracking Using Particle, Swarm Optimization with Artificial Neural Network Algorithm

Intro – Google Sketchup, PV Syst, AutoCAD: Creation of a grid-connected project, Construction and use of 3D shadings scenes, Meteorological data in PV-syst.

Unit-5 **(T Hrs-7, P Hrs -1)**

Solar project development phases and issues: Initiation phase, Definition phase, Design phase, Development phase, Implementation phase, Follow-up phase.

Project planning and schedule of activities: Management activities**,** Project planning, Project scheduling, Risk management, Risk identification, Risk analysis, Risk planning, Risk monitoring

Best practices in design & installation to ensure safety and performance: Work History, Financial Transparency, Health and Safety, Insurance.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment (Min. 06 experiment) would be evaluated by external trainer or by faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by external trainer or the faculty concerned. The marks shall be entered on the index sheet of the practical file. Each experiment will be evaluated in 5 marks as per given distribution.

Evaluation scheme:

S. No.	Experiment (10 marks)	Attendance (10 marks)	Test result (20 marks)	Viva (10 MARKS)	Average in 5 Marks
Experiment 1					
Experiment 2					
:					
Experiment 10					

External Evaluation (50 marks)

The external evaluation would also be done by the external trainer or industrial expert or by faculty based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester VII
Industrial Training & Presentation

Course Code: EEC792 **L T P C**
0 0 0 4

Students will have to undergo industrial training of six weeks in any industry or reputed organization after the VI semester examination in summer. The evaluation of this training shall be included in the VII semester evaluation.

The student will be assigned a faculty guide who would be the supervisor of the student. The faculty would be identified before the end of the VI semester and shall be the nodal officer for coordination of the training.

Students will prepare an exhaustive technical report of the training during the VII semester which will be duly signed by the officer under whom training was undertaken in the industry/ organization. The covering format shall be signed by the concerned office in-charge of the training in the industry. The officer-in-charge of the trainee would also give his rating of the student in the standard University format in a sealed envelope to the Director/Principal of the college.

The student at the end of the VII semester will present his report about the training before a committee constituted by the Director/Principal of the College which would comprise of at least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director/Principal. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Director/Principal.

The marks by the external examiner would be based on the report submitted by the student which shall be evaluated by the external examiner and cross examination done of the student concerned.

Not more than three students would form a group for such industrial training/ project submission.

The marking shall be as follows.
Internal: 50 marks
By the Faculty Guide – 25 marks.
By Committee appointed by the Director/Principal – 25 marks.

External: 50 marks
By Officer-in-charge trainee in industry – 25 marks.
By External examiner appointed by the University – 25 marks.

Technical report will consist five chapter as per given format:
Chapter 1: Brief about organization
Chapter 2: Detail of business carried out by organization
Chapter 3: Specific contribution during the industrial training (not more than 500 words)
Chapter 4: Learning during the industrial training (not more than 200 words)
Chapter 5: Conclusion

Plagiarism will check of technical report in chapter 3, 4 & 5 only.

Semester VII
PROJECT WORK PHASE-I

Course Code: EEC798

L	T	P	C
0	0	8	4

A group of students, not more than three, will be assigned a faculty guide who would be the supervisor of the group. The faculty would be identified in the starting of the VII semester.

The group will carry out the literature search and collect required material for carrying out the project.

The group will prepare a report not exceeding 15 pages at the end of semester.

The assessment of performance of students should be made at least twice in each semester i.e. VII and VIII. In this semester, the student shall present the progress of project live as also using overheads project (30% Project completion) or power point presentation on LCD to the internal committee.

The evaluation committee shall consist of faculty members constituted by the college which would comprise of at-least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director/Principal. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Director/Principal.

The marking shall be as follows.

Internal: 100 marks
By the Faculty Guide - 50 marks
By Committee appointed by the Director/Principal – 50 marks

Semester VII
DISCIPLINE & GENERAL PROFICIENCY

Course Code: EGP711 **C-1**

There shall be continuous evaluation of the student on the following broad parameters:

1. Observance of dress code.

2. Participation in Conferences /Workshops / Seminars.

3. Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

5. Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

6. Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Semester VII
Open Elective-I

Course: Principle of Management
Course Code: FOE011 **L T P C**
3 1 0 4

Objective:
To enable the students to study the evolution of Management, to study the functions and principles of management and to learn the applications of principles in an organization.

Course Contents:

Unit I: Introduction To Management And Organizations (Lectures 08)
Definition of Management – Science or Art – Manager Vs Entrepreneur - types of managers - managerial roles and skills – Evolution of Management – Scientific, human relations , system and contingency approaches – Types of Business organization - Sole proprietorship, partnership, company-public and private sector enterprises - Organization culture and Environment – Current trends and issues in Management.

Unit II: Planning (Lectures 08)
Nature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning premises – Strategic Management – Planning Tools and Techniques –Decision making steps and process.

Unit III: Organising (Lectures 08)
Nature and purpose – Formal and informal organization – organization chart – organization structure – types – Line and staff authority – departmentalization – delegation of authority – centralization and decentralization – Job Design - Human Resource Management – HR Planning, Recruitment, selection, Training and Development, Performance Management , Career planning and management.

Unit IV: Directing (Lectures 08)
Foundations of individual and group behaviour – motivation – motivation theories – motivational techniques – job satisfaction – job enrichment – leadership – types and theories of leadership – communication – process of communication – barrier in communication – effective communication – communication and IT.

Unit V: Controlling (Lectures 08)
System and process of controlling – budgetary and non-budgetary control techniques – use of computers and IT in Management control – Productivity problems and management – control and performance – direct and preventive control – reporting.

Textbooks:

1. Stephen P. Robbins & Mary Coulter, "Management", Prentice Hall (India) Pvt. Ltd.
2. JAF Stoner, Freeman R.E and Daniel R Gilbert "Management: Pearson Education.

References:

1. Stephen A. Robbins & David A. Decenzo & Mary Coulter, "Fundamentals of Management" 7th Edition, Pearson Education.
2. Robert Kreitner & Mamata Mohapatra, "Management", Biztantra.
3. Harold Koontz & Heinz Weihrich "Essentials of Management" Tata Mc Graw Hill.
4. Tripathy PC & Reddyu Pn," Principles of Management", Tata Mc Graw Hill.

***Latest editions of all the suggested books are recommended.**

Course: Artificial Neural Network

Course Code: FOE012 **L T P C**

3 1 0 4

Objective: This course aims at introducing the fundamental theory and concepts of computational intelligence methods, Presentation of artificial intelligence as a coherent body of ideas and methods to acquaint the student with the basic programs in the field and their underlying theory. Students will explore this through problem-solving paradigms, logic and theorem proving, language and image understanding, search and control methods and learning.

Unit I **(Lecture 08)**

Artificial Intelligence: Issues, Techniques, Problems, Problem solving state space search; DFS; BFS Production: System, Problem characteristics; Heuristic Search Techniques; generate and Test; Hill Climbing; Best First Search; Constraint satisfaction.

Unit II **(Lecture 08)**

Knowledge representation: Approaches; Issues; Representing simple facts in logic; Resolution and natural deduction; Representing knowledge using rules; Procedural vs. Declarative knowledge; Forward v/s Backward chaining.

Slot and Filler Structures: Semantic nets; Frames; Conceptual dependency; Scripts; parsing techniques.

Unit III **(Lecture 08)**

Introduction to Neural Network: Introduction, Organization of the Brain, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch-Pitts Model, Potential Applications of ANN.

Essentials of Artificial Neural Networks: Artificial Neuron Model, Types of Neuron Activation Function, ANN Architectures, Learning Strategy (Supervised, Unsupervised, Reinforcement).

Unit IV **(Lecture 08)**

Single Layer Feed Forward Neural Networks: Introduction, Perceptron Models and Training Algorithms.

Multilayer feed forward Neural Networks: Credit Assignment Problem, Generalized Delta Rule, Derivation of Back propagation (BP) Training.

Unit V **(Lecture 08)**

Expert System: Definition and Characteristics; Expert system life cycle & Expert system tools; MYCIN & DENDRAL.

Associative Memories: Paradigms of Associative Memory, Pattern Engineering, Hebbian Learning, Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function, Architecture of Hopfield Network.

Text Books:

1. E Rich. and K Knight, "Artificial Intelligence", Tata McGraw Hill.
2. S. Rajasekharan and G. A. Vijayalakshmi pai, Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications, PHI Publication.

Reference Books:

1. "Simon Haykin, Neural Networks- A comprehensive foundation, Pearson Education.
2. S.N. Sivanandam, S. Sumathi,S. N. Deepa, Introduction to Neural Networks using MATLAB 6.0", TMH.
3. James A Freeman and Davis Skapura, Neural Networks Pearson Education, 2002.
4. Timothy J. Ross, Fuzzy Logic with Engineering Applications, McGraw-Hill Inc.
5. V.S. Janakiraman, K Sarukesi, "Foundation of Artificial Intelligence & Expert System", Macmillan.

***Latest editions of all the suggested books are recommended.**

[FOE013 amended vide approval dt. July 23, 2018 of V.C]

Course: Industrial Sociology (old name: Industrial Psychology)

Course Code: FOE013 **L T P C**

3 1 0 4

Objective: Students will learn core psychological competencies including:

1. History of I/O Psychology and its integration into the broader discipline
2. Various fields of psychology from which I/O shares a great deal with (i.e. Social Psychology, Psychometrics, Motivation, Learning theory, Personality)

Course Contents:

Unit I **(Lectures 08)**

Sociology in the industrial Perspective: Concept of Sociology, Sociology as a Science, Sociology of work & industry, Perspectives for sociological analysis of work, Class- Conflict in Industry, Social impact of industrialization, Corporate skills in the fast growing multinational set up.

Unit II **(Lectures 08)**

Work and Social change: Nature of modern societies, emergence of industrial capitalism, Technology & Social change, the information society after the industrial society, post-modernity, globalization & Convergence, Significance of the service sector today, work restructuring and corporate management.

Unit III **(Lectures 08)**

Work experience in Industry: The concept of alienation, Work satisfaction, Technology & work experience, and Social background of workers, Work orientations, Stress & anxiety of the worker, Work & Leisure, Unemployment, Conflicts in the work place.

Unit IV **(Lectures 08)**

General and Applied Ethics- Ethics and the professions – Standard of right and wrong, problems of Ethical Certainty, Significance of professional Ethics for Engineers, New Technology and Ethics, Applied Ethics - Cases in professional Engineering Practice, Principles of business ethics, Individual in the organization.

Unit V **(Lectures 08)**

Ethical Leadership: Decision making, corporate culture and reputation management, corporate social responsibility and social reporting.

Text Books:

1. Sheth N.R., Social Frame Work of Indian Factory, O.U.P. Bombay.

2. Gisbert P., Fundamentals of Industrial Sociology, O.U.P. New Delhi.
3. Watson Tony J., Sociology: Work & Industry, New York. Routledge.
4. Schinzinger, Roland & Mike W. Martin, Introduction to Engineering Ethics- Boston, McGraw Hill.

Reference Books:

1. Fleddermann Charles, Engineering Ethics, Upper Saddle River- N.J. Prentice Hall.
2. Miller & Form, Industrial Sociology, London Harper & Row.
3. Parsons Richard D., The Ethics of Professional Practice- Allyn & Bacon, London.
4. Govindarajan - Engineering Ethics- Prentice Hall (India) New Delhi.

***Latest editions of all the suggested books are recommended.**

Course: Organizational Behaviour
Course Code: FOE014 **L T P C**
3 1 0 4

Objective: This course is to understand the concept of Organizational Behaviour.

Course Contents:

Unit – I **(Lecture 08)**

Concept, Nature, Characteristics, Models of Organizational Behaviour, Management Challenge, Organizational Goal. Global challenges and Impact of culture.

Unit – II **(Lecture 08)**

Perception: Concept, Nature, Process, Importance. Attitudes and Workforce Diversity.
Personality: Concept, Nature, Types and Theories of Personality Shaping, Learning: Concept and Theories of Learning.

Unit – III **(Lecture 08)**

Motivation: Concepts and Their Application, Principles, Theories, Motivating a Diverse Workforce.
Leadership: Concept, Function, Style and Theories of Leadership-Trait, Behavioural and Situational Theories. Analysis of Interpersonal Relationship.

Unit – IV **(Lecture 08)**

Organizational Power and Politics: Concept, Sources of Power, Approaches to Power, Political Implications of Power. Knowledge Management & Emotional Intelligence in Contemporary Business Organization.
Organizational Change: Concept, Nature, Resistance to change, Managing resistance to change, Implementing Change.

Unit –V **(Lecture 08)**

Conflict: Concept, Sources, Types, Functionality and Dysfunctional of Conflict, Classification of Conflict Intra, Individual, Interpersonal, Intergroup and Organizational, Resolution of Conflict, Stress: Understanding Stress and Its Consequences, Causes of Stress, Managing Stress.

Text Books:

1. Dwivedi, D. N, Managerial Economics, Vikas Publishing House.
2. Varshney & Maheshwari, Managerial Economics, Sultan Chand & Sons.

Reference Books:

1. Robbins Stephen P., Organizational Behavior Pearson Education
2. Hersey Paul, "Management of Organizational Behavior: Leading Human Resources" Blanchard, Kenneth H and Johnson Dewey E., Pearson Education
3. Khanka S. S. "Organizational Behavior

***Latest editions of all the suggested books are recommended.**

Course: Engineering and Managerial Economics
Course Code: FOE015 **L T P C**
3 1 0 4

Objective:

1. To understand the concepts of Economics, Managerial Economics and its scope in engineering perspective
2. To study demand analysis, demand forecasting and market structure.

Course Contents:

Unit-I **(Lectures 08)**

Introduction: Meaning, Nature and Scope of Economics, Meaning of Science, Engineering and Technology; Managerial Economics and its scope in engineering perspective.

Unit-II **(Lectures 08)**

Demand: Basic Concepts Demand Analysis; Law of Demand; Determinates of Demand; Elasticity of Demand-Price, Income and cross Elasticity; Uses of concept of elasticity of demand in managerial decisions.

Unit-III **(Lectures 08)**

Forecasting: Demand forecasting; Meaning, significance and methods of demand forecasting; production function; Laws of returns to scale & Law of Diminishing returns scale.
Short and Long run Cost curves: fixed cost, variable cost, average cost, marginal cost, Opportunity cost.

Unit-IV **(Lectures 08)**

Market Study: Market Structure Perfect Competition; Imperfect competition: Monopolistic competition, Monopoly, Oligopoly, Duopoly Sorbent features of price determination and various market conditions.

Unit-V **(Lectures 08)**

Inflation: National Income; Concept of N.I. and Measurement; Inflation: Meaning of Inflation; Type, causes & prevention methods; Business Cycles, Phases of business cycle.

Text Books:

1. Koutsoyiannis, A : Modern Microeconomics, ELBS.
2. Kakkar, D.N., Managerial Economics for Engineering, New Age International Publication.

Reference Books:

1. Dwivedi, D.N., Managerial Economics, Vikas Publishing.
2. Maheshwari, Y., Managerial Economics, Prentice Hall of India.

***Latest editions of all the suggested books are recommended.**

Course: Network security & cryptography
Course Code: FOE016 **L T P C**
3 1 0 4

Objective: The goal is to become familiar with basic techniques to protect data in computer and communication environments against several different varieties of fraud.

Course Contents:

Unit I **(Lectures 08)**

Network Security: Attacks; Services & Mechanisms; Conventional Encryption: Classical Encryption Techniques, Steganography.

Unit II **(Lectures 08)**

Encryption Schemes: DES: Standard, Strength; Block Cipher Design Principles; Block Cipher Modes of Operation: Triples DES; Key Distribution, Random Number Generation.

Unit III **(Lectures 08)**

Public-Key Cryptography: Principles; RSA Algorithm; Key Management; Fermat's & Euler's Theorems; Primarily Miller Test; Chinese Remainder Theorem.

Unit IV **(Lectures 08)**

Message Authentication & Hash Functions: Authentication: Requirements, Protocols, Introduction to Message Authentication Codes and Hash Functions, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA), Digital Signature.

Unit V **(Lectures 08)**

IP Security: Electronic Mail Security; Pretty Good Privacy (PGP); S/MIME; Authentication Header; Encapsulating Security Payloads.
Web Security: Secure Socket Layer & Transport Layer Security, Secure Electronic Transaction (Set);

Text Books:

1. Stallings, W., Cryptography and Network Security: Principles and Practice, Prentice Hall.
2. Kahate, A., Cryptography and Network Security, Tata McGraw Hill.

Reference Books:

1. Johannes, A. B., Introduction to Cryptography, Springer.

***Latest editions of all the suggested books are recommended.**

Semester VIII
VLSI Design & Technology

Course Code: EEC811	L	T	P	C
	3	0	0	3

Objective:

- The objective behind this subject is to know about VLSI design principles, the circuit designing using monolithic process.

Course Contents:

UNIT-I **(Lectures 08)**

Era of Integrated Circuit: Introduction to Monolithic Integrated Circuit Technology, Bipolar &MOS IC, Film IC, Crystal Growth Process**:** Czochralaski technique, Floating zone refining process, silicon wafer preparation & characterization, Oxidation: Thermal oxidation, Oxide thickness measurement, Oxidation system.

UNIT-II **(Lectures 10)**

Diffusion, Ion Implantation, Epitaxy, **Etching& Film Deposition** of dopants: Diffusion Equations. Dopant profiles, sheet resistance, diffusion furnace, liquid and gaseous dopants: Ion implantation techniques, dopant profiles, apparatus used, Epitaxial growth of Si, apparatus for epitaxy, Photolithography techniques for pattern transfer, Mask making, photo resist & techniques. Vacuum deposition & Sputtering apparatus, Basics of CVD Processes.

UNIT-III **(Lectures 10)**

MOS& CMOS Transistor: MOS System under external bias, MOSFET Scaling & Small-Geometry Effects, MOS Inverters, static & dynamic characteristics, NAND, NOR, AOI Circuits, Design Considerations, Layout Design, Micron & Submicron technologies, parasitic effects, Physical limitations.

UNIT-IV **(Lectures 06)**

Concepts of SPICE for Circuit simulation, Standard Digital ICs: Combinational and Sequential MOS Logic Circuits, Design of standard Cells for LSI, VLSI Circuits, Computer-Aided Design Technology.

UNIT-V **(Lectures 06)**

Programmable Logic Devices: PAL, PLA, PLD/CPLD, PGA/FPGA, ASIC, VLSI Testing.

Text Books:

1. S.M. Sze (Ed.), VLSI Technology, Mc Graw Hill.

2. D.A. Pucknell & Eshraghian, Basic VLSI Design, (PHI).

3. Wayne Wolf, Modern VLSI Design Systems on Silicon, (Pearson Pub.).

References Books:

1. S. Gandhi, VLSI Fabrication Principles ED. John Willey.

2. S.A. Campbell, The Science and Engineering of Microelectronic Fabrication, Oxford Univ. Press.

3. K. Gopalan, Introduction to Digital Microelectronics Circuits, Mc Graw Hill.

4. Sedra, Smith (International Student Edition), Microelectronic Circuits, Oxford Univ. Press.

5. Milman & Grabel, Microelectronics Mc Graw-Hill.

***Latest editions of all the suggested books are recommended.**

Semester VIII
Optical Fiber Communication

Course Code: EEC812	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

Objective:

- To study the optical fiber communication system in detail & also get an overview of light sources, detectors sources.

Course Contents:

Unit I **(Lectures 10)**

Introduction to Optical Fiber Communication System: Block diagram of OFCS, Advantage and Disadvantage of OFCS over other communication systems. Ray theory of transmission and concept of acceptance angle and Numerical Aperture (Numerical based on this), Meridional and skew propagate wave theory of optical propagation: cut – off wavelength. Group velocity and Group delay, Types of fibers, Mode of propagation.

Unit II **(Lectures 08)**

Light Sources and Detectors Sources: Light Emitting diodes, Laser diodes, Surface emitter LEDS, Edge emitter LEDS, Super luminescent LEDS, LED operating Characteristics, Laser Diode: Laser principles, semiconductor laser diode, Hetero junction Laser, P-N photo diode, P-I-N Photo diode.

Unit III **(Lectures 08)**

Intensity Modulation: Basic coherent system, Analog modulation formats; AM/IM Sub carrier Modulation, FM/IM Sub carrier Modulation, Coherent detection, Heterodyne Synchronous Detection.

Unit IV **(Lectures 08)**

Losses in Fibers: Absorption, scattering and bending losses. Signal distortion in optical fiber: Material dispersion, waveguide dispersion, intermodal dispersion. Noise in optical fiber: Thermal Noise, shot noise, S/N Ratio, Measurement of Attenuation, dispersion, refractive index, Optical time domain reflectometry (OTDR)

Unit V **(Lectures 06)**

Advanced Systems and Techniques: Wavelength Division Multiplexing, DWDM, optical amplifiers, Optical filters, Optical Networks: SONET/SDH, Photonic switching, Local Area Networks, Optical Sensors.

Text books:

1. Jonn M. Senior, Optical fiber communication (Principles and Practice), Pearson
2. Govind P. Agrawal - Fiber Optic Communications Systems, Wiley

References Books:

1. G. Keiser - Optical Fiber Communication, TMH.
2. Joseph Palais Fiber Optic Communications, Pearson.
3. Wilson Hawkes, Opto Electronics, PHI.
4. Selvrajan, Srinivas, Optical Fiber Communication, TMH.

***Latest editions of all the suggested books are recommended.**

Semester VIII
VLSI Design & Technology (Lab)

Course Code: EEC862 **L T P C**
0 0 3 2

Objective:
1. To bring both Circuits and System views on design together.
2. Offers profound understanding of complex digital VLSI circuit, design, Computer aided simulation and synthesis tool for hardware design.

List of Experiments:

Note: Minimum eight practical's to be performed.

1) Introduction to Xilinx tool
2) HDL code to realize all logic gates
3) Design of 8-to-3 encoder using Xilinx tool
4) Design of 2-to-4 decoder using Xilinx tool
5) Design Shift register using Xilinx tool
6) Design of flip flops (SR, JK, D) using Xilinx tool
7) Introduction to Tanner EDA Tool
8) To find D.C. and transient response of a CMOS Inverter circuit
9) To analyse the CMOS NAND and NOR Gates and compare their schematic using tanner EDA tool
10) To design and analyse D-LATCH and SRAM circuit

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)
Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)			

External Evaluation (50 marks)
The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester VIII
Optical Fiber Communication (Lab)

Course Code: EEC863

L	T	P	C
0	0	3	2

List of Experiments:

Note: Minimum eight practical's to be performed.

1. To study the electrical characteristics of different types of LED.
2. To study the characteristics of Laser Diode.
3. To study the characteristics of Photodiode.
4. To study & measure attenuation of optical fiber
5. To study characteristics of Photo Transistor.
6. To study Fiber optic Analog/Digital, transmitter/receiver link.
7. To study the fiber optical connectors.
8. To study the characteristics of optocoupler.
9. To study the characteristics of Photovoltaic cell and LDR.
10. To study the OTDR in detail.

Evaluation Scheme of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)				ON THE DAY OF EXAM (15 MARKS)		TOTAL INTERNAL (50 MARKS)
EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	ATTENDANCE (10 MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)	

External Evaluation (50 marks)

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Semester VIII
Biomedical Instrumentation

Course Code: EEC813

L	T	P	C
2	0	0	2

Objective:

- To study the bio-medical instrumentation, cardiovascular measurement, Imaging and display system & bio-telemetry.

Course Contents:

Unit I **(Lectures 06)**

Introduction to Electrophysiology and Cell Structure Bioelectric signals: EEG, ECG, EMG, EOG, Muscle cell and nerve cell actions, resting potentials.

Unit II **(Lectures 08)**

Central Nervous and Cardio-Vascular System: Receptors, Motor systems, Neural and neuromuscular measurements, Evoked response of EEG, Structure of Heart, Rhythmicity, Pacemaker cells, ECG theory, Electrocardiograph, Measurement of blood pressure and blood flow, ECG electrodes, Life saving devices: Pacemaker, Defibrillators.

Unit III **(Lectures 08)**

Bio-signal Amplifiers and Signal Processing: Electrodes and transducers for biomedical applications, Basic requirements of op-Amp circuits and instrumentation amplifiers in biomedical applications, ECG data acquisition and biomedical signal processing

Unit IV **(Lectures 08)**

Intensive Care Instrumentation and Patient Safety: Bedside and central station monitoring systems, Introduction to bio-medical telemetry, Surgical Diathermy, Physiological effects of electricity, Macroshock and Microshock hazards, Basic approaches to protection against shock.

Unit V **(Lectures 10)**

Imaging and Display System: X-ray machine, CT-scanners, Ultrasound scanner, Nuclear methods, Recorders and displays: Inkjet, Thermal array, Fiber optic face plate CRT, Non fade CRO
Clinical Laboratory Equipment: Calorimeter, Spectro- photometers, Auto analyzers, Blood cell counter, Blood gas analyzers.

Text Books:

1. Khandpur R.S.- Biomedical Instrumentation- TMH.

2. Venkata Ram, S.K.-Bio-Medical Electronics & Instrumentation (Revised)- Galgotia.

Reference Books:

1.Cromwell- Biomedical Instrumentation and Measurements- PHI.

2.Webster, J.G. –Bio- Instrumentation, Wiley.

3. Ananthi, S. –A Text Book of Medical Instruments-New Age International.

4. Carr & Brown –Introduction to Biomedical Equipment Technology – Pearson.

***Latest editions of all the suggested books are recommended.**

Semester VIII
PLC Programming (Lab)

Course Code: EEC861

L	T	P	C
0	0	4	2

Objective: To understand and learn how system and process are automated in industry and how automated monitoring and control function are performed.

List of Experiments-

1. **Introduction to PLC:** Introduction to PLC hardware and role in automation ,Architectural Evolution of PLC, Introduction to the field devices attached to PLC,PLC Fundamentals - (Block diagram of PLC's),Detail information about PLC components ,Power supply, CPU, I/Os, Communication bus, Various ranges available in PLC's, Types of Inputs & outputs modules , Source Sink Concepts for connecting external devices, Electrical Signal levels used in industrial application, Wiring of the I/O devices to PLCs, Concept of flags and Scan cycle execution, Selection of control system to suit the local requirement, Setting up PLCs / Connecting CPU, I/O modules, Rack, Backplane and Communication bus.
2. **PLC Programming software:** Introduction to PLC programming software, Advanced Feature of PLC programming software, Starting the programming terminal and configuring the PLCs, Addressing concepts in various PLCs, PLC programming types– Ladder Diagram (LD), Instruction List(IL), Functional Block Diagram (FBD) Sequential Function Charts (SFC), Structured Text (ST), Information on the PLC & its Software and Language, Upload / Download and Monitoring of program
3. **PLC Programming:** Starting the programming terminal, Creating & Modifying an R S Logix new project, Introduction to Bit Byte and Word Concept, Programming instructions arithmetic and logical , Load /and /or/out / and Read / Write , Compare / Add / Sub /And /Or – Blocks, Leading edge / trailing edge instructions, MOVE block application, Programming instructions arithmetic and logical ,Timer and Counter Blocks programming, Comments in the PLC programs, Handling Analog I/Ps, Advanced Programmers ,Conversion, Jump Shift instructions, Accumulator functions, Extended mathematical functions, Indirect Addressing, PLC Project Development, Creating various Tasks & Organizing Data, Programming Program Control Instructions, Upload, Download and Monitoring of program.
4. **Operation, Maintenance and Troubleshooting:** Managing R S Logix 500 Project Files, Back up of the programs and reloading, Interpreting Project Organization & Execution, Documenting & Searching for Project Components, Online operations, Monitoring Arrays & Tags of User-Defined Data , Forcing of the I/O's and Toggling Bits, Editing Ladder Logic Online, Identifying the status of PLC and communication bus, Troubleshooting Controller, I/O Modules, PS Problems, CPU, I/O module replacements, Fault detection and error handling, Online editing of the program, Forcing the I/Os, Backup and Restoring programs, Cold, Warm, and Hot Restarts in Siemens PLCs ,Troubleshooting and fault diagnostics of PLC, Fault Detection using Semantic S 7 software ,Hardware fault detection, Replacing CPU, Digital or Analog Modules, battery, Power Supply, Clearing the faults.

5. **SCADA:** Introduction and Applications of SCADA Technology, Architectural evolution of SCADA, Introduction to SCADA software, Features supported by RS View Software, Start up Option and application management, Licensing – No. of I/Os, Screens, Creating a new application, Creating tags and address assignments, Creating & Editing graphic display with animation, Data Entry / Start Stop command, Analog entry, Sizing, Movement, Blinking, Visibility, Filling, Create navigational tools between various pages for user, Trends - Configuring & Accessing Real-time and Historical data. Guide to the alarm pag, Alarm Classes, Configuring, Retrieving and Acknowledgement, Logic writing in SCADA software.

Text Books: Garry Dunning "Introduction to Programmable Logic Controller" Thomson 3rd Edition.

***Latest editions of all the suggested books are recommended.**

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment (Min. 10 experiment) would be evaluated by external trainer or by faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by external trainer or the faculty concerned. The marks shall be entered on the index sheet of the practical file. Each experiment will be evaluated in 5 marks as per given distribution.

Evaluation scheme:

S. No.	Experiment (10 marks)	Attendance (10 marks)	Test result (20 marks)	Viva (10 MARKS)	Average in 5 Marks
Experiment 1					
Experiment 2					
:					
Experiment 10					

External Evaluation (50 marks)

The external evaluation would also be done by the external trainer or industrial expert or by faculty based on the experiment conducted during the examination.

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20 MARKS)	TOTAL EXTERNAL (50 MARKS)

Note: External exam will be conducted at the end of the training.

Semester VIII
Project Work Phase-II

Course Code: EEC898 **L T P C**
0 0 14 7

Students should devote themselves to prepare something tangible, which could be a working model of their thoughts based on their subject of choice.

The project shall be finalized by the students based on the VII semester project work report and shall be completed (100% working condition) and submitted at least one month before the last teaching day of the VIII semester, date of which shall be notified in the academic calendar.

The assessment of performance of students should be made at least twice in each semester i.e. VII and VIII. In this semester student shall present the final project live as also using overheads project or power point presentation on LCD to the internal committee as also the external examiner.

The evaluation committee shall consist of faculty members constituted by the college which would comprise of at-least three members comprising of the Department Coordinator, Class Coordinator and a nominee of the Director/Principal. The students guide would be a special invitee to the presentation. The seminar session shall be an open house session. The internal marks would be the average of the marks given by each member of the committee separately in a sealed envelope to the Director/Principal.

The marking shall be as follows.

Internal: 50 marks
By the Faculty Guide - 25 marks.
By Committee appointed by the Director/Principal – 25 marks.

External: 50 marks
By External examiner appointed by the University – 50 marks.

Semester VIII
DISCIPLINE & GENERAL PROFICIENCY

Course Code: EGP811 **C-1**

There shall be continuous evaluation of the student on the following broad parameters:

1. Observance of dress code.

2. Participation in Conferences /Workshops / Seminars.

3. Attendance in guest lectures, invited talks and special technical sessions organized from time to time.

4. Participation in community projects including NSS.

5. Exhibiting team spirit in different Culture & extra curriculum activities, Department Club activities of the University and College organized from time to time.

6. Observance of rule & regulations in the College/University, Behavior in Campus Premises, Bus, hostel mess and hostel.

7. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.

8. General behavior

9. Any extraordinary achievement.

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however, the marks shall be included for calculation of cumulative Performance Index (CPI).

Head of Department would be display GP marks on notice board in prescribed format after IInd & IIIrd CT in semester:

S No		Enroll No.	Student Name	Dress code	Participation in Conferences /Workshops / Seminars	Participation in guest lectures, invited talks and special technical sessions	Participation in community Services	Participation in Culture & extra curriculum activities, Department Club Activities	Participation in sports/ co-curricular activities	General Behavior	Any Extra Achievement
				(5)	**(15)**	**(20)**	**(10)**	**(20)**	**(20)**	**(5)**	**(5)**
	Responsible for marks			Mentor	Head	Head	Mentor	Cultural Events Coordinator & Department Club Coordinator	Sports Coordinator	Mentor	Director or Principal

Semester VIII
Open Elective-II

Course: Machine learning & Data Analytics

Course Code: FOE021 **L T P C**

3 1 0 4

Objective:

1. Be able to formulate machine learning problems corresponding to different applications.

2. Understand a range of machine learning algorithms along with their strengths and weaknesses.

Course Contents:

Unit I **(Lectures 08)**

Introduction, Different Types of Learning, Hypothesis Space & Inductive Bias, Evaluation and Cross-Validation, Linear Regression, Introduction to Decision Trees, Learning Decision Tree, Overfitting

Unit II **(Lectures 08)**

K- Nearest Neighbour, Feature Selection, Feature Extraction, Collaborative Filtering, Bayesian Learning, Naïve Bayes, Bayesian Network

Unit III **(Lectures 08)**

Logistic Regression, Introduction of Support Vector machine, The Dual Formulation, Maximum Margin with Noise, Nonlinear SVM & Kernel Function, Solution to the Dual Problem.

Unit IV **(Lectures 08)**

Multilayer Neural Network, Neural Network and Backpropagation Algorithm, Deep Neural Network Introduction to Computational Learning Theory, Sample Complexity: Finite Hypothesis Space, VC Dimension

Unit V **(Lectures 08)**

Introduction to Ensembles, Bagging and Boosting, Introduction to Clustering, Kmeans Clustering, Agglomerative Hierarchical Clustering,

Test Books:

1. Machine Learning by Tom M. Mitchell, Mc Graw Hill Publication.
2. Machine Learning: A Probabilistic Perspective (Adaptive Computation and Machine Learning series) by Kevin P. Murphy, MIT Press.
3. Deep Learning (Adaptive Computation and Machine Learning series) by Ian Good fellow, Yoshua Bengio and Aaron Courville, MIT Press.
4. Introduction to Machine Learning with Python: A Guide for Data Scientists by Andreas Muller.

***Latest editions of all the suggested books are recommended.**

Course: Total Quality Management
Course Code: FOE022 **L T P C**
3 1 0 4

Objective: To study about quality concepts, management policies, control charts.

Course Contents:

Unit I **(Lectures 08)**

Quality Concepts: Introduction; Meaning; Quality characteristics of goods and services; Evolution of Quality control, TQM; Modern concept, Basic concepts of quality; Dimensions of quality; Juran's quality trilogy; Deming's 14 principles; PDCA cycle; Total quality management (TQM) models.

Unit II **(Lectures 08)**

Quality Management: Organizational structure and design; Quality function; Decentralization; Designing and fitting organization for different types products and company; Human Factor in Quality: Attitude of top management; Co-operation of groups; Operators attitude, responsibility; Causes of operators error and corrective methods; Quality circles.

Unit III **(Lectures 08)**

Quality improvement and cost reduction: 7 QC tools and new QC tools; Economics of quality value and contribution; Quality cost; Optimizing quality cost; Quality assurance.

Unit IV **(Lectures 08)**

Control Charts: Theory of control charts; Control charts construction: Construction of Mean & Range charts, fraction defective chart and number of defective charts; Attributes control charts: Defects, construction and analysis of c-chart.

Unit V **(Lectures 08)**

IS0-9000, Six sigma and TPM: ISO 9000 series; Concept of Six Sigma and its application; Total Productive Maintenance (TPM).

Text Books:

1. Sharma D. D Total Quality Management, S. Chand.
2. LaI H., Total Quality Management, Wiley Eastern Limited.
3. Greg Bounds, Beyond Total Quality Management, McGraw Hill.

Reference Books:

1. Menon, H.G., TQM in New Product Manufacturing, McGraw Hill.

***Latest editions of all the suggested books are recommended.**

Course: Entrepreneurship
Course Code: FOE023 **L T P C**
3 1 0 4

Objectives: To develop and strengthen entrepreneurial quality and motivation in students and to impart basic entrepreneurial skills and understanding to run a business efficiently and effectively.

Unit I : **(Lectures 08)**

Entrepreneurship:

Entrepreneur – Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur Entrepreneurship in Economic Growth, Factors Affecting Entrepreneurial Growth.

Unit II: **(Lectures 08)**

Motivation:

Major Motives Influencing an Entrepreneur – Achievement Motivation Training, Self-Rating, Business Games, Thematic Apperception Test – Stress Management, Entrepreneurship Development Programs – Need, Objectives.

Unit III: **(Lectures 08)**

Business:

Small Enterprises – Definition, Classification – Characteristics, Ownership Structures – Project Formulation – Steps involved in setting up a Business – identifying, selecting a Good Business opportunity, Market Survey and Research, Techno Economic Feasibility Assessment – Preparation of Preliminary Project Reports – Project Appraisal – Sources of Information – Classification of Needs and Agencies.

Unit IV: **(Lectures 08)**

Financing and Accounting:

Need – Sources of Finance, Term Loans, Capital Structure, Financial Institution, Management of working Capital, Costing, Break Even Analysis, Taxation – Income Tax, Excise Duty – Sales Tax.

Unit V: **(Lectures 08)**

Support to Entrepreneurs:

Sickness in small Business – Concept, Magnitude, Causes and Consequences, Corrective Measures – Business Incubators – Government Policy for Small Scale Enterprises – Growth Strategies in small industry – Expansion, Diversification, Joint Venture, Merger and Sub Contracting.

Text Books:

1. Khanka. S.S., "Entrepreneurial Development" S. Chand & Co. Ltd., Ram Nagar, New Delhi.
2. Donald F Kuratko, "Entrepreneurship – Theory, Process and Practice", Cengage Learning.

References:

1. Hisrich R D, Peters M P, "Entrepreneurship" 8th Edition, Tata McGraw-Hill.
2. Mathew J Manimala, "Entrepreneurship theory at cross roads: paradigms and praxis" 2nd Edition Dream tech.
3. Rajeev Roy, 'Entrepreneurship', Oxford University Press.
4. EDII "Faulty and External Experts – A Hand Book for New Entrepreneurs Publishers: Entrepreneurship Development", Institute of India, Ahmadabad.

***Latest editions of all the suggested books are recommended.**

Course: Big Data & Hadoop
Course Code: FOE024 **L T P C**
3 1 0 4

Course Objective: This course will cover the basic concepts of big data, methodologies for analyzing structured and unstructured data with emphasis on the relationship between the Data Scientist and the business needs.

UNIT I **(Lectures 08)**
Introduction to Big Data: Introduction – distributed file system – Big Data and its importance, Four Vs Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.

UNIT II **(Lectures 08)**
Introduction Hadoop: Big Data – Apache Hadoop & Hadoop Eco System – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.

UNIT- III **(Lectures 08)**
Hadoop Architecture: Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands, Anatomy of File Write and Read., Name Node, Secondary Name Node, and Data Node, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.

UNIT-IV **(Lectures 08)**
Hadoop Ecosystem and Yarn: Hadoop ecosystem components - Schedulers - Fair and Capacity, Hadoop 2.0 New Features- Name Node High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN.

UNIT-V **(Lectures 08)**
Hive and Hiveql Hbase: Hive Architecture and Installation, Comparison with Traditional Database, Hive QL - Querying Data - Sorting and Aggregating, Map Reduce Scripts, Joins & Subqueries, HBase concepts- Advanced Usage, Schema Design, Advance Indexing - PIG, Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper.

Text Books:

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”, Wiley.
2. 2.Chris Eaton, Dirk deroos et al., “Understanding Big data”, McGraw Hill.

3. 3.Tom White, “HADOOP: The definitive Guide”, O Reilly.
4. 4.Vignesh Prajapati, “Big Data Analytics with R and Haoop”, Packet Publishing.

Reference Books:

1. Tom Plunkett, Brian Macdonald et al, “Oracle Big Data Handbook”, Oracle Press.
2. http://www.bigdatauniversity.com/
3. Jy Liebowitz, “Big Data and Business analytics”, CRC press.

***Latest editions of all the suggested books are recommended.**

Course: Financial Management
Course Code: FOE025 **L T P C**
3 1 0 4

Objective: The basic objective of this course to understand the functions, roles, goals and the processes of financial management.

Course Contents:

Unit I **(Lectures 08)**

Introduction: Concept of finance, scope and objectives of financial management; Functions of Finance Manager in Modern Age; Financial decision areas; Time value of money; Risk and Return analysis; Valuation of Securities.

Unit II **(Lectures 08)**

Investment Decision; Appraisal of project; Techniques of capital budgeting and its applications; Risk and Uncertainty in Capital Budgeting; Leverage analysis: Financing, operating and combined leverage and its implications; EBIT-EPS analysis.

Unit III **(Lectures 08)**

Financing Decision: Long-term sources of finance, Concept and approaches of capital structure decision: NI, NOI, Traditional and Modigliani Miller Approach; Cost of capital equity share, preference share, debentures, weighted average cost of capital.

Unit IV **(Lectures 08)**

Working Capital: Concept of Gross Working Capital and Net Working Capital, Various Approaches to Working Capital Management, Factors affecting working capital requirement and sources of working capital financing, Management of inventory, receivables and cash.

Unit V **(Lectures 08)**

Dividend Decision: Dividend policies; Factors affecting dividend policies, Dividend Theories, Bonus policy guidelines relating to dividend declaration and payment.

Text Books:

1. Pandey I.M., Financial Management, Vikas Publications.
2. Khan & Jain, Financial Management, Tata McGraw-Hill.
3. Chandra Prasanna, Fundamentals of Financial Management TMH.

Reference Books:

1. Smith K.V., Management of Working Capital, 2nd edition, Harper Collins Publications.
2. Agarwal J.D., Working Capital Management, Tata McGraw-Hill.

***Latest editions of all the suggested books are recommended.**