CLASS: FIRST				Theory: 3	Hrs/wk
SUBJECT: BASICS OF ELECTRICAL ENGINEERING				Tutorial:1	Hrs/wk
EE	101	Units	6	Practical:__	Hrs/wk

Article	Hrs
BASIC CONCEPTS:- Voltage & current; Power & Energy; Dependent and Independent sources; Ohm's laws series & parallel connections; Delta- star connections and transformations.	15
D.C. NETWORK THEOREMS:- Source transformation; Linearity & superposition; Thevenin's & Norton's Theorems; Source transportation; source superposition; Nodal analysis; Mesh analysis.	35
ENERGY STORAGE ELEMENTS:- The capacitor; The Inductor; Analysis of RC-transient circuits; Analysis of RL-transient circuits; RLC transient circuits.	25
ANALYSIS OF AC- CIRCUITS:- The Phasor equivalent circuit; Methods of Ac-circuit Analysis; Power factor and average power in the sinusoidal Ac-circuits; Complex power; Series & parallel resonance; Calculation of current, voltage, and power in three–phase circuits with delta and star connections.	38
MAGNETIC CIRCUITS AND TRANSFORMERS	7
Total	**120**

Text book1:" Engineering Circuit Analysis" By W. Hayt
        2: "Introductory Circuit Analysis" By Boylested

CLASS: First				Theory: 3	Hrs/wk
SUBJECT: MATHEMATICS				Tutorial:1	Hrs/wk
EE	102	Units	6	Practical:_	Hrs/wk

Article	Hrs
Review of Vectors: i) Representation of vectors in space (i;j;k) unit vectors. ii) Scalar product iii) Vector product	4
Review of Complex Numbers: i) The Argand diagram. ii) Addition; Subtraction; Product; Quotient; power and roots. Iv) Demoiver's Theorem.	4
MATRICES AND DETERMINANTS:- i) Definitions ii) Properties. iii) Inverse of a matrix iv)Solution of Equations (Cramer's rule).	12
DIFFERENTIATION:- Techniques of differentiation; Chain rule; Implicit differentiation; Higher order differentiation; Applications of differentiation; maxima and minima; Curve plotting; Differentiation of trigonometric functions .	12
TRANSCENDENTAL FUNCTIONS:- (Inverse trigonometric; Natural logarithmic; Exponential and power) i) Definitions ii) properties iii) graphs iv) derivatives and integrals.	12
APPLICATIONS OF THE DEFINITE INTEGRAL:. i) Volumes of revolution. ii) Length of the curve. iii) Surface area of revolution.	12
METHODS OF INTEGRATION:- i) Trigonometric Substitutions. ii) Quadratics. iii) Partial fractions. iv) Integration by parts. v) Further Substitutions.	20
VECTOR CALCULUS:- i) vector function versus scalar function, ii) Del operator; Gradient; Divergence and Curl.	12
POLAR COORDINATES:- i) The Polar Coordinate system. ii) Graphs of polar equations.	16
SEQUENCES AND SERIES:- i) Sequences: convergence; Test of monotone ii) series: geometric series; nth partial sum; tests of convergence; alternating series. iii) Power and Taylor's series.	16
Total	120

Text book:"Calculus", By Thomas **,12th Ed.**

CLASS: FIRST SUBJECT: PHYSICAL ELECTRONICS EE 103 Units 4	Theory: 2 Hrs/wk Tutorial: 1 Hrs/wk Practical: __ Hrs/wk

Article	Hrs
ENERGY BANDS IN SOLIDS:- Charged particles, field effect intensity; Potential energy, The ev units of energy –Nature of atom. Electronic structure of elements, Energy band theory of crystals; Lattice structure of crystals.	12
TRANSPORT PHENOMENA IN SEMICONDUCTOR:- Mobility and conductivity; Properties of intrinsic P and **N** type semiconductors; Mass action law, conductivity modulation; Thermistors; Generation and recombination of charges; Diffusion current; continuity equation; Injection minority carrier charges; Potential variation within a graded semiconductors.	12
JUNCTION DIODE CHARACTERISTICS:- PN junction in equilibrium; Volt Ampere characteristics; Temperature dependence; diffusion capacitance;	9
DIODE CIRCUIT ANALYSIS:- Non-linear properties; Ideal diode; Basic theory and analysis of simple diode circuit; DC load line; Small signal analysis and concept of dynamic resistance; AC load line; Diode capacitance; Temperature effects of diode; Different types of diodes (Zener; schottckey; Varactor; Tunnel and negative resistance diodes).	12
RECTIFIERS:- Circuit analysis of halfwave and full wave rectifiers, Bridge rectifier; Ripple and form factor calculations; Efficiency and IV for above circuits; Types of filters; C filters , L filter ,L .C. filter, PIE filter; Analysis of filter and calculation of ripple and regulation.	9
CLIPPING AND CLAM PING CIRCUIT:-	6
OPTOELECTRONIC DEVICES:- Principle of operation and characteristics of Photoconductive; photovoltaic and photoemissive sensors and light emitters; photodiode; photodetectors; phototransistors; Solar cell construction and characteristics and applications; LED characteristics; LED Eye Response, Curve and Geometric and applications; Optoisolators.	12
TRANSISTORS:- Normal operation; PNP; NPN; Current components in transistor; Current gain; Common base; Input and output characteristics; Common emitter; Input and output characteristics; Common collector; Input and output characteristics.	18
Total	**90**

Textbook1:INTEGRATEDELECTRONICS"MCGRAWHILL;9THREPRINT,1995.ByMILLMAN&HALKIES
2: " ELECTRONICS DEVICES AND COMPONENTS", PITMAN, 1995 By MOTTERSHED,.
3: " SOLID STATE DIVICES", PHI; 4TH EDITION, 1995.By STREETMAN,
4" SEMICONDUCTOR DEVICES & CIRCUITS", JOHN WILEY & SONS, 1992.By : M.S. TYAGI
5: " ELECTRONICS DEVICES & CIRCUITS THEORY", HI; By BOYLSTED & NASHELSKY,

CLASS: FIRST SUBJCT: DIGITAL TECHNIQUES EE 104 Units 5	Theory: 2 Hrs/wk	Tutorial: 1 Hrs/wk	Practical: 1 Hrs/wk

Article	Hrs
NUMBER SYSTEMS:- Decimal number system; Binary; Octal and hexadecimal number systems; Conversion from one number to another number system; Addition; Subtraction; Multiplication and division using different number system; Representation of binary number insignia-magnitude; Sign 1's Complement and align 2's complement notation; Rules for addition and subtraction with complement Representation; BCD; EBCDIC; ASCII; Extended ASCII; Gray and other codes.	10
LOGIC GATES AND BOOLEAN ALGEBRA:- AND; OR; NOT; NAND; NOR; Ex-OR logic gates; Positive and negative logic; Fundamental concepts of Boolean algebra; De-murrage's laws; Principles of duality; Simplification of Boolean expressions; Canonical and standard forms for Boolean function; SOP and POS, forms; Realization of Boolean functions using only NAND and NOR gates.	10
BOOLEAN FUNCTION MINIMIZATION:- Objectives of the minimization procedures; Karnaugh map method; Don't care conditions; Quine-McCluskey tabulation method; Concept of prime implicants.	10
COMBINATIONAL LOGIC CIRCUITS USING DISCRETE LOGIC GATES:- Half adder and full adder; Half subtractor and full subtractor; Parity generator and checker; Code converters; Binary multiplier; Majority circuits; magnitude comparator	10
COMBINATIONAL LOGIC CIRCUIT USING MSI INTEGRATED CIRCUITS:- Binary parallel adder; BCD adder; Encoder; priority encoder; decoder; Multiplexer and demultiplexer circuits; Implementation of Boolean functions using decoder and Multiplexer; BCD to 7-segment decoder; Common anode and common cathode 7-segment displays; Random access memory; Read only memory and erasable programmable ROMS	15
INTRODUCTION TO SEQUENTIAL LOGIC CIRCUITS:- Basic concepts of sequential circuits; Cross coupled SR flip-flop using NAND or NOR gates; JK flip- flop; Clocked flip- flop; D-type and Toggle flip-flops; Truth tables and excitation tables for flip- flops; Master- slave configuration; Edge triggered and Level triggered flip-flops; Elimination of switch bounce using flip- flops; Flip-flops with preset and clear.	15
LOGIC DESIGN USING SSI CHIPS **LOGIC DESIGN USING MSI CHIPS (**multiplexer; and decoders); expansion theorem; multiplexes ROM **PAL; PLA; PLD; PALASM; examples.**	15
LOGIC HAZARDS **LOGIC FAMILIES AND THEIR COMPARISON**	5
Total	**90**

Text book1: Digital Logic and Computer Design By MORRIS MANO,"
         2: Digital Computer Fundamentals" By BARTEE THOMAS,"
         3: Digital Integrated Electronics" By TAUB AND SCHILLING,
         4:"Modern Digital Design" By RICHARD SANDIGE,

CLASS: FIRST SUBJECT: COMPUTER SCIENCE				Theory:2	Hrs/wk
				Tutorial:_	Hrs/wk
EE	105	Units	6	Practical:2	Hrs/wk

Articles	Hrs
General overview of personal computer architecture	2
Computer peripherals, keyboard, screen, mouse, and storage media	2
Computer busses, ports, interfaces	2
Overview of MSDOS operating system	2
MSDOS internal commands	2
MSDOS external commands	2
Using the text editor	2
Overview of windows operating system	2
Windows desktop, changing settings, starting programs	2
Creating, deleting, copying, moving, searching for files and folders	2
Using my computer, my document, and help facility	2
Using windows control panel	2
Using the windows accessories paint, notepad, word pad, …..etc	4
Setup applications to windows, remove applications from windows	2
Connecting to the internet, using the windows explorer	2
Using the Microsoft Word	6
Using the Microsoft Excel	6
Using the Matlab	16
Total	60

Text book 1: "Computer Science"
        2: "MATLAB Handbook"

CLASS: FIRST SUBJECT: ENGINEERING DRAWING EE 106 Units 2	Theory: __ Hrs/wk Tutorial: __ Hrs/wk Practical: 3 Hrs/wk

Article	Hrs
BASIC CONCEPTS:- Introduction to Engineering drawing and its uses as an engineering language in industry; Dimensioning; Symbols and terms used in drawing; Proper use of drawing instruments; Use of international metric system; Names and dimensions of lines used in drawings.	6
LETTERING AND NUMERALS:- Arabic and Latin lettering and numerals.	3
DRAWING OF GEOMETRICAL PATTERNS:- Drawing various types of Geometrical patterns **(Tracery); Various** methods of drawing ellipses; Various types of tangents.	12
DRAWING OF SECTIONAL VIEWS AND TANGENTS:- Drawing according to scale; Drawing various views of an actual object; Projections of all views necessary for a given object; Projection of views using first and third angle projection methods.	12
ISOMETRIC PROJECTIONS:- FREEHAND SKETCHING; proper and reasonable proportions.	12
COMPUTER AIDED ENGINEERING DRAWING AUTO CAD:- Preparing to draw with Auto cad; Basics of 2D Drawing; Edit & Modifications commands ; Placing dimensions & Text on drawing; Isometric drawing ; Basics of 3D drawing.	45
Total	**90**

Text book1: Engineering drawing & Graphic Technology" By Thomas E. French 2:" Autocad LT for windows" By KIRKPATRICK, J

CLASS: FIRST					Theory:2	Hrs/wk
SUBJECT: PRINCIPLE OF MECHANICAL ENGINEERING					Tutorial:1	Hrs/wk
EE	107		Units	4	Practical:_	Hrs/wk

Article	Hrs
STATICS:- Force system; Units system; Parallelogram law; Forces + components; Resultant of coplanar forces, components of force in space; Moment of a force; Moment of couples, equilibrium: Free body diagram; Coplanar system;; Friction: Nature of friction; Theory of friction; Coefficient of friction; Centroids & center of gravity – centroids of area; Centroids determined by integration; Moments of inertia: radius of gyration;	26
DYNAMICS:- Kinetics of particle; Rectilinear motion; Curvilinear motion; Rectangular components of curvilinear motion; Normal and tangential components of acceleration; Kinetics: Force; Mass and acceleration; Kinetics of particle Newton's 2nd law .	24
THEOREMDYNAMICS:- Introduction; Active materials & their specifications; Work and heat in ideal gasses and steam, 1st law of thermodynamics, particle law in steam and gasses; 2nd law of thermodynamics, particle law in steam and gasses.	20
STRENGTH OF MATERIALS:- Hook's law; Tension and compression stress; Stresses in beams (initial principal).	20
Total	**90**

Text book1: **Engineering Mechanics (statics)** By**:** J.L.MERIAM

2: Engineering Mechanics(Dynamics) By**:** J.L.MERIAM

3: Applied heat for engineers, By :Sneeden &Kerr

4: ميكانيك المواد   تأليف أيان جون هيرن

CLASS: FIRST SUBJECT: LABORATORY EE [108] Units [2]	Theory: __ Hrs/wk Tutorial __ Hrs/wk Practical: 3 Hrs/wk

Article	Hrs
The principal objective is to ensure that students have a good quality capstone design & experience to integrate concepts from a range of classes in the core. The students are to apply modern engineering practices and techniques. Each student should submit a written technical report for each experiment. The experiments cover:- - Principles of measurements and measuring equipment. - Principles of CRT and oscilloscopes. - D.C. circuits. - A.C. circuits. - Diode characteristics and applications. - Transistor characteristics and biasing. - Digital circuits fundamentals.	
Total	

Text book1:
      2:

<table>
<tr><td rowspan="3">CLASS: FIRST
SUBJECT: Humanitarians subject
EE   109   Units   2</td><td>Theory: 2   Hrs/wk</td></tr>
<tr><td>Tutorial __   Hrs/wk</td></tr>
<tr><td>Practical: __   Hrs/wk</td></tr>
</table>

Article	Hrs

<div dir="rtl">

القسم الأول:– التطور التاريخي لحقوق الإنسان   -

أولا:– المجتمعات البدائية

– مرحلة ما قبل التاريخ

– الحضارات الشرقية (بلاد وادي الرافدين والحضارة الفرعونية نموذجاً)

– الحضارات الغربية (اليونانية والرومانية نموذجاً)

ثانيا:– الشرائع السماوية

– الديانة اليهودية

– الديانة المسيحية

– الديانة الإسلامية(بصوره أكثر تفصيلاً)

ثالثاً:– تطور حقوق الانسان في القوانين الوضعية

–نظرية العقد الاجتماعي

– الحروب العالمية وأثرها في حقوق الانسان

– التنظيم الدولي

القسم الثاني :– حقوق الإنسان التعريف بها وأنواعها

أولا– التحديد والتعريف

– الحق في الفقه الإسلامي

– الحق في الفقه القانوني

– تعريف حقوق الإنسان

ثانياً– تقسيمات حقوق الإنسان (وتتم بدراسة مفصلة ومقارنة بين القانون والشريعة الإسلامية)

–الحقوق الجماعية(حق تقرير المصير, حق التنمية, الحق في بيئة مناسبة, حق الإنسان في العيش بسلام)

–الحقوق الفردية (الحقوق الاقتصادية والثقافية, الحقوق المدنية والسياسية الحقوق الصيغة بالشخصية)

القسم الثالث:– ضمانات احترام وحماية حقوق الإنسان

أولا – الضمانات في الشريعة الإسلامية

ثانياً:– الضمانات على الصعيد الوطني

ثالثا:– الضمانات على الصعيد الدولي

</div>

	Total	30

Text book1:
      2:

CLASS: FIRST SUBJECT: Technical English	Theory: 2	Hrs/wk
	Tutorial __	Hrs/wk
	Practical: __	Hrs/wk
EE 110 Units 2		

Article	Hrs
Unit One: Reading passage about electricity and electronics.	**6**
Unit Two: Reading passage about electronic current and circuits.	**6**
Unit Three: Reading passage about electromagnetism	**6**
Unit Four: Reading passage about miniaturization and microminiaturization	**6**
Unit Five: Reading passage about radio waves and vacuum tubes	**6**
Total	**30**

Text book1:
      2:

CLASS: SECOND SUBJECT: ENGINEERING ANALYSIS EE | 201 | Units | 6	Theory: 3	Hrs/wk
	Tutorial: 1	Hrs/wk
	Practical: __	Hrs/wk

Article	Hrs
MULTIPLE INTEGRALS:- i) Double Integral. ii) Area and volumes. iii) Double Integral in Polar Coordinates iv) Evaluation of volume and triple Integrals. v) Evaluation of surface & surface Integrals.	8
SEQUENCES AND SERIES:- i) Sequences: convergence; Test of monotone ii) series : geometric series; nth partial sum; test of convergence; alternating series. iii) Power and Taylor's series.	8
VECTORS FUNCTIONS:- i)Equations of lines and planes. ii) Product of three or more vectors. iii) Vector function & motion : velocity and acceleration. iv)Tangential vectors. v) Curvature and normal vector.	10
ORDINARY DIFFERENTIAL EQUATIONS:- i) First order (variables separable; homogeneous; linear – Bernoulli and exact). ii) Second order (Homogeneous and non homogeneous). iii) Higher order differential equations.	10
SOLUTION OF DIFFERENTIAL EQUATIONS BY POWER SERIES:- Legendre s equation; Legendre s polynomials; Bessel function of the first and second kinds; Bessel function properties.	10
PARTIAL DIFFERENTIATION EQUATION:- Wave equation; laplace equation; solution of boundary condition problems; general solution; solution by separation of variables.	10
NUMERICAL ANALYSIS:- i)Solution of non-linear equations (Iteration; bisection and Newton-Raphson). ii) Finite differences. iii) Numerical differentiation and Integration. iv) Numerical solution of 1st order ordinary differential equations.	10
MATRIX ANALYSIS:- Review of matrix theory; Linear transformation; eigen values & eigen vectors; lace Lap transform of matrices; Application of matrices to electric circuits.	10
STATISTICS:- Definition; Frequency distribution (relative & commutative; Mean; Standard deviation).	10
PROBABILITY:- Definition; mutually exclusive & conditional probability; permutations & combinations; Probability distribution: Binomial; Normal & Poisson distributions.	10
COMPLEX VARIABLE THEORY:- Function of complex variable; complex differentiation; Analytic function & its properties; Integration in the complex plane; Cauchy s theorem; Cauchy s integral formula for simply & multiply connected regions; Complex variable theory: Taylor's theorem; Laurent series; The residue theorem.	10
APPLICATIONS OF MATLAB	14
Total	120

Text book 1: ''**Advanced Engineering Mathematics**'' By KREYSIK   **2:** **"Calculus"** By Finney& Thomas

Class: SECOND Subject: SIGNALS AND SYSTEMS EE 202 Units 6	Theory: 2	Hrs/wk
	Tutorial: -	Hrs/wk
	Practical: 2	Hrs/wk

Article	Hrs
SIGNALS AND SYSTEMS :- Basic Definitions; Mathematical Models; Continuous- Time and Discrete-Time Systems.	4
SIGNAL AND SYSTEM CHARACTERISTICS AND MODELS:- Basic Operations on Signals; Signal Characteristics; System Representations and Models; System Characteristics	4
CONTINUOUS- TIME SIGNALS AND SYSTEMS:- Time –Domain Representations of Continuous- Time Signals; Sinusoidal and Complex Exponential Signals; Singularity Function Signals; Signal Energy and Power.	4
TIME DOMAIN ANALYSIS OF CONTINUOUS-TIME SIGNALS:- System Equation Solution; System Impulse Response; Zero-State Response of Linear; Time Invariant System; The Superposition Integral; Continuous-Convolution and Properties.	4
FREQUENCY-DOMAIN REPRESENTATION OF CONTINUOUS- TIME SIGNAL:- Spectra and Bandwidth of Continuous- Time Signals; Fourier Series Representations of Signals; Amplitude and Phase Spectra of Periodic signals; The Fourier Transform and Spectra of Aperiodic Energy Signals; The Fourier Transform and Spectra of No energy signals.	6
FREQUENCY-DOMAIN ANALYSIS OF CONTINUOUS- TIME SYSTEM:- System Frequency Response; Frequency-Response Determination; Frequency Response of Electric Circuits; Phase Delay and Group Delay; Bode Plots of Amplitude and Phase Responses.	4
ANALYSIS OF CONTINUOUS- TIME SYSTEM USING THE LAPLACE TRANSFORM:- The Laplace Transform; Laplace Transform Evaluations and Theorems; Evaluations of Inverse Laplace Transform; Solution of Linear Integrodifferential Equations; System Transfer Function; Frequency Response.	6
CONTINUOUS TIME FILTER:- Distortion less Transmission; Ideal Filters; Approximation of Ideal Filters; Butterworth and Chebyshev Filters Design.	4

SAMPLED CONTINUOUS TIME SYGNALS:- Ideal Sampling and The Sampling Theorem; Practical Sampling Effects.	**6**
DISCRETE- TIME SIGNALS AND SYSTEMS:- Time Domain Representation of Discrete-Time Signals; Sinusoidal and Complex- Exponential Signals; Exponential Signals; Unite Step; Unit Ramp and Pulse Signals; signals Energy and Power.	**4**
TIME – DOMAIN ANALYSIS OF DISCRETE-TIME SYSTEMS:- System Equation Solution; Recursive Solution of System Equation; System Unit Pulse Response; Zero-State Response or Linear-Time Invariant System; Discrete Convolution and Priorities.	**4**
FREQUENCY-DOMAIN ANALYSIS OF DISCRETE-TIME SIGNALS:- Spectra and Bandwidth of Discrete-Time Fourier Series and Spectra of Periodic Signal; System Frequency Response; Frequency-Response Determination.	**4**
ANALYSIS OF DISCRETE-TIME SYSTEMS USING THE Z-TRANSFORM:- The z-Transform; Transform Evaluation and Theorem; Evaluation of Inverse z-Transform; z-Transform of Linear Difference Equations; The System Transfer Function; System Stability and Frequency Response Using The Transfer Function.	**6**
Total	**60**

Text book1: "Introduction to Signals & Systems" By D.K. Lindner,
2: "Signals & Systems" By Carlson

CLASS: SECOND SUBJECT: ELECTRONICS EE [203] Units [4]	Theory: 2 Hrs/wk Tutorial: 1 Hrs/wk Practical: __ Hrs/wk

Article	Hrs
. **INTRODUCTION TO TRANSISTOR CIRCITS:** NPN & PNP Bipolar Transistor; Current Flow Mechanism in Transistor Junctions; Transistor configurations; Current Gain Calculation [Alpha] and [Beta]; Transistor input/ output characteristics; DC Load line ; Operating point; Different DC circuit biasing.	**12**
SMALL SIGNAL ANALYSIS AND DESIGN: Small signal equivalent circuit for CB, CE and CC configuration; Input/Output resistance; Calculation of current and voltage Gain in small signal amplifier; Graphical Analysis for voltage gain; Hybird parameters to analyze transistor circuits.	**15**
BAISING STAIBBILITY: Stability factor analysis due to temperature variation (Effect of Ico, Vbe and Beta); Temperature compensation using diode biasing.	**6**
FET and MOS transistor : Introduction to the theory and operations of JFFT & MOSFET; FET Transistor configurations; Transistors transfer characteristics; Amplifier Circuit Biasing; transistor Equivalent circuit; Small signal analysis of FET transistor.	**15**
FREQUENCY RESPONSE: Definition and Concepts; Gain in decibel; Bode plot for the gain; The effect of the Coupling capacitor; Low frequency analysis due to the R-C Coupled amplifier in BJTs; the Effect of emitter bypass capacitor**;** Calculation of the Low cut-off frequency. Transistor amplifier at high frequencies; Hybrid PIE equivalent circuit at high frequency; High frequency behavior of CB & CE amplifier; High cut-off frequency; Gain Band-Width products for the above circuits; FET at high frequencies; CD and CS amplifier at high frequency;	**12**
NEGATIVE FEEDBACK IN AMPLIFIERS : Basic concept of feedback amplifier ; Effect on gain due to feedback ; Input and out put impedances ; Feed back amplifier and sensitivity function ; Voltage series , voltage shunt , current series and current shunt configuration circuits ; Design analysis ; Frequency response of a feedback amplifier .	**12**
OPERATIONAL AMPLIFIER: Ideal Op-amp equivalent circuit; Operational Amplifier Specification; Circuit analysis of an Op-amp; Closed loop Op-amp Circuit (Inverting and Non-Inverting Circuit).	**9**
POWER ELECTRONIC DEVICES: UJT Construction, Operation and characterises; Thyrsistor Equivalent Circuit ; Thyrsistor Characteristics and operation ; Application of the devices.	**9**
Total	**90**

Text book1: "**Electronic Devices** 'By MILLMAN
          2: "**Electronic Devices**" **By** FLOYD

CLASS: **SECOND**				Theory: 2	Hrs/wk
SUBJECT: **DIGITAL DESIGN**				Tutorial: 1	Hrs/wk
EE	204	**Units**	4	Practical: __	Hrs/wk

Article	Hrs
INTRODUCTION	**3**
FIVE VARIABLES MINIMAZATION	**6**
ADDITIONAL MINIMAZATION TECNHNIQUES: Tabular; Prime; Implicit; Mcklusky; Entered Variables	**15**
TOP-DOWN DESIGIN OF COMBAINAONAL CIRCUITS:- Gate Level ;Adders Subtracter; Multiplexer; Decoders	**15**
ARITHMETIC AND LOGIC UNIT	**3**
SEQUENTIAL LOGIC CIRCUITS DESIGIN:- Basic concepts of counters and registers; Binary counters; BCD counters; Up down counter; Johnson counter; module-n counter; Design of counters using state diagrams and tables; Sequence generators; Shift left and right register; Registers with parallel load; Serial –in parallel-out (SIPO) and parallel-in-serial-out (PISO); Register using different. Type of flip-flops; Sequence generator .	**18**
SEQUENTIAL LOGIC CIRCUITS:- Delay Model; Characteristics equation, PS/NS Table; State Diagram; Asm Chart; Karnaugh Map; Transition Map; Timing Diagram of flip-flops.	**9**
SYNCHROUS SEQUENTIAL LOGIC:- Mealy And Moore Circuits; Timing Diagram; Implicit Table State Reduction And Assignment.	**12**
SYNCHROUS COUNTERS:- Shift Registers; Twisted Ring Counter; Maximum Length Shift Counter.	**9**
Total	**90**

Text book1: "**Modern Digital Design**", By Richard S. Sandige

CLASS: SECOND SUBJECT: MACHINES 205		4	Theory: 2	Hrs/wk
			Tutorial: 1	Hrs/wk
			Practical:	Hrs/wk

Article	Hrs
D.C. MACHINE Construction of DC machine, Direct current Generator and motor principles, principles of generator action , principles of motor action	3
Types of DC Generators Shunt DC Generators, series DC Generators	3
Types of DC Motors Shunt DC Motors, series DC Motors, compound DC motors, separately excited DC motors	3
Speed control of DC motors Shunt DC motor speed control, series DC motor speed control	3
Stepper motors Type of stepper motor, construction of stepper motor	6
Transformers Construction of transformers, principle of operation, approximate equivalent circuit, phase diagram, voltage regulation, open circuit test, short circuit test, transformer efficiency, auto transformer theory, three phase transformer	18
A.C Machines **Tree phase induction motor** Construction, Equivalent circuit, torque speed characteristic, starting torque, condition for maximum torque, condition for maximum starting torque, method of speed control, no load test, blocked rotor test, power flow diagram, applications	18
Single phase Induction motor Construction , theories of operation, torque speed characteristic, Equivalent circuit, no load test, Blocked rotor test, Power flow diagram, application	18
Three phase synchronous generator Construction, Equivalent circuit, applications	9
Single phase synchronous motors **Reluctance motor** Construction of Reluctance motor, applications	6
Hysteresis motor Construction of Hysteresis motor , application	3
AC Commutator machine Universal motor	
Total	**90**

Text book1: electrical machines and transformer by: Ancieron and Macneiil

Class: SECOND Subject: ELICTROMAGNETIC FIELDS EE | 206 | Units | 4	Theory: 2	Hrs/wk
	Tutorial: 1	Hrs/wk
	Practical: __	Hrs/wk

Article	Hrs
REVIEW OF VECTOR CALCULUS.	**5**
COULOMB'S LAW AND ELECTRIC FIELD INTENSITY:- Experimental law of coulomb; Electric field intensity; Field of a continuous and volume charge distributions; line charge and sheet charge; Streamlines and sketches of fields.	**10**
ELECTRIC FLUX DENSITY AND GAUSS'S LAW:- Electric flux density; Gauss's law; Application of Gauss's law; some symmetrical charge distributions.	**10**
ENERGY AND POTENTIAL:- Energy expended in moving a point charge in an electric field; Definition of potential difference and potential; Potential field of a point charge and system of charges; Potential gradient; Dipole.	**10**
CONDUCTORS; DIELECTRICS AND CAPACITANCE:- Current and current density; continuity of current; Conductor Properties and boundary conditions. Nature of Dielectric Materials; Boundary Conditions for Perfect dielectric Materials; Capacitance; Several Capacitance Examples.	**10**
POISSON′S AND LAPLACE′S EQUATIONS:- Poisson and Laplace 's equations; Examples of the solution of Laplace equation; Examples of the solution of Poisson's equation.	**10**
STEADY MAGNETIC FIELD:- Boit – Savart law; Amperes law; Magnetic Flux & Magnetic Flux Density; Inductance; Scalar and Vector Magnetic Potentials.	**10**
MAGNETIC FORCES AND MATERAILS:- Force on Moving Charge; Force on Differential Current. Elements; Force Between Current Differential Elements; Force and Torque on a Closed Circuit; Magnetization and Permeability; Magnetic Boundary Conditions; Magnetic Circuit .	**10**
TIME - VARYING FIELLDS AND MAXWELL′S EQUATIONS:- Faraday's Law; Displacement Current; Maxwell's Equations in Point Form; Maxwell's Equations in Integral Form; Wave Equations; Wave Propagation in Different Medii.	**15**
Total	**90**

Textbook1::**ENGINEERING ELECTROMAGNETICES Mc- Graw Hill; 5th Edition; 1992 ; 7th Reprint 1995** .By WILLAIM H.HAYT

    2:: **Elements of engineering electromagnetic Prentice Hall; 3rd Edition; 1992** By . N. N. RAO

    3: **Theory and problems of electromagnetics Mc-Graw Hill; 2nd Edition; 1993**.By JOSEPH A.

CLASS: SECOND SUBJECT: PROGRAMING IN C/C++				Theory: 2	Hrs/wk
EE	207	Units	6	Tutorial:	Hrs/wk
				Practical: 2	Hrs/wk

Articles	Hrs
Introduction, Why Programming, Programming Languages, Importance of C	2
Definition of statement, directives, header files, Simple C program	2
printf function, strings, escape characters	2
Console input output sample functions, sample programs	2
Identifiers, keywords, Basic C data types	2
Format strings, characters, and width specifiers	2
scanf function	2
Operators, arithmetic and logical, sample programs	4
Mathematical functions, representing mathematical functions as C statements, solving equations using C	2
if and if … else statements, sample programs, switch statement	2
Loops (for, while, do..while) statements, sample programs	4
nested loops , break and continue statements	2
Sample C standard functions, getchar, putchar, getch, getche, putch, gets, puts, delay, sound, random, …..	2
Macros, the define directive, sample applications	2
Functions, types of functions, sample functions	4
Arrays, one, two and multidimensional arrays, initialization, indexing, sample programs	4
Passing arrays to functions	2
Variable types, definition of local, global, constant, static and volatile variables	2
Pointers, definitions, near and far pointers	2
Referencing, sample pointers applications	2
Pointers and strings, pointers and functions	2
Data structures, definition, sample applications	2
Data structures and pointers, passing structers to functions	2
Introduction to object oriented programming, C++ classes	2
Private and public members of class, sample classes	2
Constructor and destructor of class	2
Total	**60**

Text book 1: "**Theory and problems of programming with C**"   By Byron S. Gottfried
 2: "**Application Programming in ANSI C**" By Richard Johnsonbaugh & Martin Kalin

CLASS: SECOND				Theory: __	Hrs/wk
SUBJECT: LABORATORY				Tutorial:__	Hrs/wk
EE	208	Units	2	Practical: 5	Hrs/wk

Article	Hrs
The principal objective is to ensure that students have a good quality capstone design & experience to integrate concepts from a range of classes in the core. The students are to apply modern engineering practices and techniques. Each student should submit a written technical report for each experiment. The experiments cover the related topics in electronics and communication as well as computer programming.	
Total	

Text book 1:
      2:

	Theory: 2	Hrs/wk
Class: SECOND **Subject: INDUSTRIAL MANAGEMENT**	**Tutorial: -**	**Hrs/wk**
CE 209 **Units** 2	**Practical:-**	**Hrs/wk**

المفردات	الفصل
مفاهيم عامة(General concepts)	1
أنواع المنظمات حسب مكيفاتها(Owner ship)	2
وضع القرار في المنظمة (Decision making)	3
مفهوم النظم وتحليل القيمة(Systems concept and value analysis)	4
نظام الإنتاج والتصميم المنتج وتطويره (Production system and product design and development)	5
الرقاب على جودة المنتج(Product Quality control)	6
إدارة الصيانة والاستبدال (Maintenance and replacement management)	7
إدارة المواد(المشتريات,الخزن) Material management purchase management purchase and inventory	8
إدارة التسويق(Marketing management)	9
إدارة الموارد البشرية(Human resource management)	10
إدارة التمويل(Financial management)	11
السلامة الصناعية(Industrial safety)	12
Total	**30**

Text book1:,
    2:

Theory:	2	Hrs/wk

Class: SECOND
Subject: DEMOCRACY

Tutorial: -		Hrs/wk

CE	210	Units	2

Practical:-		Hrs/wk

المفردات	الفصل

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مفردات ماده الديمقراطية

الكورس الأول:– يتضمن ماده الحريات العامة بين الشريعة والقانون

الكورس الثاني:– يتضمن ماده نظم إدارة الدولة بين الشريعة والقانون

الحريات العامة (بين الشريعة والقانون)

أولا:– المقدمة

ثانياً:– التعريف بالحريات العامة

   –   الأصل اللغوي

   –   الأصل التاريخي

   –   الأساس القانوني

   –   الأساس الشرعي

ثالثا:– أسس الحريات العامة

   – العدالة

   – المساواة

   – الحرية

رابعاً:– الحريات العامة الو صفية

   – حرية الرأي

   – حرية الفكر

   – حرية الأعلام

   –   المسا واه

خامساً:– الشريعة الإسلامية والحريات العامة

   – موقف الإسلام من المرأة (الميراث, الزواج, تولي الوظائف)

   – موقف الإسلام من حرية العقيدة

نظم إدارة الدولة

أولا:–   في تحديد النظم السياسية

   – فكره النظام السياسي

   – شرعية النظم السياسية

   – أنواع النظم السياسية

ثانياً:–   في النظام الديمقراطي

   – مقدمة تأصيلية

   – تعريف الديمقراطية

   – أركان ومرتكزات النظام الديمقراطي

ثالثاً:–   نماذج الديمقراطية

   – الديمقراطية المباشرة

</div>

	– الديمقراطية غير المباشرة	
	– الديمقراطية شبة المباشرة	
	– كيف يتم التحول إلى الديمقراطية	
	رابعاً:– الديمقراطية ونظم إدارة الدولة	
	– النظام المركزي	
	– النظام اللامركزية	
	– إشكاليات النظام الديمقراطي	
	خامساً:– موقف الإسلام من الديمقراطية	
	– الخطاب الإسلامي التقليدي	
	– الخطاب الإسلامي المعاصر	
Total		**30**

Text book1:,
   2:

CLASS: THIRD			Theory:2	Hrs/wk
SUBJECT: Electronic II			Tutorial:1	Hrs/wk
301		4	Practical:	Hrs/wk

Article	Hrs
OP-AMP APPLICATIONS: inverting, non-inverting amplifier, buffer, summing amplifier, difference amplifier, integrator and differentiator , comparator, sample and hold, zero crossing detector, peak detector, precision diode and fast rectifier, analog computation.	12
FILTERS: filter approximations, passive RLC design, active filter design methods (ladder, and cascaded design technique).	9
OSCILLATORS : BarkHausen´s criteria for oscillators ; Satiability concept Three pole amplifier ; Nyquist criteria ; Stabilizing networks ; frequency compensation and sinusoidal oscillator ; phase shift , Wien bridge , Colpitts , Hartley , Crystal and Tune circuit type oscillator (AF &RF Range).	9
TUNED AMPLIFIER: Introduction to single tuned amplifier ; G.B. response calculations & design ; Cascade amplifier ; Neutralization methods ; Synchronously tuned amplifier ; Elementary treatment of stagger tuned and doubly tuned amplifiers .	9
AUDIO FREQUENCY LINEAR POWER AMPLIFIERS: Introduction to Class A, B, AB, a ,C operation , Class A – common –emitter power amplifier ; Transformer coupled amplifier ; Class push –pull power amplifier ; Amplifiers using complementary symmetry ; Class C amplifier .	12
Comparators and Converters : Zero crossing detector , Schmitt trigger , Comparator ,Voltage limiters and window detector , Clippers and clampers , Peak detector , introduction to A / D and D /A converters and sample and hold circuit .	9
MULTIVIBRATORS: Astable, monostable, 555 timer, and bistable	12
INTEGRATED CIRCUITS AND DEVICES : Introduction of IC families ; Fabrication Steps and evolving transistor , Diode and Resistor ; capacitors families.	9

SPECIALIZED IC APPLICATIONS : phase locked loops , ICL 8038 function generator , Voltage Controlled Oscillator , XR 2240 programmable timer / counter .	**9**
Total	**90**

Text boobs: 1- integrated electronics by Milmann
2- Microelectronics by Milma

CLASS: THIRD SUBJECT : DIGITAL SIGNAL PROCESSING EE 302 Units 6	Theory: 3	Hrs/wk
	Tutorial: -	Hrs/wk
	Practical:_	Hrs/wk

Article	Hrs
REVIEW OF DISCRETE SIGNALS AND SYSTEMS	**6**
DISCRETE FOURIER SERIES:- Spectra of periodic digital signals, Properties of series.	**9**
DICSRETE FOURIER TRANSFORM:- Properties, Frequency response of LTI systems**.**	**9**
CONVOLUTION AND CORRELATION	**6**
DISCRETE AND FAST FOURIER TRANSFORM	**9**
Z- TRANSFORM:- Review, Z-plane poles and zeros**.**	**9**
FRAMEWORK FOR DIGITAL FILTER DESIGN	**6**
FINITE IMPULSE RESPONSE DIGITAL FILTER DESIGN:- window method, frequency sampling method, realization of FIR.	**12**
INFINITE IMPULSE RESPONSE DIGITAL FILTER DESIGN:- Pole-zero method, Bilinear Z-transform, Realization of IIR**.**	**12**
APPLICATIONS OF FILTER BANKS IN DSP	**12**
Total	**90**

Text book 1: " Digital Signal Processing", By Emmanuel and Barrie,
             2: "Digital Signal Processing with Computer Applications", John Wiley & Sons , 1997 By PAUL A. LYNN,

CLASS: **THIRD**	Theory3	Hrs/wk
SUBJECT: CONTROL ENGINEERING	Tutorial: -	Hrs/wk
EE	303	Units	6	Practical: __	Hrs/wk

Article	Hrs
INTRODUCTION AND BASIC DETINITION: CLOSED LOOP AND OPEN LOOP CONTROL SYSTEMS	3
TRANSFER FONCTION: ELECTRCAL SYSTEM; MECHANICAL SYSTEM; SERVO SYSTEM	6
BLOCK DIAGRAM: BLOCK DIAGRAM REDUCTIOIN ALGEBRA.	3
SIGNAL FLOW GRAPH: MASON GAIN RULE.	6
TIME RESPNSE: TYPICAL TEST SIGNALS &TYPES OF SYSTEM; STEADY STATE ERRORS; TRANSIENT RESPONSE OF 1st and 2nd ORDER SYSTEM.	9
STABILITY OF CONTROL SYSTEM: ROUTH-HURWTIZ CRITERION**:**	3
ROOT LOCUS ANALYSIS: ROOT LOCUS PLOT; GENENAL RULSES OF CONSTRUCTING ROOT LOCI; ROOT LOCUS ANALYSIS OF CONTROL SYSTEMS.	9
FREQUENCY RESPONSE: INTRODUCTION TO FREQUENCY RESPONSE.	3
BODE PLOT:; BODE ANALYSIS; RULES FOR SKETCHING THE BODE PLOTS;PHASE AND GAIN MARGINES; RELATIVE STABILITY.	9
CONT ROL SYSTEM DESIGN BY FREQUENCY RESPONSE: PROPORTIONAL GAIN ONLY; LEAD COMPENSATION; LAG COMPENSATION.	12
THE PID CONTROLLER; DEFINITION; TUNING BY ZIEGLER-NICHOLES METHODS.	6
DIGITAL CONTROL SYSTEMS : Z- TRANS FORM &INREVSE Z-TRANSFROM; PULSE TRANSFER FUNCTION ; OPEN LOOP AND CLOSED LOOP RESPONSES OF DISCRETE-TIME SYSTEMS;DESCRETIZATION METHODS; STABILITY TEST FOR DIGITAL CONTROL SYSTEM (JURY'S TEST).	15
STATE-SPACE ANALYSES: STATE EQUATION; SOLUTION OF STATE EQUATION;CONTROLABILITY AND OBSERVABILITY.	6
Total	**90**

Text book 1: **"AUTOMATIC CONTROL SYSTEM"** By B. KUO 2001
2: **"MODERN CONTROL SYSTEM"** By K.OGATA   2001

CLASS: THIRD **SUBJECT : MICROPROCESSORS** EE 304 Units 4	**Theory: 2**	**Hrs/wk**
	Tutorial: 1	**Hrs/wk**
	Practical:__	**Hrs/wk**

Article	Hrs
INTRODUCTION TO 16BIT MICROPRPCESSOR:- 8086 Architecture, Machine language, instruction, Internal execution and timing .	6
8086 FAMILY ASSEMBLY LANGUAGE PROGRAMMING :- Data Transfer instructions ;Arithmetic instructions, logical, Shift and rotate instructions ; Branch instructions ; Loop instruction;NOP ; HLT and flag manipulation instructions; Assembler directives.	12
8086 SYSTEM CONNECTIONS AND TIMING : - 8086 Hardware overview ; Basic Signal flow on 8086 buses ;Analyzing a minimum mode system; 8086 addressing and address decoding ; 8086 timing parameter .	12
INTERRUPTS AND INTERRUPT SERVICE PROCEDURE :- 8086 interrupts and interrupt response ; 8086 interrupt types ; Hardware and software consideration for using interrupt .	12
I/O PROGRAMMING :- Fundamentals I/O consideration ;Programmed and interrupt I/O ; Block transfers and DMA ,I/O design example .	12
INTERFACING :- Programmable Parallel ports and handshake input/ output ; Interfacing microprocessors to keyboard and display ; D/A converter operation ; Interfacing and applications ;A/D converter ; Specifications and interfacing ; Serial communication interfaces .	12
PARALLE I/O AND INTERFACING APPLICATION :- Interfacing memory ; Memory ; Mapped I/O .	12
GENERAL PURPOSE PROGRAMMABLE PERIPHERAL DEVICES: - PPI 8255 , Timer 8254.	12
Total	**90**

Text book 1 : "**The Intel Microprocessor**" By BARRY B. BREY,
              2:"**The 8088 & 8086 mp`s programming , interfacing S/W, H/W &applications", Prentice Hall, 2003** By   W. A. Triebel & A. Singh

CLASS: THIRD SUBJECT: DIGITAL SYSTEM DESIGN EE 305 Units 4	Theory: 2 Hrs/wk
	Tutorial: 1 Hrs/wk
	Practical: Hrs/wk

Article	Hrs
Asynchronous Circuit Analysis and Design	
Analysis of asynchronous sequential network	3
Asynchronous design, primitive flow tables,	3
implication tables, adjacency diagram & state assignment.	3
Systematic state assignment procedure	3
Standard Buses	
Internal, External buses	3
Serial, Parallel buses	3
Memory Expansion	
ROM, RAM	3
Programmable Logic Devices	
GAL, SPLD, CPLD, OLMC, ISP, FPGA	12
V-Hardware Description Language (VHDL)	
Introduction to VHDL	3
VHDL description of combinational network	3
Modeling flip-flops using VHDL process	3
Compilation and simulation of VHDL code	3
Modeling a sequential machine	3
Variables, Signals and Constants	3
Arrays	3
VHDL operators, functions, procedures	3
Packages and Libraries	3
Programmable Logic Controller PLC	
Basic Elements of PLC	3
PLC inputs and outputs interfaces	3
Ladder programming	3
PLC Instructions: Latching,	3
Timers, Counters,	6
Sequencers, Comparisons, Shift Registers	6
System Projects	6
Total	**90**

Text book1:
1- **Digital Fundamental   by Floyd**
2- **PLC Software Manual**
3- **Digital System Design using VHDL By Charles H**

CLASS: THIRD			Theory:2	Hrs/wk
SUBJECT: COMMUNICATION			Tutorial:1	Hrs/wk
EE	306	Units	4 ctical:	Hrs/wk

Article	Hrs Hrs
Transmission lines: Equivalent circuit, characteristic impedance, phase velocity, reflection coefficient, standing waves, quarter – wave transformer, smith chart calculation and stub matching.	**15 5**
Analog Input Analog Output Schemes: Amplitude Modulation ; Equation for AM, modulation index, spectrum of AM, DSB transmission with and without carriers, VSB transmission, DSB,C amplitude modulators, Envelope detectors, Balanced Modulator, SSB signal generation and Demodulation schemes.	15
Frequency modulation: Equations for FM, modulation Index, spectrum calculation for sinusoidal waveform and Bessels function table, phase modulation, relationship between FM and PM, NBFM, frequency modulators (Armstrong method) Types of noise in AM and FM systems.	15
Digital Input Analog Output Schemes : ASK, FSK, QAM, BPSK, QPSK, Transmitter and receiver block diagrams.	15
Analog Input Digital Output Schemes : Various pulse modulation methods, pulse code modulation PCM, Delta modulation DM. Comparison between PCM and DM, Compounding method, Noise in digital systems.	15
Digital Input Digital Output Schemes : Line encoding methods : NRZ, RZ, Manchester, and multilevel encoding methods and comparison of these schemes	15
Total	90

Text book1: principle of communication engineering by Anokh Singh
               2:

CLASS: THIRD SUBJECT:ELECTRONIC INSTRUMINTATION EE 307 Units 4	Theory: 2 Hrs/wk
	Tutorial: 1 Hrs/wk
	Practical: __ Hrs/wk

Article	Hrs
INSTRUMINTATION ERRORS	**6**
TRANSDUCERS:- Resistive, Capacitive, Inductive. Active Transducers.	**9**
SIGNAL CONDITIONING:- Input signal modification, scaling of measuring variables, delay lines, noise, signal averaging, interference, grounding, shielding, signal filtering, signal correlation, current-mode amplifier.	**12**
SIGNAL CONVERSION:- Conversion by transducer bridge, electronic multipliers, signal generator, a.c to d.c signal conversion, logic elements, sample & hold, A/D and D/A signal conversion, isolation amplifier.	**12**
INSTRUMENTATION AMPLIFIER:- Circuit design, characteristics, CMMR .	**9**
ANALOG ELECTRONIC INSTRUMENTS:- Analog (voltmeter, multi-meter, vector impedance meter, frequency meter, distortion analyzer, spectrum analyzer.	**15**
DIGITAL INSTRUMENTS:- Digital indicator, voltmeter (dual slop, multi-slop, successive approximation, and voltage to frequency converter, ammeters, ohmmeters, multi-meters, counters (frequency, frequency ratio meter, time-interval meter, energy meter), digital multiplexers, microprocessor-based meters.	**15**
INTERFACE BUSES:- Parallel port, RS-232, GPIB.	**12**
Total	**90**

Text books: 1- "Electronic Instrumentation and Measurement Techniques" ByWilliam David Cooper and Albert D. Helfrick.
2-Principles of Measurement systems By John P. Bentley
3-Electrical and Electronic Measurement By Ahmed A.Montaser and Karam A. sharshar

CLASS: THIRD SUBJECT: : LABORTORY EE 308 Units 4	Theory: __ Hrs/wk Tutorial: __ Hrs/wk Practical: 6 Hrs/wk

Article	Hrs
The principal objective is to ensure that students have a good quality capstone design & experience to integrate concepts from a range of classes in the core. The students are to apply modern engineering practices and techniques. Each student should submit a written technical report for each experiment. The lab include experiments in electronic circuit analysis, communication Systems and microprocessor technology. ف	
Total	

Text book1:
2:

Class: FOURTH SUBJECT: Industrial Electronic EE 401 Units 4	Theory: 2 Hrs/wk Tutorial: 1 Hrs/wk Practical: Hrs/wk

Article	Hrs
Introduction : Scope of power electronics , power converter specification . **Power Semiconductor Devices :** Thyristor families , V-I characteristics of SCR , Triac , GTO , Diac , Source of thyristor triggering , turn On \ turn Off characteristic and Gate triggering requirements, series/parallel operation, device ratings.	12
Power transistor devices: Basic structure and V-I characteristics of power MOSFET,IGBT,SIT. Switching characteristic, Gate/Base drive circuits, Safe operating area, di/dt / dv/dt limitation, series/parallel operation, ratings.	12
Phase Control Converters: Signal phase central taped transformer connection , half controlled and fully controlled Bridge configuration , three phase half controlled Bridge converters , Use of flywheeling diode operation with resistive , inductive and Back EMF load , line commutated inverter , effect of source inductance on converter performance , power factor , ripple factor calculation , firing scheme , linear alpha and cosine angle control , application of D.C motor speed control , regulated power supply , battery charger .	18
Thyristor commutation techniques : Natural commutation , Force commutation ,Voltage / Current commutation , DC chopper , Principle of Voltage control , analysis of Morgan chopper circuit , Johns chopper circuit, regenerative chopper circuit .	15
Inverters : **Single phase series and parallel inverters , classification of CSI and VSI inverters , single phase and three phase inverter circuit , methods of voltage controlled inverter circuits , comparison of thyristor and transistor based inverters, application to speed control of AC motors , uninterrupted power supply , induction melting , heating furnaces .**	15
Industrial Applications: **DC Motor Control, Induction Motor Control, Pulse width Modulation & Speed Control, Static Relays & Contactors.**	12
Total	**90**

Text book1: power electronics by: Muhammad Rashid   2:

CLASS: FOURTH	Theory: 2	Hrs/wk
SUBJECT: DATA TRANSMISSION& COMPUTER ETWORKS	Tutorial:1	Hrs/wk
EE 402 Units 4	Practical:	Hrs/wk

Article	Hrs
INTRODUCTION AND DEFINITIONS:- Data Communication, Networks, Protocols, Standards, and Standard organizations.	3
BASIC CONCEPTS:- Line configuration, Topology, Categories of networks.	6

TRANSMISSION MEDIA:-
 Electromagnetic spectrum.
 Guided media: Unshielded Twisted Pair (UTP) Cable.
      Shielded Twisted Pair (STP) Cable.
      Coaxial Cable.
      Optical Fiber.
 Unguided media: Radio Transmission.
      Microwave Transmission.
      Satellite Microwave.
	9

INTERFACES AND MODEMS:- Data transmission: parallel, serial, synchronous and asynchronous. DTE-DCE interface and standards. Modems.	6
THE OSI AND TCP/IP MODELS	6
NETWORKING AND INTERNETWORKING DEVICES:- Networking devices: NICs, Hubs, Repeaters, Bridges and Switches. Internetworking devices: Router and Gateways.	6
DATA LINK CONTROL:- Link Discipline, Flow control, Error control.	6
DATA LINK PROTOCOLS:- Asynchronous protocols, Synchronous protocols.	3
LOCAL AREA NETWORK (LAN):- Ethernet Token Bus project 802 Token Ring FDDI.	12
TCP/IP MODEL AND PROTOCOLS	9
WIRELESS LAN (WLAN):- Introduction and history of (WLANs), Standardization and frequency bands, IEEE 802.11 standard.	9
WIDE AREA NETWORK (WAN)	6
WIRELESS WAN	6
INTERNET WORKING AND INTERNET	3
Total	90

Text book1: "Introduction to data comm. And networking", By Pehrouz Forouzan.
    2: "Computer Networks and internets", Douglas By E. Comer (4th edition)

CIASS: FOURTH		Theory:	2	Hrs/wk
SUBJECT: Microprocessor & Micro Controller		Tutorial:	1	Hrs/wk
EE	403	Units	4	Practical: Hrs/wk

Article	Hrs
Introduction to Advanced Microprocessors : Overview of 80186,80286 , 80386 , 80486 Architecture , Descriptor table , Privilege levels , paging . Detail study of Pentium , Pentium MMX architecture , Pentium II , Memory and Microprocessor , The Programming Model , Real mode and protected mode Memory addressing , Data formats .	12
The 80386 and 80486 Microprocessor : Architecture – Real mode and Protected mode , 80386 Memory Management , Memory segmentation , Memory paying Mechanism , On chip cache organization .	12
Assembly language and Programming concepts : The instruction set , Addressing modes , Data movement instructions , Arithmetic and logic instructions , programming the Microprocessor .	12
Interfacing and Applications : Memory interfacing , Basic **I /O** interfacing .	9
Microprocessors and Microcontrollers : Comparing Microprocessors and Microcontrollers , The Z80 and MCS 51 , Microcontroller survey .	6
Microprocessor & Micro Controller : Comparing Microprocessors and Microcontrollers, , Micro Controller survey.	9
The MCS-51 Architecture : Introduction, MCS-51 family microcontrollers hardware, Input/output pin, ports and circuits, External memory interfacing, counter, timer, serial data input/output, Interrupts.	9
Basic Assembly Language Programming Concept : Addressing mode, External data, move, Code memory read – only data moves, Push and Pop opcodes, Data Exchanges, Logical operations, Arithmetic operations, Branching Instructions, Interrupts and Returns.	12
An MCS-51 Microcontroller Design : Microcontroller Specification, External memory and Memory space Decoding, Expanding I/O , Memory map I/O , Memory address decoding, Testing the Design, Lookup table for the 8051, Serial data Transmission.	9
Total	90

Text book1: "The 80386-80486 and Pentium processor" By Walter A. Tribel;
2: "The intel Microprocessors " By Barry B. Bery
3: "The 8051 micro-controller" By I. Scott Mackenzie.

CIASS: FOURTH SUBJECT: Microelectronics EE 404 Units 6	Theory: 3 Hrs/wk
	Tutorial: - Hrs/wk
	Practical: Hrs/wk

Article	Hrs
Semiconductor Fundamental : Energy band model of solid, intrinsic and extrinsic semiconductor, free carrier density in semiconductor, carrier concentration and Fermi level. Carrier transport and recombination, carrier diffusion, the drift current, Hall effect. MIS, MOS, Schottky barriers, magnetic effect, bipolar junction, p-n junction, FET.	6
IC fabrication processes : Crystal growth, diffusion, doping, evaporations, and photo masking, Ion implementation, Thin and thick film fabrication, sputtering, mounting, package, and hybrid integrated circuits**.**	12
LSI and VLSI Design and Application : Discrete device design, bipolar transistor fundamental, technology, and miniaturization. Linear I.C's: fabrication, and general consideration. Current sources,. LSI oriented bipolar technology. Logic Families based on bipolar transistor (RTL, DTL, TTL, ECL, TRL, $I^2 L$). TTL gate circuit analysis. Metal- Semiconductor junction, Metal-Oxide Semiconductor junction. FET theory and analysis.	18
MOS Transistor Fundamentals and MOS I.C Technology : MOS capacitor, static characteristics of the MOS transistor, MOS device fabrication. MOSFET's. Logic circuits based on MOSFET, PMOS, NMOS, CMOS,DMOS, SOS, VMOS. NMOS inverter and gate circuit analysis. CMOS inverter and gate circuit analysis. Charge-coupled devices and non-volatile memory devices, software applications.	18
ASIC Design methodologies and system design consideration	9
LCA, Standard cell, Gate array, Structured array]	9

Full-Custom and Semi-Custom Design :Design motivations; design either discrete component, full-custom and semi-custom design approaches**.**	**9**
Field programmable gate arrays FPGA and Field programmable analog arrays FPGA	**9**
Total	**90**

Text book1: Microelectronic By Millmann
          2:principle of CMOS VLSI design By Neil Weste and Karmran Eshrahian

CLASS: FOURTH SUBJECT: Microwave Engineering				Theory: 2	Hrs/wk
EE	405	Units	4	Tutorial: 1	Hrs/wk
				Practical:	Hrs/wk

Article	Hrs
REVIE OF ELECTROMAGNETIC THEORY	3
TRANSMISSION LINES IN MICROWAVES	9
MICROWAVE NETWORK ANALYSIS USING S-PARAMETERS	9
PASSIVE COPONENTS IN MICROWAVES AND ACTIVE MICROWAVE CIRCUIT.	12
MICROWVE FILTERS	3
MICROWAVE DIODE AND TRANSISTOR S.	6
DESIGN OF MICROWAVE AMPLIFIERS	3
DESIGN OF MICROWAVE OSCILLATORS	3
MICROWAVE INTEGRATED CIRCUITS	3
APPLICATION OF MICROWAVE IN ELECTRONIC SYSTEMS	6
PINCIPLE OF RADIATION	6
ANTENNAS	9
PINCIPLE OF PROPAGATION	9
METHODS OF PROPAGATION	9
Total	90

Text book 1: "Microwave Circuits and devices" by Liao 2 : " Microwave Engineering" by Pozar

CLASS : FOURTH SUBJECT: Computer aided design EE 406 Units 4	Theory: 2 Hrs/wk
	Tutorial: - Hrs/wk
	Practical: Hrs/wk

Article	Hrs
Introduction Linear circuits , A.C circuits , A.C circuits matrix analysis , two port analysis , graph theory. Numerical solution for non linear network simple search algorithm convergence properties , secant method.	12
Simulation Algorithms , stability and accuracy in Eulers methods , higher-order , Runge-kutto Algorithms.	15
State variable analysis Generation of state equation from topological data , finding a tree, solution of state equations.	18
Sensitivity analysis Sensitivity measures , sensitivity calculation tolerance analysis.	9
Optimization Gradient algorithms , numerical solution of gradient algorithm , stability , search methods.	12
C.A.D for integrated circuits Layout algorithm routing algorithm , testability analysis.	15
Genetic algorithms Application of GA in electronics.	9
Total	**90**

Text book1: computer assisted network and system analysis by: by Mastacusa
        2:

CLASS : FOURTH SUBJECT: ENGINEERING PROJECT EE 407 Units 4	Theory: 1	Hrs/wk
	Tutorial:__	Hrs/wk
	Practical 3	Hrs/wk

Article	Hrs
Collaborative team work of the nature in a research environment is expected, including extensive interaction with other students. Each student should submit a written technical report and should attend the final oral examination . The students apply verbal written and oral technical skills to document the design process .	
Total	**120**

Text book1:
          2:

CLASS : FOURTH SUBJECT: LABORATORY EE 408 Units 4	Theory:. Hrs/wk
	Tutorial:. Hrs/wk
	Practical: 6 Hrs/wk

Article	Hrs
The principle objective is to ensure that students have a good quality capstone design & experience to integrate concepts from a range of classes in the core. The students are to apply modern engineering practices and techniques. Each student should submit a written technical report for each experiment.	
Total	**180**

Text book1:
     2: