Semester IV

MA25XXX: MATHEMATICS-IV

COURSE OUTCOMES:

On completion of this course, students are able

1. To solve Engineering problems using complex variable techniques and line integrals of a complex valued function.
2. To apply the concept of probability to find the physical significance of various distribution phenomena.
3. Attain the basic techniques of quality improvement, fundamental knowledge of statistics and probability.
4. Understand the concepts of reliability and maintainability.
5. To apply principals and concepts of graph theory in practical situation.

Hours/ Week			Maximum Marks				Total Marks	Credits		
			Theory		Practical					
L	T	P	End Sem	CW	SW	End Sem		Th	Pr	Total
3	1	-	70	30	-	-	100	4	-	4

COURSE CONTENTS

Unit-1 Functions of Complex Variables: Analytic function, Cauchy-Riemann Equations and Harmonic Functions, Conjugate Functions and theirApplications, Complex Integrals, Cauchy's Integral Theorem and Integral Formula, Singularities, Poles, Residues, Residue Theorem, ContourIntegration for simple cases, Conformal mapping and its Application to two-dimensional problems in electric field.

Unit-2 Statistics: Modern view of Probability theory, Random Variables, Distribution Function and Density Function, Random Variables of Discreteand Continuous type, Functions of two random variables, Bivariate Probability with Conditional and Marginal Probability Distribution.

Unit-3 Stochastic Process and Markov Chain: General Concepts and Definition of Stochastic Processes, Mean, Auto-correlation and Auto-Covariance, Classification of Stochastic Process and Some Problems. Probability Vectors, Stochastic Matrix, Fixed Point of a Matrix, Definition of Markov Chain, Transition Matrix and Graph, Some Theorems and Applications.

Unit-4 Reliability: Basic concepts, Failure law, Bath Tub Curve, Evaluation of Reliability of a Component from Test Data, System Reliability, Components in Series and Parallel, Redundancy, Non-Series Parallel
System.

Unit-5 Graph Theory and Combinatorial Optimization: Graphs – Definitions and Basic Properties, Isomorphism, Euler Circuits and Hamiltonian Cycle, Digraphs, Trees-Properties, Spanning Trees, Planer graphs, Shortest Path Problem, Dijkstra Algorithm, Spanning Tree-Kruskal and Prim Algorithm.

Text Books

1. Ramana B V, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2006.
2. Das H. K, Higher Engineering Mathematics, S. Chand New Delhi, 2011.
3. Baisnab A, and Jas M, Elements of Probability and Statistics, Tata McGraw HillBook Company, New Delhi, 1993.

Reference books

1. Jain, R.K. and Iyengar S.K, Advanced Engineering Mathematics, Narosa Publishing House, New-Delhi , 2006.
2. Veerarajan T, Statistics, Probability and Random Process, 2nd Edition, Tata McGraw Hill Publishing Company Ltd., New Delhi 2003.
3. Balagurusamy E., Reliability Engineering, Tata McGraw-Hill Education Pvt.Ltd., New Delhi, 2012.
4. Goodaire E.G. and Michael M. Permenter, Discrete Mathematics with Graph Theory.

Assessment

1. Internal Assessment for continuous evaluation, mid-term tests, tutorials, class performance, etc. (30%)
2. End semester Theory Exam (70%)

EC25XXX: ANALOG CIRCUITS

PREREQUISITE: Network Theory, Electronic Devices and Engineering mathematics

COURSE OUTCOMES:

Student should be able to:

1. Analyze and design BJT and FET based amplifier for required frequencyspecifications.
2. Analyze and design power efficient amplifiers.
3. Improve amplifier performance by varying various parameters and designvarious frequency generators.
4. Analyze and design amplifiers for various linear and non-linear mathematicaloperations using Linear integrated circuits.
5. Analyze and design various wave form generators and active filters usinglinear integrated circuits.

Hours / Week			Maximum Marks				Total Marks	Credits		
			Theory		Practical					
L	T	P	End Sem	CW	SW	End Sem		Th	Pr	Total
3	-	-	70	30	-	-	100	3	-	3

Unit 1. Review of BJT & MOSFET biasing, small signal analysis: low frequency model ofBJT & MOSFET & its analysis for different configuration, Multistage amplifier.

Unit 2. High frequency analysis: High frequency model of transistor, Frequency response of amplifier, cascading of amplifier & its effect on gain & Bandwidth, Step response of amplifier. Power amplifier, compensation symmetry, configuration, RF circuit, tuned circuit

Unit 3. Feedback Amplifiers: General feedback theory, characteristics of negative feedback amplifiers, Effect of negative feedback on input and output resistance of amplifiers, analysis of feedback amplifiers. Oscillators: Principle of oscillation, calculation of frequency of oscillation & conditions for sustained oscillations, LC Oscillators - Colpitt's, Hartely and Crystal Oscillators, RC Oscillators: Phase shift & Wien bridge oscillators, Frequency stability criteria and controlled oscillators.Voltage.

Unit 4. Operational Amplifiers: Differential amplifier, its modification & transfer characteristics, Internal Architecture of op-amp, offset error in voltages & currents & their temperature drift, Op-amp parameters such as CMRR, slew rate & their measurements, Frequency response of op-amp, study of op-amp ICs like 741, 324, 308 etc. Temperature compensation techniques, current mirror in op-amp. Linear analog systems using op-amp such as - V to I and I to V converters, integrator, differentiator, Two stage and three stage instrumentation amplifiers.

Unit 5. Non-linear Applications and Active Filters using Operational Amplifiers: Non- Linear analog systems: Zero crossing detectors, Square wave & triangular wave generators, Comparators, Schmitt trigger, Voltage to frequency & frequency to voltage converters, Small signal rectifiers, Sample & hold circuit, Logarithmic amplifier. Active Filters**:** Introduction to active filters: active networks using OP-AMP, approximation to ideal low pass filter, Active filters: LP, HP, BP, BS, & their design guidelines.

ASSESMENT: Mid-term test, Assignment, Tutorial, Quiz and End semester exam.

TEXT BOOKS RECOMMENDED:-

1. Sedra & Smith L., Electronics Circuits, 5th ed., 2004, McGraw Hill.
2. Gayakwad R.A., Op AMP & Linear Integrated Circuits. 4th ed., 2007, PHI.
3. Van Valkenburg M.E., Analog Filter Design, 2nd ed., 2001, Holt Rinehart &Winston.

REFERENCE BOOKS RECOMMENDED:-

1. Milliman & Halkias, Integrated Electronics, 2nd ed., 1997, McGraw Hill.
2. Robert Boylsted, Electronic Devices & Circuits, 2nd ed., 2000, PHI.
3. Millman and Grable, Microelectronics, 2nd ed., 1987, TMH.

EC25XXX: ANALOG AND DIGITAL COMMUNICATION

COURSE OUTCOMES:

At the end of this course students will demonstrate the ability to:

1. Analyze and compare different analog modulation schemes for their efficiency and bandwidth
2. Analyze the behaviour of a communication system in presence of noise
3. Investigate pulsed modulation systems and analyze their system performance
4. Analyze different digital modulation schemes and compute the bit error performance
5. Outline various advanced communication systems and relate the concepts of information theory and coding with digital communication systems.

Hours / Week			Maximum Marks				Total Marks	Credits		
			Theory		Practical					
L	T	P	End Sem	CW	SW	End Sem		Th	Pr	Total
3	-	-	70	30	-	-	100	3	-	3

Unit 1: Analog Modulation: Review of signals and systems, Frequency domain representation of signals, Modulation and demodulation of AM signals, Power relations in AM, Superheterodyne receivers; Frequency Division Multiplexing; Angle Modulation and demodulation, Spectra of AM, and FM.

Unit 2: Random Processes and Noise: Review of random processes; Line codes, PSD, Transmission of random signals through LTI systems; Sources of noise, Noise Figure, Noise Equivalent Temperature, Gaussian and white noise characteristics; Effects of Noise in amplitude modulation systems and Frequency modulation systems, Pre-emphasis and De-emphasis, SNR comparisons.

Unit 3: Pulse modulation: Sampling of low-pass and bandpass signals, Quantization, Encoding, Pulse code modulation (PCM), Time Division multiplexing (TDM); Differential pulse code modulation (DPCM), Delta modulation (DM), Adaptive Delta modulation (ADM); Noise considerations.

Unit 4: Optimum Receivers and Digital Modulation: Geometric representation of signals, Optimum detection of signals in noise: MAP, ML detection, Optimum receivers. Baseband Pulse Transmission: Inter symbol Interference and Nyquist criterion for zero ISI, Equalization; Pass band Digital Modulation: ASK, PSK, FSK and QAM, their generation, detection and Probability of Error evaluations, Synchronization.

Unit 5: Overview of Information Theory, Coding and Advanced Communication Systems: Overview of information theory and coding: Concept of information, and channel capacity; Hamming codes, CRC; Digital Modulation trade-offs; Overview of Multiple-Access Techniques: TDMA, FDMA, CDMA; Introduction to Satellite communications: Radio link analysis, Free-space propagation model, Introduction to Mobile radio, Introduction to Optical communications.

ASSESMENT: Mid-term test, Assignment, Tutorial, Quiz and End semester exam.

TEXT BOOKS RECOMMENDED:

1. Haykin S., "Communications Systems", John Wiley and Sons, 2001.
2. Proakis J. G. and Salehi M., "Communication Systems Engineering", Pearson Education,2002.
3. Taub H. and Schilling D.L., "Principles of Communication Systems", Tata McGraw Hill,2001.

REFERENCE BOOKS RECOMMENDED:

1. Wozencraft J. M. and Jacobs I. M., ``Principles of Communication Engineering", JohnWiley, 1965.
2. Barry J. R., Lee E. A. and Messerschmitt D. G., ``Digital Communication", Kluwer Academic Publishers, 2004.
3. Proakis J.G., ``Digital Communications", 4th Edition, McGraw Hill, 2000.

EC25XXX: ELECTROMAGNETIC WAVES

COURSE OUTCOMES:

At the end of this course students will demonstrate the ability to:

1. Study and Analyze various laws to develop the Maxwell equations.
2. Characterize Uniform Plane Wave in different mediums.
3. Calculate reflection and transmission of waves at media interface.
4. Design and Analyze of Transmission lines to carry out the impedances transformations.
5. Analyze wave propagation on metallic waveguides in modal form.

Hours / Week			Maximum Marks				Total Marks	Credits		
			Theory		Practical					
L	T	P	End Sem	CW	SW	End Sem		Th	Pr	Total
3	-	-	70	30	-	-	100	3	-	3

UNIT 1: Electromagnetic and Maxwell's Equations:
Basics of vector calculus, Basic Laws of Electrostatics, Gauss's theorem for electrostatics. Equivalence theorem, method of images. Basic laws of magneto statics, Ampere's Law, Duality, Uniqueness and reciprocity theorem. Development of Maxwell's equations.

UNIT 2: Uniform Plane Waves:
Boundary conditions, Wave equation and solution, Wave polarization, Wave propagation in different mediums, Phase and group velocities, Power flow and pointing vector, Surface currents and power loss in a conductor.

UNIT 3: Plane Wave at Media Interface:
Plane waves in arbitrary direction, Reflection and refraction at dielectric interface and total internal reflection, Brewster's angle, Standing waves, Conducting surface, Skin depth. Basic of EMI and EMC, Classes of EMI: Inter and Intra EMI, Classes of EMC: Emission, Susceptibility, and Coupling, Testing for EMI and EMC, Standards of EMI and EMC.

UNIT 4: Transmission Lines:
Transmission Lines, Equations of voltage and current on Transmission lines, Propagation count and characteristics impedance, Reflection coefficient and VSWR, Impedancetransformation on lossless and low loss transmission lines, Power transfer on Transmission lines, Smith chart, admittance Smith chart, Applications of Transmission lines.

UNIT 5: Waveguides:
Wave propagation in parallel plate waveguides, Analysis of wave guides general approach, Rectangular waveguides, TE & TM modes, Surface currents on the waveguide walls, Attenuation in waveguide, Field visualization using simulation software.

ASSESMENT: Mid-term test, Assignment, Tutorial, Quiz and End semester exam.

TEXT / REFERENCE BOOKS:

1. R.K Shevgaonkar, Electromagnetic Waves, Tata McGraw Hill India.
2. Principles of Electromagnetics Matthew N.O Sadiku., 6th edition.
3. David Cheng, Field & wave Electromagnetics.
4. Microwave Engineering, Pozar ,4th edition

EC25XXX: MICROPROCESSOR AND MICROCONTROLLER

COURSE OUTCOMES:

Students should be able to:

1. Understand the basic architecture of 8-bit microprocessors and their operation usingassembly language programming and interfacing.
2. Distinguish and analyze the properties of 8-bit and 16 microprocessors with their programming and interfacing.
3. Understand the internal design of the 8051 microcontrollers along with the featuresand the programming.
4. Apply the architectural knowledge for the real-time problem-solving using interfacingconcepts.
5. Design processor and controller-based applications using compatible peripherals.

Hours/ Week			Maximum Marks				Total Marks	Credits		
			Theory		Practical					
L	T	P	End Sem	CW	SW	End Sem		Th	Pr	Total
3	-	-	70	30	-	-	100	3	-	3

Unit 1: Architecture of 8085 microprocessor, instructions sets, assembly language programming, interfacing with memory and I/O devices, interrupts systems.

UNIT 2: Introduction to 16 bits microprocessors, Architecture of 8086 microprocessor,instruction sets, addressing modes, assembly language and interrupt handling.

UNIT 3: Architecture of 8051 microcontroller, SFR's, instruction sets, assembly language programming, timers and counters, serial communication in 8051.

UNIT 4: Interfacing of 8051: A/D, D/A converter, external memory, LCD, Keyboard, DC and stepper motor

UNIT 5: Introduction to peripheral interface ICs such as PID 8155, PPI 8255, DMA controller and their interfacing with microprocessors and microcontrollers. Real time applications design.

ASSESMENT: Mid-term test, Assignment, Tutorial, Quiz and End semester exam

TEXT BOOKS RECOMMENDED:

1. Gaonkar, Introduction to Microprocessor. 2nd ed., 2004, Prentice Hall.
2. Sridhar and Ghosh, Computer Organizations and Architecture, 2nd ed., 2003,PHI.
3. Mazidi,8051 Microcontroller and Embedded Systems, 2nd ed. 1998, Pearson Edu.
4. Ayala, The 8051 Microcontroller, 2nd ed. 2001, Penram Publ.

REFERENCE BOOKS RECOMMENDED:

1. Rey Bhurchandi, Advanced Microprocessor Architecture, 2nd ed. 2001, TMH.
2. Bray, The Intel Microprocessors: Architecture, Programming and Interfacing, 2nd ed.,2003 PHI.

EC25XXX: ELECTRONICS WORKSHOP

COURSE OUTCOMES :

Student should be able to:

1. Classify and identify various Active & Passive Electronic Components.
2. Test various electronics components using basic tests and also with measuring instruments.
3. Familiarize with Arduino and bread board. Implement and test circuit on breadboard.
4. Identify various types of PCBs and practice on layout design for any circuit.
5. Write a technical report for the implemented circuit.

Hours/Week			Maximum Marks				Total Marks	Credits		
			Theory		Practical					
L	T	P	End Sem	CW	SW	End Sem		Th	Pr	Total
-	-	2	-	-	20	30	50	-	1	1

LIST OF EXPERIMENTS:

S.No.	List of Experiments
1.	Study and identifications of various types of resistors.
2.	Study and identifications of various types of capacitors.
3.	Study and identifications of various types of inductors
4.	Study and identifications of various types of diodes/transistors/MOSFET.
5.	Study and identifications of various types of relays/switches.
6.	Study and identification of surface mount devices (SMDs)
7.	Familiarization with the working of breadboard. Hands-on practice of assembling and testing of circuits on breadboard.
8.	Hands-on practice session on circuit simulation software. Observation of input and output signals before/after circuit simulation.
9.	Circuit and application design using the diodes/transistors and associated components. Implementation and testing of the circuit on breadboard. Comparisons of working with simulation software.
10.	Learning Arduino platform and familiarization with its coding.
11.	Familiarization of various types of Printed Circuit Boards.
12.	Design layout of any circuit using the software. Practice for PCB etching/design and PCB drilling
13.	Practices on soldering techniques
Minor Project	
Design and implement a small electronics project using the following steps: 1) Selection of circuit and its application 2) Component selection and their testing 3) Testing of selected circuit on simulation software and breadboard 4) PCB design including layout making and drilling 5) Soldering of components on PCB and circuit testing 6) Technical report writing for minor project	

ASSESMENT: Internal viva, Continuous evaluation of experiments, Journal write-up, and Additional experiments conducted, Quiz, End semester exam.

EC25XXX: ANALOG CIRCUITS LAB

COURSE OUTCOMES:

Student should be able to:

1. Understand single & double stage amplifier, and find its gain and bandwidth.
2. Understand various oscillator circuits and find its frequency of oscillation.
3. Understand op-amp based amplifier, and find its gain for various configurations.
4. Implement various op-amp based circuits.
5. Implement various active filters using op-amp.

Hours/ Week			Maximum Marks				Total Marks	Credits		
			Theory		Practical					
L	T	P	End Sem	CW	SW	End Sem		Th	Pr	Total
-	-	2	-	-	20	30	50	-	1	1

LIST OF EXPERIMENTS:

S.No.	List of Experiments
1.	To observe the characteristics of single stage R-C coupled amplifier
2.	Verify the characteristics double stage R-C coupled amplifier
3.	Measurement of input impedance and output impedance of single stage R-C coupled amplifier stage
4.	Study of frequency response of a single stage JFET amplifier
5.	Study of frequency response of double stage R-C coupled amplifier (with feedback)
6.	Analyze the characteristics of R-C phase shift oscillator
7.	Analyze Wein bridge oscillator
8.	Study of OP-Amp as: • Inverting Amplifier • Non-inverting Amplifier • Summing Amplifier
9.	Study of integrator circuit & differentiator circuit using Op Amp
10.	Study of class-C amplifier
11.	Study of active low-pass filter of first order
12.	To study active high-pass filter
Lab. Project	
1.	To design and develop a Lab Project based on Hardware / Software.

ASSESMENT: Internal viva, Continuous evaluation of experiments, Journal write-up, and Additional experiments conducted, Quiz, End semester exam.

EC25XXX: ANALOG AND DIGITAL COMMUNICATION LAB

COURSE OUTCOMES :

Student should be able to:

1. To analyze the Fourier Synthesis of Periodic Waveforms
2. To observe the Frequency Division Multiplexing of Analog signals
3. To analyze different generation and detection techniques of Amplitude and Frequency Modulated waveforms.
4. To identify different line coding techniques and demonstrate the concepts.
5. To analyze various digital modulation and demodulation schemes.

Hours/ Week			Maximum Marks				Total Marks	Credits		
			Theory		Practical					
L	T	P	End Sem	CW	SW	End Sem		Th	Pr	Total
-	-	2	-	-	20	30	50	-	1	1

LIST OF EXPERIMENTS:

S.No.	List of Experiments
1.	To measure Fourier Synthesis of various periodic waveforms
2.	Generation of AM and DSB-SC waveform and Multiplexing / De-multiplexing FDM signal
3.	Demodulation and detection of AM and DSB-SCusing Envelope Detector and Synchronous Detection
4.	Modulation and Demodulation of Frequency Modulated waveform
5.	To generate sampled signal of a band limited sinusoidal signal & its reconstruction, and to observe the two channels Time Division Multiplexing waveform
6.	Generation & detection of TDM-PCM signal
7.	Analysis of different methods of data transmission to regenerate the data at receiver or repeater
8.	Verification of Differential Pulse Code Modulation (DPCM) Technique
9.	Verification of DM output for various amplitudes and frequencies of input signal and for various clock frequencies
10.	Generation and detection of BPSK and QPSK signal
11.	Generation and detection of ASK and FSK signal
12.	Study of QAM Modulation and Demodulation
Lab. Project	
1.	To design and develop a Lab Project based on Hardware / Software.

ASSESMENT: Internal viva, Continuous evaluation of experiments, Journal write-up, andAdditional experiments conducted, Quiz, End semester exam.

EC25XXX: MICROPROCESSOR AND MICROCONTROLLER LAB

COURSE OUTCOMES :

Student should be able to:

1. Learn and practice assembly language programming of 8085/8086 microprocessors on development board and simulator softwares.
2. Practice assembly language/embedded 'C' programming of 8051 microcontroller on Keil software.
3. Design the projects on real time problems using 8051 microcontroller circuits on circuit simulation software and analyze their input/output characteristics.
4. Implement simulated circuit on the breadboard and verify its working.
5. Prepare the layout for working project and design its PCB for final circuit testing. Prepare a technical report of project assigned.

Hours/ Week			Maximum Marks				Total Marks	Credits		
			Theory		Practical					
L	T	P	End Sem	CW	SW	End Sem		Th	Pr	Total
-	-	2	-	-	20	30	50	-	1	1

LIST OF EXPERIMENTS:

S.No.	List of Experiments
	8085 Assembly Language Programs
1.	Write assembly language programs for the following operations (i) Addition of two 8-bit numbers. (ii) Subtraction of two 8-bit numbers. (iii) Addition of two 16-bit numbers. (iv) Multiplication of two 8-bit numbers. (v) Division of two 8-bit numbers.
2.	Write an assembly language program for the multiplication of Eight 8-bit numbers stored at consecutive memory locations.
3.	Write an assembly language program for block copy of Ten bytes from one location to another. (assume the memory locations)
4.	Write an assembly language program for the multiplication of a 16-bit number with 8-bit number.
5.	Write an assembly language program for multiplication of an 8-bit number by 8-bit number using rotate instruction.
6.	Write an assembly language program to find the largest number out of the ten 8-bit numbers.
7.	Write an assembly language program to arrange ten 8-bit numbers in ascending order.
8.	Write an assembly language program to generate a time delay of 50 ms. (Do calculation only)
9.	Write an assembly language program for the addition of two 8-bit numbers in BCD using DAA.
10.	Write an assembly language program to separate nibbles of an eight-bit number.
11.	Write an assembly language program with a subroutine having multiplication of two numbers.
12.	Write an assembly language program to find out positive, negative and zero in a series of data. (assume location and data)
13.	Write an assembly language program to convert ASCII to binary.
14.	Write an assembly language program to convert decimal to seven-segment display.
15.	Write an assembly language program to convert BCD to binary.
16.	Write an assembly language program to find out the square root of a number by subtracting odd integers.
17.	Write an assembly language program to XOR data without using XRA instruction.

18.	Write an assembly language program to add a series of numbers in BCD.
Microcontroller 8051	
19.	Write an assembly language programs to add, subtract, multiply & divide two 8 bit numbers stored in registers R0 & R1 of register bank 0, and store the results of various operations in different registers of register bank 2.
20.	Write an assembly language program to convert given 8-bit binary no. in the accumulator to 3 digit BCD, store 100 R2, 10 digit in R1 & 1s digit in R0 of register bank 1.
21.	Write an assembly language programs to unpack a packed BCD no. in the accumulator & save the result in R0 & R1 of register bank 2.
22.	Write an assembly language program to move a block of 50 bytes from internal RAM of 8051 to external RAM.
23.	Write an assembly language program to count no. of 1s & 0s in a given 8-bit no. in a register. Assume data is at location 3000H of external data memory. Store the counts of 0s & 1s in registers R0 & R1 respectively.
24.	Write an assembly language programs to find the smallest no. in a given array. An array is stored at a location starting from address 3000H.
25.	Write an assembly language program to implement a Boolean logic Y=(A+B).C Use bit addressable area of internal RAM. A, B & C are Boolean variables
26.	Write an assembly language programs to provide a delay of 1 sec.
27.	Write an assembly language programs to transfer a message serially at baud 8-bit data & I stop bit, do this continuously.
28.	Write an assembly language program to generate a square wave of 80% duty cycle on bit 3 of port 1.
29.	Write an assembly language programs to swap lower & upper nibble of any 8 bit data stored in a register without using SWAP instruction.
30.	Write an assembly language programs to find square root of a no. using subtraction of successive odd integers.
31.	Write an assembly language programs to calculate value of function $f(x) = x^2 + x + 1$. Where x is an 8 bit binary number.
32.	Write an assembly language programs assuming that INT 1 pin of 8051 is connected to a switch that is normally high. Whenever it goes low it should turns on an LED connected to P1.3 which is normally off. It should stay ON for few secs an then go down.
33.	Write an assembly language programs to receive a byte serially & check whether the byte is a valid byte or not. If it is a valid byte write 'C' on serial window else write 'E'.
Lab. Project	
1.	Design any real-time problem using 8051 microcontroller using the following steps: (i) Design the circuit on simulator software. (ii) Write/execute its corresponding assembly language /embedded 'C' program on Keil software and generate its Hex file. (iii) Load Hex file in microcontroller in simulator software and simulate the circuit. (iv) Implement the complete hardware on a breadboard and test it.

ASSESMENT: Internal viva, Continuous evaluation of experiments, Journal write-up, and Additional experiments conducted, Quiz, End semester exam.

HU 22881/24881/25881/27881: VALUES, HUMANITIES AND PROFESSIONAL ETHICS

PRE-REQUISITES: NIL

COURSE OUTCOMES: After completion of course, the students will be able to:

CO-1**:** Explain and elaborate the social institutions and Constitution of India through which the society and nation is governed.

CO-2: Describe the kinds of values and ethics and their importance.

CO-3: Contextualize the professional attitude and approaches as per needs of society and values.

CO-4: Explain and illustrate the process of Social, Political and Technological changes in context to global changes.

Hours / Week			Maximum Marks				Total Marks	Credits		
			Theory		Practical					
L	T	P	End Sem	CW	SW	End Sem		Th	Pr	Total
-	2	-	-	100	-	-	100	2	-	2

1. Role of Humanities in Engineering education, Morals, Values and Ethics,social institutions and association, social stratification in India, social change, Universal and Situational values, coexistence of self and body and their needs andactivities.

2. Constitution of India - Preamble, Rights and Duties. Directive Principles, Parliamentary and presidential democracy, The Problem of hierarchy of values and their choice, the views of Mahatma Gandhi on concept Indian nation and democracy.

3. Ethical and decision making capability and its development: Meaning of Ethical dilemma, Concept of personal and group Ethics: Balance between -rights and duties,The Problem of Sustenance of value in the process of Social, Political and Technological changes.

4. Engineering Ethics: engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger variety of moral issued - types of inquiry - moral dilemmas – moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy Models of Professional Roles.

5. Global Issues: Multinational corporations - Environmental ethics - computer ethics - weapons development – engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral leadership.

ASSESSMENT:

Only Sessional Work (100 marks) on the basis of internal viva (30) Attendance (20), Quizes/Tests (30) and Presentations (20) will be awarded against the assessment donethroughout the session.

Books for references

1. Little, William: An Introduction of Ethics (allied Publisher, Indian Reprint1955)
2. William, K Frankena: Ethics (Prentice Hall of India,1988)
3. Gaur R. R., Sangal R. and Bagaria G. P., Haman Values and Professional Ethics,Excel Books, New Delhi, 2010
4. Mike Martin and Roland Schinzinger, “Ethics in Engineering”, McGraw-Hill, New York1996.
5. Govindarajan M, Natarajan S, Senthil Kumar V. S, “Engineering Ethics”, PrenticeHall of India, New Delhi, 2004.
6. Introduction to the Constitution of India, D.D. Basu

HU2XXXX/3XXXX: CONSTITUTION OF INDIA

PRE-REQUISITES: NIL

COURSE OUTCOMES: After completion of course, the students will be able to:

1. Explain and elaborate the Indian Constitution through which the society and nation is governed.
2. Describe the list of fundamental rights and fundamental duties.
3. Elucidate the types of emergencies in Indian constitution.
4. Explain and illustrate the procedure of amendments in Indian constitution.

Hours / Week			Maximum Marks				Total Marks	Credits		
			Theory		Practical					
L	T	P	End Sem	CW	SW	End Sem		Th	Pr	Total
2	-	-	-	50	-	-	50	-	-	-

UNIT 1. Meaning and significance of Constitution, Making of Indian Constitution – Sources, Salient features of Indian Constitution and Preamble.

UNIT 2. Scheme of the Fundamental Rights and Duties: right to Equality-article 19- article 21, legal status of duties, Directive Principles of states policy- its importance and implementation.

UNIT 3. Federal structure, legislative and financial powers (union and states), Three lists (union, state and concurrent), parliamentary form of government in India- The constitution powers and status of the President of India.

UNIT 4. Judicial system and local governance in India: Its constitutional powers, Historical perspectives of the constitutional amendments in India, Amendment of the constitutional powers procedure, Local self government - 73rd and 74th Amendment.

UNIT 5. Emergency provisions: President rule, National Emergency, Financial Emergency, Election commission and its constitutional powers and procedures.

ASSESSMENT:

Only Sessional Work (100 marks) on the basis of viva (30) Attendance (20), Quizes/Tests/Activities (30) and Presentations (20) will be awarded against the assessment done throughout the session.

Books Recommended:

1. 'Indian Polity' by Laxmikanth
2. 'Indian Administration' by Subhash Kashyap
3. 'Indian Constitution' by D.D. Basu
4. 'Indian Administration' by Avasti and Avasti