KSRM College of Engineering (Autonomous)

Kadapa-516003

DEPARTMENT OF ECE

UG R18 Structure and Syllabus

(V Semester)

V Semester

S. No.	Subject Code	Subject	Category	L	T	P	IM	EM	Credits
1	1804501	Antennas and Wave Propagation	EC	3	0	0	30	70	3
2	1804502	Digital Signal Processing	EC	3	0	0	30	70	3
3	1804503	Computer Organization	EC	2	0	0	30	70	2
4	1804504	Analog Communication	EC	3	0	0	30	70	3
5	1804505	Digital IC Applications	EC	3	0	0	30	70	3
6	1804506	Microprocessors & Microcontrollers	EC	3	0	0	30	70	3
7	1804507	Microprocessors & Microcontrollers Lab	EC	0	0	3	50	50	1.5
8	1804508	Analog and Digital ICs lab	EC	0	0	3	50	50	1.5
9	1804509	Socially Relevant Project	PR				100		2
		Total:							22

Course Title	ANTENNA AND WAVE PROPAGATION					B. Tech. ECE V Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1804501	EC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs			

Course Objectives:

- The student will learn the fundamental principles of transmission line theory related to communications including the propagation of signals on a transmission line and in free space.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Define** various antenna parameters
CO 2	**Describe** the radiation mechanisms of various antennas.
CO 3	**Analyze** characteristics of antenna arrays.
CO 4	**Calculate** Various parameters of antenna .
CO 5	**Analyze** the effects of atmosphere on wave propagation.

UNIT- I

Antenna Basics: Introduction, Basic antenna parameters- patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Effective height, Antenna Apertures, Friis transmission formula, Illustrative problems. Fields from oscillating dipole, Antenna temperature, front–to-back ratio, basic Maxwell's equations, retarded potential-Helmholtz Theorem, Radiation from Small Electric Dipole, Quarter wave Monopole and Half wave Dipole – Current Distributions, Field Components, Radiated power, Radiation Resistance, Beam width, Directivity, Effective Area and Effective Height, Natural current distributions, far fields.

UNIT- II

Antenna Arrays: Point sources- Definition, Patterns, arrays of 2 Isotropic sources. Principle of Pattern Multiplication, Uniform Linear Arrays – Broadside Arrays, End fire Arrays, Derivation of their characteristics and comparison, BSA with Non-uniform Amplitude Distributions, Bionomial Arrays.

UNIT- III

VHF, UHF AND Microwave Antennas: Arrays with Parasitic Elements, Yagi - Uda Arrays, Folded Dipoles & their characteristics. Helical Antennas, Horn Antennas, Parabolic Reflector, Micro strip Antennas.

Antenna Measurements: Introduction, Directivity Measurement, Gain Measurements (by comparison, Absolute and 3-Antenna Methods).

UNIT- IV

Wave Propagation-I: Introduction, Characterizations and general classifications, different modes of wave propagation, Ray/ Mode concepts. Ground wave propagation (Qualitative treatment) - Introduction, Plane earth reflections, Space and surface waves, wave tilt, curved earth reflections. Space wave propagation- Introduction, field strength variation with distance and height, effect of

earth's curvature, absorption, Super refraction, M-curves and duct propagation, scattering phenomena, tropospheric propagation, fading and path loss calculations.

UNIT- V

Wave Propagation-II: Sky wave propagation- Introduction, structure of Ionosphere, refraction and reflection of sky waves by Ionosphere, Ray path, Critical frequency, MUF, LUF, OF, Virtual height and Skip distance, Relation between MUF and Skip distance, Multi-HOP propagation, Energy loss in Ionosphere, Summary of Wave Characteristics in different frequency ranges.

Text Books:

1. John D. Kraus, Ronald J. Marhefka and Ahmad S. Khan, "Antennas and wave propagation", TMH, New Delhi, 4th Edition, (Special Indian Edition), 2010
2. E.C. Jordan and. Balmain, "Electromagnetic Waves and Radiating Systems", PHI, 2nd Edition, 2000.
3. C.A. Balanis, "Antenna Theory" John Wiley & Sons, 2nd Edition, 2001.

Reference Books:

1. K.D. Prasad, "Antennas and Wave Propagation", Satya Prakashan, Tech India Publications, New Delhi, 2001
2. F.E. Terman, "Electronic and Radio Engineering," McGraw-Hill, 4th Edition, 1955.

Course Title	Digital Signal Processing					B. Tech. ECE V Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1804502	EC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min						End Exam Duration: 3Hrs		

Course Objectives:

- To become familiar with Discrete Fourier Transform and its efficient computation.
- To understand various IIR and FIR realization techniques.
- To know the design of IIR and FIR filters.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand properties and algorithms of DFT.
CO 2	Realize Various Digital Filters.
CO 3	Analyze IIR and FIR filters.
CO 4	Design IIR filters, FIR filters Decimator and Interpolator.

UNIT-I

Discrete Fourier series: DFS representation of periodic sequences, Properties of discrete Fourier series, Discrete Fourier Transform (DFT), properties of DFT, linear convolution of sequences using DFT.

Fast Fourier Transforms: Efficient computation of the DFT, Decimation in time and decimation in frequency FFT algorithms, FFT algorithms for composite N.

UNIT-II

Realization of Digital Filters: Block diagram representation of linear constant-coefficient difference equations, basic structures of IIR filters- direct form I, direct form II, transposed form, cascade form, parallel forms, basic structures of FIR filters-Direct form, Cascade form, Linear phase structure, Lattice structures.

UNIT-III

IIR Digital Filters: General considerations-Causality and its implications, Characteristics of Practical Frequency-selective filters, Design of analog filters-Butterworth and chebyshev approximations, IIR filter design by backward difference, Impulse Invariance, Bilinear transformation, design examples: frequency transformations, Illustrative Problems.

UNIT-IV

FIR Digital Filters: Symmetric and Anti-symmetric FIR filters, Design of Linear Phase FIR digital filters using windows, Frequency sampling technique, comparison of IIR and FIR filters, Illustrative Problems, applications of DSP (Dual Tone Multifrequency signal detection, Spectral analysis of sinusoidal and nonstationary signals).

UNIT-V

Multirate Signal Processing: Introduction, Decimation, and interpolation, Sampling rate conversion by a rational factor, Implementation of sampling rate conversion, Multistage implementation of sampling rate conversion, Sampling rate conversion of bandpass signals, Sampling rate conversion by arbitrary factor, Applications of multirate signal processing.

Text Books:

1. A.V.Oppenheim and R.W. Schaffer, & J R Buck, "Discrete Time Signal Processing," 2nd ed., Pearson Education, 2012.
2. John G. Proakis, Dimitris G. Manolakis, "Digital signal processing, principles, Algorithms and Aapplications", Pearson Education/PHI, 4th Edition, 2007.
3. Sanjit K Mitra, "Digital signal processing", A computer base approach- Tata McGraw-Hill, 3rd Edition, 2009.

Reference Books:

1. Andreas Antoniou, Digital signal processing: Tata McGraw-Hill, 2006.
2. Digital signal processing: M H Hayes, Schaum's Outlines, Tata McGraw-Hill, 2007.
3. A. Anand Kumar, "Digital Signal Processing," PHI Learning, 2011.

Course Title	COMPUTER ORGANIZATION				B. Tech. ECE V Sem			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1804503	EC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		2	--	--	1	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs			

Course Objectives:

- To give the concepts related to Computer Organization and Design
- To introduce CPU, Memory, I/O Devices

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Understand** micro programmed control.
CO 2	**Describe** the various functional units of computer.
CO 3	**List** out the various components of CPU.
CO 4	**Classify** various peripheral devices.
CO 5	**Compare** various memory units**.**

UNIT-I

Basic Structure of Computers: Computer Types, Functional Units, Basic operational Concepts, Bus Structures, Software, Performance, Multiprocessors and Multi Computers.

Register Transfer and Micro Operations: Register transfer, Bus and Memory transfers, Arithmetic micro operations, Logic micro operations, Shift Micro Operations, Arithmetic Logic shift units.

UNIT-II

Basic Computer Organization and Design: Instruction codes, computer Registers and instructions, Timing and control, instruction cycles, memory- reference instructions, Input-Output and interrupt.

Microprogrammed Control: Control Memory, Address Sequencing, Micro Program Example, Design of Control Unit.

UNIT-III

Central Processing Unit: General register Organization, Stack Organization, Instruction formats, Addressing Modes, Program Control, RISC, Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline.

UNIT-IV

Input-Output Organization: Peripheral Devices, Input-Output interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, DMA, Input-Output Processor, Serial Communication.

UNIT-V

Memory Organization: Memory Hierarchy, Main memory, Auxiliary memory, Associative Memory, Cache Memory, Virtual memory, Characteristics of Multiprocessors, Interconnection Structures, Inter Processor Arbitration, Inter Processor Communication and Synchronization, Cache Coherence, Shared Memory Multiprocessors.

Text Books:

1. Carl Hamacher, Zvonks Vranesic, SafeaZaky, “Computer Organization”, 5th Edition, Tata McGraw-Hill.(Unit I-1chapter)
2. M. Moris Mano, “Computer Systems Architecture”, 3rd Edition, Pearson/PHI.

Reference Books:

1. William Stallings, Computer Organization and Architecture, 6th Edition, Pearson/PHI.
2. S Andrew S. Tanenbaum, Structured Computer Organization, 4th Edition, PHI/Pearson.
3. P. Sivarama, Dandamudi, “Fundamentals or Computer Organization and Design”, Springer Int. Edition.
4. John L. Hennessy and David A. Patterson, “Computer Architecture a quantitative approach”, 4th Edition, Elsevier.
5. Joseph D. Dumas II, “Computer Architecture: Fundamentals and principles of Computer Design”, BS Publication.

Course Title	ANALOG COMMUNICATIONS				B. Tech. ECE V Sem		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
1804504	**EC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		3	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					**End Exam Duration: 3Hrs**			

Course Objectives:

- To analyze various transmitter and receiver functions and circuits
- To analyze different modulation and demodulation techniques

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand different blocks in communication system and how noise affects communication.
CO 2	Distinguish between different amplitude modulation and angle modulation schemes.
CO 3	Construct AM, FM Transmitters and different radio receiver circuits for various applications.
CO 4	Compare various Pulse modulation and demodulation techniques.
CO 5	Verify sampling theorem

UNIT-I

Introduction to communication systems: Modulation, its needs and types, Fundamental physical limitations, Electromagnetic Spectrum and Area of Applications.

Amplitude modulation: Hilbert Transform and its properties, base band and pass band representation of signals, Pre-envelope and band pass signals, AM, DSBSC and SSB, Generation and detection methods, VSB, frequency translation, FDM, Nonlinear distortion and Inter Modulation, problem solving.

UNIT-II

Angle modulation: Phase and frequency modulation, NBFM, WBFM, Multi-tone FM, Transmission band width of FM, direct and indirect generations of FM, Demodulation methods, Non-linear effects, FM versus AM, problem solving.

UNIT-III

Radio Transmitters and Receivers: Block diagram study of radio broadcast AM and FM transmitters, Super heterodyne AM and FM receivers, Measurement of sensitivity, selectivity, choice of IF, AGC, Tracking-characteristics of radio receivers, FM stereo.

UNIT--IV

Noise: External and internal sources of noise, Noise calculations, Noise equivalent resistant, Noise figure, Noise temperature, Effect of noise in AM and FM modulation system, FM threshold effect, Pre-emphasis and de-emphasis.

UNIT-V

Sampling: Review of sampling theorem, Practical aspects of sampling; pulses of finite duration, Flat top sampling.

Pulse Modulation: PAM generation and detection, PDM and PPM, Generation and detection, Spectra, Synchronization.

Text books:

1. Simon Haykin, "Communication Systems", Wileyestern,1978, 4th edition.
2. B.P. Lathi "Modern Digital and Analog communication system", Oxford University Press, 2nd Edition, 1996.
3. A. Bruce Carlson "Communication systems", Mc Graw Hill, ISE, 5thedition.

Reference Books:

1. Dennis Roddy and John Coolen, "Electronic communications" Prentice-Hall of India Private Limited, 1981.
2. Kennedy and Davis, "Electronic communication systems",4thEdition, Mc Graw International edition, 1992.
3. Taub and Schilling, "Principles of communication Systems", Mc Grace Hill, ISE,1971.

Course Title	DIGITAL IC APPLICATIONS					B. Tech. ECE V Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1804505	EC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs			

Course Objectives:

- To introduce **Verilog** HDL and its language elements to design digital systems.
- Make students familiar with design of different combinational and sequential digital circuits.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Understand** CMOS, Bipolar logic families and fundamentals of **Verilog** VHDL Programming.
CO 2	**Apply** the concepts of **Verilog** HDL for modeling and simulation of digital logic circuits.
CO 3	**Analyze** various Combinational and Sequential logic circuits.
CO 4	**Model** digital logic circuits using CMOS, BJT and ECL technologies.

UNIT-I

CMOS Logic and Interfacing: Review of Logic Families (TTL&ECL), CMOS logic, CMOS NAND and NOR gates, CMOS AOI and OAI gates, CMOS steady state and dynamic electrical behavior, CMOS logic families, CMOS/TTL interfacing, low voltage CMOS logic and interfacing. CMOS transmission gates, BiCMOS.

UNIT-II

The Verilog Hardware Description Language: HDL based Design flow, Program Structure, Logic system, Nets, Variables and Constants. Vectors and Operators, Arrays.
Logical Operators and Expressions. Compiler Directives. Structural design elements, data flow design elements, behavioral design elements (procedural code), and time dimension, Simulation, Test Benches and Synthesis.

UNIT-III

Combinational Logic Design: Design using basic gates, Decoders, Encoders, three state devices, Multiplexers and Demultiplexers, Code Converters, EX-OR gates and parity circuits, Design considerations with relevant Digital ICs, **Verilog** Modules for the above ICs.

UNIT-IV

Design Examples (USING Verilog): Design examples (using Verilog) - Comparators, Seven-Segment Decoders, Adders, subtractors, MSI Arithmetic and Logic Units, Combinational multipliers.

UNIT-V

Sequential Logic Design: SSI Latches and Flip-Flops, Counters, Design of Counters using Digital ICs, Ring Counter, Johnson Counter, Modulus N Synchronous Counters, MSI Registers, Shift Registers, Modes of Operation of Shift Registers, Universal Shift Registers, MSI Shift Registers, Design considerations with relevant Digital ICs, **Verilog** Modules for the above ICs.

Text Books:

1. John F. Wakerly, "Digital Design Principles & Practices" PHI/Pearson Education Asia, 4th Edition, 2008.
2. J. Bhasker, "A Verilog HDL Primer", Star Galaxy Publishing; 3rd edition (January 31, 2005)

Reference Books:

1. Fundamentals of Digital Logic with Verilog Design – Stephen Brown, Zvonko Vranesic, TMH, 3rd Edition, 2014
2. Verilog HDL – Samir Palnitkar, 2nd Edition, Pearson Education, 2009.
3. Advanced Digital Design with Verilog HDL – Michael D. Ciletti, PHI, 2009.
4. J. Bhasker, "A Verilog HDL Synthesis: A Practical Primer", Star Galaxy Publishing.
5. T.R. Padmanabhan, B Bala Tripura Sundari, Design Through Verilog HDL, Wiley 2009.
6. Zainalabdien Navabi, Verliog Digital System Design,TMH, 2nd Edition.

Course Title	Microprocessors & Microcontrollers				B. Tech. ECE V Sem			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1804506	EC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	--	--	3	30	70	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs			

Course Objectives:

- To become familiar with 8086 Microprocessor and 8051 Microcontroller Architecture, Instructions, Operating Modes and Programming.
- To use 8086 microprocessor and 8051 microcontroller for various applications.
- To study various peripherals for microprocessor based systems.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Define various components and list out various features of microprocessor, microcontroller and peripherals.
CO 2	Describe the internal block diagram of microprocessor, microcontroller and peripherals, addressing modes, instruction set and data transfer schemes.
CO 3	Develop algorithm and assembly language programs to solve problems.
CO 4	Apply an appropriate algorithm, program and peripheral for the application.
CO 5	Design the microprocessor or microcontroller based system to solve real time problems. (Prepare a case study model to get a first prototype)

UNIT I

Introduction to Microprocessors: 8085 Microprocessor - Architecture, Instruction set, Addressing modes, Basic Timing Diagrams, Interrupts and Simple Programs.

8086 Microprocessor - Architecture, Instruction set, Addressing modes, Interrupt system. Pin diagram, Minimum mode 8086 system and timings, Maximum mode 8086 system and timings.

UNIT II

Assembly Language Programming: Assembler directives, Assembly language programs (8086) with Assembler directives for addition, subtraction, multiplication, division etc., sorting and searching, bit manipulation, look-up tables, string manipulations, Macros and Delay subroutines.

Data transfer schemes and Memory Interfacing: Synchronous, Asynchronous, Interrupt driven and DMA type schemes, Address decoding techniques, Interfacing Static RAM and ROM chips,

UNIT III

Peripheral Interfacing: 8255 PPI and its interfacing, Programmable Communication Interface (8251 USART) and its interfacing, Programmable Interval Timer (8254) and its interfacing, Programmable interrupt controller (8259) and its interfacing, Programmable DMA controller (8257) and its interfacing, ADC and DAC Interfacing.

UNIT IV

The 8051 microcontroller: Architecture, pin diagram, memory organization, external memory interfacing, stack, addressing modes, instruction set, Assembler directives, Assembly Language programs and Time delay Calculations, 8051 interrupt structure, 8051 counters and Timers, programming 8051 timers.

UNIT V

Introduction to ARM: ARM Design philosophy, Registers, Program Status Register, Instruction pipeline, Interrupts and vector table, Instruction Set- Data Processing Instructions, Branch, Load-Store, Software interrupt, PSR instructions, Conditional instructions, Thumb instruction Set: Register Usage, Other Branch instructions, Data processing Instructions, Single-Register and Multi Register Load-Store Instructions, Stack, Software Interrupt Instructions.

Text Books:

1. Ramesh S. Gaonkar, "Microprocessor architecture, programming and its applications with 8085", Penram International Publications, 4th Edition.
2. A. K. Ray and K.M. Bhurchandi, "Advanced Microprocessors and Peripherals", TMH.
3. The 8051Microcontroller and Embedded Systems, Mazidi Muhammad Ali, Mazidi Janice Gillespie & McKinlay Rolin D, 2nd Edition, Pearson Education, 2008.
4. The 8051 microcontroller: Architecture, Programming & Applications, Kenneth J Ayala, penram publications, 2nd edition.
5. ARM System Developer's Guide-Designing and Optimizing system software, Andrew N.Sloss, Dominic Symes, Chris Wright, Elsevier, 2008.

Reference Books:

1. Douglas V. Hall, "Microprocessors and Interfacing: Programming and Hardware", 2nd Edition, Tata McGraw-Hill.
2. Barry B. Brey, "The Intel Microprocessors-Architecture, Programming and Interfacing", 8th Edition, PHI.
3. Y. Liu and Glenn A. Gibson, "Microcomputer Systems: 8086/8088 Family Architecture, Programming and Design", 2nd Edition, PHI.
4. Microcontrollers Architecture, Programming, Interfacing and System Design – Raj Kamal, Pearson Education, 2005.
5. Steve Furbur, ARM System onchip Architecture, 2nd Edition, Addison Wesley, 2000.

Course Title	Microprocessors and Microcontrollers Lab				B. Tech. ECE V Sem			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1804507	PJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		--	--	3	1.5	50	50	100
Mid Exam Duration: 1Hr 30 Min					End Exam Duration: 3Hrs			

Course Objectives:

- To write 8086microprocessor and 8051 microcontroller programs for various operations
- Learning interfacing of processor with various Peripherals.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Develop algorithm and assembly language programs to solve problems.
CO 2	Analyze abstract problems and apply a combination of hardware and software to address the problem.
CO 3	Choosing an appropriate algorithm, program and peripheral for the application.
CO 4	Design the microprocessor based system to solve real time problems.

Microprocessor 8086 & Microcontroller 8051: (Any four from 1 – 6. Experiments 7 and 8 are compulsory)

1. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
2. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
3. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
4. Reading and Writing on a parallel port.
5. Timer in different modes.
6. Serial communication implementation.
7. 8259 – Interrupt Controller: Generate an interrupt using 8259 timer.
8. 8279 – Keyboard Display: Write a small program to display a string of characters.

General Problems

1. Addition and Subtraction of two 8- bit/16 bit numbers, Multiplication of two 8-bit & two 16-bit numbers, Division of 16-bit by 8-bit and 32-bitby 16-bit number
2. Addition and Subtraction of 6 data bytes with 6-data bytes of another location.
3. Check the given Number is even or odd, Counting of 0's and 1's in a given data, Check the given number is logical palindrome or not.
4. Finding the maximum and minimum numbers in a given string of data.

5. Sorting the given numbers in ascending and descending order.
6. Finding the Factorial and Generating Fibonacci Series.
7. Conversion of BCD to hexadecimal number, Multiplication of two 3x3 matrices.
8. Addition, Subtraction, Multiplication, Division using Microcontroller.

Interfacing

1. Dual DAC interface (waveform generation).
2. Stepper motor control.
3. Display of flags using logic controller.
4. Traffic light controller.

Course Title	Analog and Digital IC Applications Lab				B. Tech. ECE V Sem		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**	
1804508	**EC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		--	--	3	1.5	50	50	100
						End Exam Duration: 3Hrs		

Course Objectives:

- To verify various op-amp applications
- To verify the applications of different ICs
- To write Verilog VHDL programs for different logic circuits.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Demonstrate** the circuits with analog IC's (741, 555, 78XX/79XX, 723)
CO 2	**Apply** IC's (741, 555, 78XX/79XX, 723) in electronic applications.
CO 3	**Design** a digital system to meet required specifications.
CO 4	**Test** the functionality of system design with Test Benches.
CO 5	**Test** the results of designed digital system using FPGA.

Part A: Analog IC Application Lab:

1. OP AMP Applications – Adder, Subtractor, Comparator Circuits.
2. Active Filter Applications – LPF, HPF (first order).
3. Function Generator using OP AMPs.
4. IC 555 Timer – Monostable and Astable Operation Circuit.
5. IC 566 – VCO Applications.
6. Voltage Regulator using IC 723.
7. 4 bit DAC using OP AMP.
8. Precision Diodes

Part B: Digital IC Applications:
(Simulate the internal structure of the following Digital IC's using Verilog VHDL)

1. Logic Gates- 74XX.
2. Half Adder, Half Subtractor, Full Adder, Full Subtractor & Ripple Carry Adder.
3. 3-8 Decoder -74138 & 8-3 Encoder- 74X148.
4. 8 x 1 Multiplexer -74X151 and 2x4 Demultiplexer-74X155.
5. 4 bit Comparator-74X85.
6. D Flip-Flop 74X74.
7. JK Flip-Flop 74X109.
8. Decade counter-74X90.

Course Title	Socially Relevant Projects					B. Tech. V Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1804509	PROJ	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		--	--	-	2	100	--	100
Course Objective: The objective of the project is to enable the student to take up investigative study in rural areas in the field of Electrical Engineering								
On successful completion of this course, the students will be able to								
CO 1	Understand core concepts and research findings relative to human development, socialization, group dynamics and life course processes.							
CO 2	Identify and transfer existing ideas into new contexts and applications							
CO 3	Apply and transfer academic knowledge into the real-world							
CO 4	Design a component or a product applying all the relevant standards and with realistic constraints							

The following are the rules and regulation for **Socially Relevant Projects:**

1. The student has to spend 50 to 60 Hrs in the semester on any socially relevant project and submit a report for evaluation.
2. The project is evaluated for 100 marks in the semester by a committee consisting of head of the department, project mentor and one senior faculty member of the department.
3. A student shall acquire 2 credits assigned, when he/she secures 50% or more marks from the total of 100 marks.
4. In case, if a student fails, he/she shall resubmit the report.
5. There is no external evaluation for the socially relevant project.