Syllabus

for

Third Year

B. Tech. Electronics and Telecommunication Engineering

Four Year (Eight Semesters) Course

w.e.f. (July 2008)

Department of Electronics and Telecommunication Engineering
Dr. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
Lonere-402103, Dist-Raigad (MS)

Dr. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY
LONERE-402103 (MS)

Syllabus for Third Year Electronics and Telecommunication Engineering (Effective from year June 2008)

B. Tech. Third Year (Electronics and Telecommunication Engineering)											
Sr. No.	**Semester**	**Name of the subject**	Weekly Load			**Credit**	**Theory**	**Test (test1 + test 2)**	**Practical/ Oral**	**Term Work**	**TOTAL**
			L	**T**	**P**						
1	**Semester V**	Integrated Circuits and Applications	3	1	2	10	50	50	25	25	150
2		Electromagnetic Fields	3	-	-	6	50	50	--	50	150
3		Microcontrollers and its Applications	3	-	2	8	50	50	25	25	150
4		Digital Signal Processing	3	1	2	10	50	50	25	25	150
5		Electronic Circuit Design	3	1	2	10	50	50	25	25	150
6		Industrial Training(Audit course)	**Grade will be awarded as PP/NP**								
		Total of Part I	**15**	**3**	**08**	**44**	**250**	**250**	**100**	**150**	**750**
7	**Semester VI**	Advanced Microprocessor and Interfacing	3	-	2	8	50	50	25	25	150
8		Power Electronics	3	-	2	8	50	50	25	25	150
9		Antenna and Wave Propagation	3	-	2	8	50	50	25	25	150
10		Digital Communication	3	1	2	10	50	50	25	25	150
11		Digital System Design	3	1	2	10	50	50	25	25	150
12		Seminar	-	-	4	4	-	-	50	50	100
		Total of Part II	**15**	**2**	**14**	**48**	**250**	**250**	**175**	**175**	**850**

Dr. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Department of Electronics and Telecommunication Engineering

w.e.f. (July 2008)

Semester V

Sr. No.	Subject Code	Name of the subject	Teaching Scheme			
			Hrs/week L	T	P	Credits
01	BET3101	Integrated Circuits and Applications	03	1	-	06
02	BET3102	Electromagnetic Fields	03	-	-	06
03	BET3103	Microcontrollers and its Applications	03	-	-	06
04	BET3104	Digital Signal Processing	03	1	-	06
05	BET3105	Electronic Circuit Design	03	1	-	06
06	BET3106	Integrated Circuits and Applications Lab	-	-	02	02
07	BET3107	Microcontrollers and its Applications Lab	-	-	02	02
08	BET3108	Digital Signal Processing Lab	-	-	02	02
09	BET3109	Electronic Circuit Design Lab	-	-	02	02
10	BET2211	Industrial Training **(Audit course)**	**Grade will be awarded as PP/NP**			
		Total	**26**			**44**

Semester VI

Sr. No.	Subject Code	Name of the subject	Teaching Scheme			
			Hrs/week L	T	P	Credits
01	BET3201	Advanced Microprocessor and Interfacing	03	-	-	06
02	BET3202	Power Electronics	03	-	-	06
03	BET3203	Antenna and Wave Propagation	03	-	-	06
04	BET3204	Digital Communication	03	1	-	08
05	BET3205	Digital System Design	03	1	-	08
06	BET3206	Advanced Microprocessor and Interfacing Lab	-	-	02	02
07	BET3207	Power Electronics Lab	-	-	02	02
08	BET3208	Antenna and Wave Propagation Lab	-	-	02	02
09	BET3209	Digital Communication Lab	-	-	02	02
10	BET3210	Digital System Design Lab	-	-	02	02
11	BET3211	Seminar			04	04
		Total	**31**			**48**

SEMESTER V

[BET3101]: Integrated Circuits and Applications

Weekly Teaching Hrs.	TH : 03	PR : 02	TUT: 01	
Examination Hrs.	TH : 03	PR : 02		
Marking Scheme	TH :50	TEST : 50	TW : 25	PR/OR : 25
Credits	TH : 06	PR : 02	TUT : 02	Total = 10

UNIT I

Fundamentals of Operational Amplifier

Difference amplifier, Current mirror, Level translator, Push-pull amplifier, Op-Amp circuit and its characteristics: Study of Op-amp 741, Ideal characteristics, Op-amp parameters and their importance, Frequency response, Frequency compensation, Magnitude plot and phase plot.

UNIT II

Linear Applications of Op-Amp

Op-amp as adder, Subtractor, voltage follower, Differential amplifier, AC amplifier, Instrumentation amplifier, V/I and I/V converters, practical consideration of Differentiator & Integrator.

UNIT III

Nonlinear Applications of Op-Amp

Precision rectifiers, Comparator, Zero crossing detector, Schmitt trigger, Log and anti-log amplifier, Introduction to LM 339 IC comparator. Waveform generation using Op-Amp: Sine wave oscillator like R-C phase shift and Wien-bridge, Study of astable, bistable and monostable multivibrators using op-amp, Function generator using op-amplifier.

UNIT IV

Specialized IC Applications

Audio power amplifiers, IC 555, IC LM 380, video amplifier IC LM 733, study of analog multiplier.

UNIT V

Phase Lock Loop (PLL)

Study of VCO using IC 566, Operating principles of PLL & its transfer characteristics, Lock range, Capture range. Applications of PLL, Study of PLL IC 565.

UNIT VI

Active Filters

General characteristics of filters, Ideal and realistic filter responses, 1st and 2nd order active high pass, Low pass, Band pass and band reject butterworth filters.

Texts/References:

1. Ramakant Gaikwad, “Op-Amp and Linear IC Technology”, PHI ,New Delhi-5th Edition-2008.
2. K.C. Botkar, “Integrated Circuit”, Khanna Publishers- 3rd Edition-1997.
3. Franco, “Design with Op-Amp and Analog IC’s”, TMH – Bosten-3rd Edition-2002.
4. Coughlin, “Operational Amplifiers and Linear Integrated Circuits”, Pearson Education, New Delhi , 2001, 6th edition

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[BET3102]: Electromagnetic Fields

Weekly Teaching Hrs.	TH : 03	PR : 00	TUT: 00	
Examination Hrs.	TH : 03	PR : 00		
Marking Scheme	TH :50	TEST : 50	TW : 25	PR/OR : 00
Credits	TH : 06	PR : 00	TUT : 00	Total = 06

UNIT I

Vector Algebra, Calculus and Transformation

Cartesian, Cylindrical and spherical co-ordinate systems, Unit vectors, Transformations between co-ordinate systems.

UNIT II

Electrostatics

Coulombs law, Definition of electric field intensity, Different types of charge distribution, Expression for Dielectric, Definition of electric flux density, Electric flux over area, Gauss' law in differential and integral form, Divergence theorem, Electrostatic potential, Boundary condition between two dielectric, Ideal conductors, Boundary condition between ideal conductor and dielectrics, Capacitance for parallel plates, Spherical and co-axial cable, Poisson's and Laplace's equation, Energy stored in electrostatic field.

UNIT III

Magnetostatics

Continuity equation, Definition of steady current, Ampere's law of current, Magnetic flux density, General formulation of arbitrary current distribution, Biot-Savart's law, Vector magnetic potential, Solution for magnetic flux density, Ampere's circuital law and its application, Boundary conditions, Expressions for stored energy in magnetic field, Lorentz's force equation.

UNIT IV

General Time Varying Field

Maxwell's equations, Displacement current, Maxwell's equation in integral form, Boundary conditions, Poynting theorem.

UNIT V

Time Periodic Fields

Phasor representation, Maxwell's equation in phasor form, Field in ideal conductor, Boundary condition interpreted in phasor form, Poynting vector and energy stored in phasor form.

UNIT VI

Uniform Plane Wave

EM waves in charge free, current free dielectric, Properties of EM waves, Normal incidence at ideal conductor, Reflection and transmission with normal incidence at another dielectric fields in reflected and transmitted waves, Oblique incidence, Parallel and perpendicular polarization, Laws of reflection and refraction, Total internal refraction, Fields in transmitted and reflected waves, Brewster angle, Plane wave in lossy media, Wave impedance and propagation constants, Application to low loss dielectric and good conductor, Depth of penetration, Surface impedance and surface resistance, Calculation of surface resistance for rectangular conductor with infinite depth.

Texts/References:

1. Sadiku, "Elements of Electromagnetics", Oxford
2. Krauss, "Electromagnetics", McGraw Hill, New York, 4th edition
3. W. H. Hayt, "Engineering Electromagnetics", McGraw Hill , New Delhi , 1999
4. Edminister, Schaum series, "Electromagnetics", McGraw Hill, New York, 1993, 2nd edition
5. Sarvate, "Electromagnetism", Wiley Eastern

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[BET3103]: Microcontrollers and its Applications

Weekly Teaching Hrs.	TH : 03	PR : 02	TUT: 00	
Examination Hrs.	TH : 03	PR : 02		
Marking Scheme	TH :50	TEST : 50	TW : 25	PR/OR : 25
Credits	TH : 06	PR : 02	TUT : 00	Total = 08

UNIT I
Microcontrollers and Embedded Processors
Microcontrollers versus general purpose microprocessors, Microcontrollers for embedded system, Choosing of microcontroller, Overview of 8051 families.

UNIT II
8051 Microcontroller Architecture
Pin configuration, Architecture, External memory, Counters and timers, Serial data input/output, Interrupts

UNIT III
8051 Assembly Language Programming
Instruction set, Addressing modes, Data processing instructions, Jump, call and loop instructions.

UNIT IV
Interfacing
Interfacing of LCD / LED, Keyboard, Stepper motor, ADC / DAC, Sensors, I^2C and RTC Serial communication with microcontroller.

UNIT V
Introduction to PIC & AVR Microcontroller
Architecture of PIC 16F877, Instruction set, Introduction to AVR microcontrollers.

UNIT VI
Advanced Microcontroller
Features of MCS-96 Family Microcontrollers, Architecture, Pin Configuration of 80c196.

Texts / References:

1. M.A. Mazidi and J.G. Mazidi, "8051 Microcontroller & Embedded System" Pearson Education Asia, 2000
2. K.J. Ayala, "The 8051 Microcontroller", Penram International Pub, 1996

3. Sencer Yeralan, Ashuutosh Ahuwalia, “Programming and Interfacing the 8051 Microcontroller”, Addison Wesely Longman Inc
4. Frank Vahid and Tony Givargis, “Embedded System Design : A Unified Hardware/Software Introduction”, John Wiley & Sons
5. Peatman, “PIC Microcontroller”, Pearson Education Asia
6. Ajay Deshmukh, “PIC microconrollers”, Pearson Education.
7. Raj Kamal, “Microcontrollers, architecture, programming, Interfacing and System Design”, Pearson Education

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[BET3104] : Digital Signal Processing

Weekly Teaching Hrs.	TH : 03	PR : 02	TUT: 01	
Examination Hrs.	TH : 03	PR : 02		
Marking Scheme	TH :50	TEST : 50	TW : 25	PR/OR : 25
Credits	TH : 06	PR : 02	TUT : 02	Total = 10

UNIT I
Discrete Time (DT) Signals and Systems
Discrete time signal sequences, Properties, Linear and Circular Convolution, Difference Equations, Correlation.

UNIT II
Linear Time Invariant (LTI) Systems in Transform Domain
Finite dimensional DT systems, Frequency response, Transfer function, Types of transfer functions, Simple FIR and IIR digital filters, All pass transfer function, Linear phase transfer function.

UNIT III
Digital Filter Structures
Digital filter structure describing equations, Structures for FIR and IIR filters, FIR Lattice Structure.

UNIT IV
Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT)
DFT : Introduction, DFT of discrete time signals, Inverse DFT, Properties, Relationship between DFT and Z transform, Applications. FFT :Introduction, FFT algorithms, Inverse FFT, Use of FFT in linear filtering and correlation, Quantization errors in FFT algorithms.

UNIT V
Digital Filter Design
IIR Filter Design: Design of IIR filters from analog filters, Approximation of derivatives, Impulse invariance, bilinear transform, Least square filter design. FIR Filter Design: Filter specifications, Coefficient calculation methods, Coefficient quantization errors.

UNIT VI
DSP Processor
Comparison of DSP Processor and Microprocessor, Desirable features, Hardware Architecture, Internal architecture and features of Advanced DSP and TMS processor family.

Texts/References:

1. Oppenheim & Schafer, "Discrete Time Signal Processing", PHI, 2003,4th edition.
2. Proakis, "Digital Signal Processing", PHI, 2005,3rd edition.
3. Sanjit Mitra, "Digital Signal Processing A Computer Based Approach", MCG,2005
4. Johnson, "Introduction to DSP", PHI, 2001,2nd edition.

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[BET3105] : Electronic Circuit Design

Weekly Teaching Hrs.	TH : 03	PR : 02	TUT: 01	
Examination Hrs.	TH : 03	PR : 02		
Marking Scheme	TH :50	TEST : 50	TW : 25	PR/OR : 25
Credits	TH : 06	PR : 02	TUT : 02	Total = 10

UNIT I

Regulated Power Supply Design

Design of Half-wave/Full-wave rectifier circuits, Capacitor, Inductor and π filter circuits, Designs of transistorized regulator, Short circuit protection, Over-voltage protection, Variable output voltage regulator.

Three terminal fixed voltage regulator, Current regulator, three terminal adjustable voltage regulator, Dual tracking regulators, Adjustable type 723 regulators, Protection circuits used in regulators, Design of switching regulators, designing with 78s40.

UNIT II

Small Signal Voltage Amplifiers: Selection of transistor type, Selection and use of important parameters, Impedance levels, Bypass and coupling capacitor selection, Dynamic load lines, Selection of operating point, transistor biasing circuit design.

UNIT III

Power Amplifier: Power considerations, Operating conditions for power amplifier, Class A power amplifier, Class B power amplifier, Push-pull amplifier, Thermal stability of power transistor.

UNIT IV

Feedback oscillators: Amplitude linearity, Frequency stability, Wein bridge oscillator, Resonant circuit oscillator, Design of astable, monostable and bistable oscillator using IC 555.

UNIT V

Design of Electronic Voltmeter: Electronic voltmeters using op-amp, AC voltmeter, Digital voltmeter, Design of 3-digit voltmeter, Design of digital voltmeter with 7107, Multirange voltmeter using 7106/7107

UNIT-VI

Printed Circuit Board Design: Layout planning, Artwork design & scale, Artwork methods, Film processing and transfer of pattern on copper clad, Etching process, PCB design rules.

Texts/References:

1. M. M. Shah, "Design of Electronics Circuits & CAD", Wiley Eastern, 1998, 2nd edition.
2. Bosshart , "Printed Circuit Boards", Tata McGraw-Hill, 1998, 2nd edition.
3. B. S. Sonde, "Introduction to system Design using Integrated Circuits", Wiley, New Delhi, 1995, 2nd edition
4. R. Gayakwad, "Op-Amp and Linear IC's", PHI, Delhi, 2001, 4th edition

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SEMESTER VI

[BET3201] : Advanced Microprocessor and Interfacing

Weekly Teaching Hrs.	TH : 03	PR : 02	TUT: 00	
Examination Hrs.	TH : 03	PR : 02		
Marking Scheme	TH :50	TEST : 50	TW : 25	PR/OR : 25
Credits	TH : 06	PR : 02	TUT : 00	Total = 08

UNIT I
Intel 8086 Microprocessor
Introduction to 8086/8088 microprocessor, Architecture, Pin diagram, Addressing modes, Instruction format, Instruction set, Programming examples.

UNIT II
Interrupts
Interrupt vector table, Hardware interrupts, Expanded interrupt structure and programmable interrupt controller 8259.

UNIT III
I/O Interfaces to 8086
Programmed data transfer, DMA mode of data transfer, Device polling and interrupt driven mode of data transfer, Serial mode of data transfer, Study of DMA controller chip 8257/8237, Serial communication interface: 8251 PCI, Parallel Interface: 8255A PPI.

UNIT IV
Multi-processor Configuration
8086/8088 minimum and maximum mode of operation, Comparison of 8086 and 8088, Study of 8087 numeric data processor, Study of 8089 I/O processor, 8288 bus controller.

UNIT V
Memory and ADC/DAC Interfacing
Memory Interfacing to 8086, 8 bits and 12bits ADC/DAC interfacing with 8086.

UNIT VI
Overview of 80x86 family
Introduction to 80186 and 80286, Introduction to 80386 its architecture, Memory management, Paging mechanism, Introduction to Pentium microprocessor, Introduction to MMX technology.

Texts/References:

1. Liu, Gibson, “Microcomputer System: The 8086/88 Family Architecture, Program
2. Design”,PHI , New Delhi , 1996 , 2nd edition
3. Douglas Hall, “Microprocessor Interfacing: Programming and Hardware”, TMH ,
4. Illinois , 1991 , 2nd edition
5. Walter Triebel, Avtar Singh, “The 8088 & 8086 microprocessors”, PHI, 4th edition
6. Barry B. Brey, “The Intel Microprocessor”, Pearson education, 6th edition

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[BET3202] : Power Electronics

Weekly Teaching Hrs.	TH : 03	PR : 02	TUT: 00	
Examination Hrs.	TH : 03	PR : 02		
Marking Scheme	TH :50	TEST : 50	TW : 25	PR/OR : 25
Credits	TH : 06	PR : 02	TUT : 00	Total = 8

UNIT I

Thyristors and Its Applications (5 hours)

Construction and V-I characteristics of SCR, Diac, Triac, UJT, Introduction to IGBT and power MOSFETs, SCR ratings, Different triggering method of SCR, Commutation techniques for SCR, Series and parallel connections of SCR, General applications of thyristor such as switched mode power supply, UPS, Static switches, Static circuit breakers, Solid state relays, Zero voltage switch, Time delay circuit, Digital circuit applications.

UNIT II

Phase Controlled Rectifiers

Single-phase half controlled and full controlled rectifiers for R, R-L load, Introduction to three-phase rectifiers, Effect of free-wheeling diode, Performance factors, Effect of source impedance, Introduction to single-phase and three-phase AC voltage regulators, Single-phase and three-phase cyclo-converters, Dual converters.

UNIT III

Protection Techniques

Over voltage and over current protection, Gate protection, Heating, cooling and mounting of thyristors, SCR reliability.

UNIT IV

Choppers

Introduction to step-up and step-down chopper, Types of choppers: Single quadrant, two quadrants, and four quadrants. Jone's chopper and Morgan's chopper, Multiphase choppers, Introduction to AC choppers.

UNIT V

Inverters

Series and parallel inverters, Voltage source inverters, Current source inverters, Bridge inverters.

UNIT VI

AC and DC Drive Controls using Thyristors

Speed control of DC and AC motors using SCRs, Temperature control, Stepper motor control.

Texts/References:

1. Singh, Khanchandani, "Power Electronics", TMH, New Delhi, 2000, 5th edition.
2. M. H. Rashid, "Power Electronics: Circuits, Devices and Applications", Pearson Education, New Delhi, 2004, 3rd edition.
3. P. C. Sen, "Power Electronics", TMH, New Delhi, 1992, 2nd edition.

4. V. R. Moorthi, “Power Electronics: Devices, Circuits and Industrial Applications”, Oxford University Press, New Delhi, 2005, 1st edition.

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[BET3203] : Antenna and Wave Propagation

Weekly Teaching Hrs.	TH : 03	PR : 02	TUT: 00	
Examination Hrs.	TH : 03	PR : 02		
Marking Scheme	TH :50	TEST : 50	TW : 25	PR/OR : 25
Credits	TH : 06	PR : 02	TUT : 00	Total = 08

UNIT I
Wave Propagation
Introduction, Radio wave propagation, Ground or surface wave, Space wave, Sky wave effect of earth curvature on space wave, Multipath reception in space waves, Super refraction, Tropospheric scatter, Absorption

UNIT II
Ionosphere
Introduction, Critical frequencies, Virtual heights, Ionospheric changes, Skip distance, Fading, Atmospherics precipitation statistics

UNIT III
Antenna fundamentals
Basic definition, Fundamentals, Radiation pattern of a dipole, Induction and radiation field, Power radiated by short dipole radiation from grounded antennas, Effective height of an antenna, Radiation pattern of different antennas, Efficiency of earth system

UNIT IV
Wire Antenna and Array
Dipole, Antenna arrays, Directivity gain, Directivity, Beam width, Two element array, Multiple element arrays, Pattern multiplication

UNIT V
Practical Antenna
Long wire antenna, VEE antenna, Rhombic antenna, Yagi antenna, Folded dipole antenna, Log periodic antenna, Loop antenna

UNIT VI
Microstrip Antenna
Analysis, Multiple feeds for circular polarization and microstrip arrays

Texts/References:

1. Roddy Cooln, “Electronics Communication”, PHI, 2000, 3rd edition.
2. Kennedy, “Electronics Communication System”, McGraw Hill, 1995, 2nd edition.
3. K. D. Prasad, “ Antenna and Wave Propagation”, 1995, 2nd edition.
4. John D. Kraus, “Antenna”, Tata McGraw Hill,1998,2nd edition.
5. Balanis, “Antenna theory, Antenna Engineering Handbook”, McGraw Hill
6. Johnson, “Antenna Engineering Handbook”

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[BET3204] : Digital Communication

Weekly Teaching Hrs.	TH : 03	PR : 02	TUT: 01	
Examination Hrs.	TH : 03	PR : 02		
Marking Scheme	TH :50	TEST : 50	TW : 25	PR/OR : 25
Credits	TH : 06	PR : 02	TUT : 02	Total : 10

UNIT I

Probability and Random Signal Theory

Probability, Conditional probability and statistical independence, Bay's theorem, Random variables, Joint distributions, Cumulative distribution function, Probability density function, Characteristics of random variable, Random processes.

UNIT II

Sampling and Pulse Modulation

Sampling theorem, Ideal sampling and reconstruction, Aliasing error, Practical sampling, TDM with PAM signals, Crosstalk and guard time in TDM systems, comparisons of PAM, PWM and PPM, PCM generation & reconstruction, Quantisation and companding, Principles of operation and block diagram for generation of DPCM, DM, ADM.

UNIT III

Digital CW Modulation

Principles of modulation, Block schematic and comparative study of ASK, FSK and PSK systems, Introduction to quadrature carrier systems and M-array system, Introduction to matched filtering, Decision threshold.

UNIT IV

Digital Multiplexing

Multiplexing hierarchies, Inverse multiplexing, Line coding formats, Transmission limitations because of losses, Bandwidth and noise, ISI, Eye diagram and principles of equalisation, Frame patterns, Bit synchronisation and frame synchronisation, Carrier recovery.

UNIT V

Information Theory

Introduction, source entropy, Information rate, Joint entropy and conditional entropy, Mutual information, Channel capacity, Shannon theorem of channel capacity, Shannon-Fano algorithm, Huffman coding.

UNIT VI

Coding

Parity coding, Block codes such as Hamming, cyclic and convolutional codes.

Texts/References:

1. Taub & Schilling, "Analog And Digital Communication",Mc Graw- Hill , New Delhi, 1991, 2nd edition
2. B.P. Lathi, "Analog And Digital Communication", TMH , New Delhi,1997,2nd edition.
3. S.D. Sapre, R.P.Singh, "Communication Systems- Analog and Digital", TMH , New Delhi,1995,2nd edition.
4. Hsu, Shaum Series, "Analog and Digital Communication", Mc Graw Hill

[BET3205] : Digital System Design

Weekly Teaching Hrs.	TH : 03	PR : 02	TUT: 01	
Examination Hrs.	TH : 03	PR : 02		
Marking Scheme	TH :50	TEST : 50	TW : 25	PR/OR : 25
Credits	TH : 06	PR : 02	TUT : 02	Total = 10

UNIT I

Combinational Logic Design

Combinational logic design using MSI, LSI-design using multiplexers, De-multiplexers, XOR, XNOR, PROM, PAL, GAL, PAL.

UNIT II

Sequential Logic Design

Review of synchronous circuits, State machines, Moore and Mealy machines, Synthesis of synchronous sequential circuits, Analysis of state machine using D and JK FF, State reduction, counter design, ASM charts. Asynchronous State Machines. Implementing combination and sequential logic design using PLA's

UNIT III

Basic Principles of Digital System Design

Clock noise assumptions, Solution to reflection problems, Ground and power circuits, Noise and cross-talk in logic circuits, Races, Hazards, Loading effect, Metastability, Synchronizer, Fault isolation, Hardware organization, Built in self-test, testability and Diagnostic routines, Estimating digital system design reliability- Failure rates, MTBF, Simulations of digital system, Use of logic analyzer.

UNIT IV

An overview of design automation approach to digital design, of hardware description languages, Structure of VHDL, Timing and concurrency issues, Structural specification of hardware, Wiring and component interconnections, Definition and usage of packages and components, Test bench, Use of design library management, Introduction to library std_ logic_ 1164 and multi-valued logic, Behavioural descriptions of hardware syntax and semantics for various forms and constructs.

Architecture of FPGA and CPLD with: Xilinx 9500 series CPLDs and 5200 or 4000 series FPGAs.

UNIT V

Simulation and Synthesis Issues

Design entry, Placement and routing, Introduction to various industry standard tools used for simulation and synthesis.

UNIT VI

CMOS VLSI Design

Digital MOS ICs, D.C. Analysis of CMOS inverter, Layout design rules, Concept of minimum logic levels, Delay calculations.

Texts/References:

1. Wakerly, "Digital Design", Pearson Education,2002.
2. Richard Sandige, "Modern Digital Design", McGH, 1990, international edition.
3. Douglas Perry, "VHDL Programming by examples- 3rd edition", TMH.

4. Z Navabi, "Analysis and Modeling of Digital Systems", TMH 2nd edition.
5. Joseph Pick, "VHDL Techniques, Experiments and Caveats", TMH.

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BET 3211: SEMINAR

Weekly Teaching Hours	TH : 00	PR : 04	TUT: 00	
Marking Scheme	TH :00	TEST : 00	TW : 50	PR/OR : 50
Credits	TH : 00	PR : 04	TUT : 00	Total = 04

Following activities are expected during SEMINAR

1. Selection of broad area of the Seminar
2. The students must carry out the literature survey for the seminar.
3. Finalization of seminar topic.
4. Periodic presentations based on the work done during the semester.

It is broadly expected that the students must select an advance topic/area from their curriculum.
Student must report the Guide at least once in a week on a specified day and report the progress of his/her work to the Seminar Guide

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