GOVERNMENT COLLEGE OF TECHNOLOGY, COIMBATORE – 641 013

OFFICE OF THE CONTROLLER OF EXAMINATIONS

BRANCH : B.E. ELECTRONICS AND COMMUNICATION ENGINEERING

FOURTH SEMESTER

Sl. No.	Course Code	Course Title	Category	Continuous Assessment Marks	End Sem Marks	Total Marks	Credits			
							L	T	P	C
		THEORY								
1.	16LBS401	Random Process and Queuing Theory	BS	50	50	100	3	2	0	4
2.	16LES402	Electrical Engineering and Control Systems	ES	50	50	100	3	0	0	3
3.	16LPC403	Communication Theory	PC	50	50	100	3	0	0	3
4.	16LPC404	Networks and Transmission lines	PC	50	50	100	2	2	0	3
5.	16LPC405	Analog Integrated Circuits	PC	50	50	100	3	0	0	3
6.	16LPC406	Digital Signal Processing	PC	50	50	100	2	2	0	3
		PRACTICAL								
7.	16LPC407	Integrated Circuits Laboratory	PC	50	50	100	0	0	4	2
8.	16LPC408	Digital Signal Processing Laboratory	PC	50	50	100	0	0	4	2
		TOTAL		**400**	**400**	**800**	**16**	**6**	**8**	**23**

10.11.2017

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16LBS401 - RANDOM PROCESS AND QUEUING THEORY **CATEGORY: BS**

L	T	P	C
3	2	0	4

PREREQUISITES: NIL

COURSE OBJECTIVES:

*To gain the knowledge of finding moment generating functions of discrete and continuous random variables

*To familiarize with first and second order stationary, ergodic, Markov processes.

*To obtain the knowledge of auto correlation, cross correlation, power spectral density and cross spectral density.

*To acquire knowledge of Autocorrelation and cross correlation functions of input and output and to understand queuing models.

UNIT I: **RANDOM VARIABLES**	9+6 Hours
Discrete and continuous random variables-Moments-Moment generating functions and their properties. Distributions: Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and Normal distributions-Functions of Random variables.	
UNIT II: **CLASSIFICATION OF RANDOM PROCESSES**	9+6 Hours
Definition and examples-first order, second order, strictly stationary, wide sense stationary and ergodic process-Markov process - Binomial, Poisson and Normal processes-Sine wave process-Random telegraph process.	
UNIT III: **CORRELATION AND SPECTRAL DENSITIES**	9+6 Hours
Auto correlation-cross correlation-properties-power spectral density-cross spectral density-properties-Weiner Khintchine relation-Relation between cross power spectrum and cross correlation function.	
UNIT IV: **LINEAR SYSTEM WITH RANDOM INPUTS**	9+6 Hours
Linear time invariant system –system transfer function-Linear systems with random inputs-Auto correlation and cross correlation functions of input and output-White noise	
UNIT V: **QUEUEING THEORY**	9+6 Hours
Markovian models-Birth and Death Queuing models-Steady state results-Single and multiple server queuing models-Little's formula-M/G/1 queue	
TOTAL NUMBER OF HOURS	**75 Hours**

CONDUCT PERIODS:

Lecture:45 hours Tutorial:30 hours Practical:0 hours Total:75 hours

Text Books:

1.VeerajanT, "Probability, and Random Processes(with queuing Theory and Queuing Networks()",McGraw Hill Education(India)Pvt Ltd., New Delhi, Fourth Edition 2016.

Reference Books:

1. Trivedi, K.S, "Probability,Statistics with Reliability and Queuing and computer Science Applications", Prentice Hall of India Ltd,New Delhi,2014

2.Kandasamy P, Thilagavathy K and Gunavathy K, "Probability, Statistics and Random Processes",S.Chand and Co,Ramnagar,NewDelhi,Reprint 2013

3.GrossD,and Harris C.M., and Carl M.Harris, "Fundamentals of Queuing theory",John Wile and Sons, New York, 1988.

4.Allen A.O.,Probability, Statistics and Queuing theory with ComputerApplication, Elsevier,Second Edition,2005

5.Taha H.A.,Operation Research: An Introduction, Prentice Hall of India Pvt Ltd, New Delhi,2007

COURSE OUTCOMES:

Upon completion of the course, the students will have:

CO1: Understand moments and moment generating functions for their mean and variance.
CO2: Acquire fluency in stationary, ergodic processes.
CO3: Understand Markov processes and spectral densities.
CO4: Understand system transfer function and linear systems with random inputs.
CO5: Understand probable values of queues with single and multi-server models.

COURSE ARTICULATION MATRIX:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2											3	2	
CO2	2	2				1							3	2	
CO3	2	2					1				1	1	3	2	
CO4	2	2					1					1	3	2	
CO5	2	2	2		1		1				1	1	3	2	

16LES402 - ELECTRICAL ENGINEERING AND CONTROL SYSTEMS **CATEGORY: ES**

L	T	P	C
3	0	0	3

PREREQUISITES: 16LPC306 SIGNALS AND SYSTEMS

COURSE OBJECTIVES:

*To get a basic knowledge on motors and machines
*To learn about fundamental concepts of Control system modeling
*To learn the concepts of time response and frequency response analysis, stability analysis and State variable analysis of control systems

UNIT I: **DC AND AC MACHINES**	9 Hours
DC Generator- Construction- Working principle- Armature reaction- Commutation- DC motors-Back emf- Performance characteristics- Alternators- Construction- Principle of operation- emf equation- phasor diagram- Synchronous motor- Applications	
UNIT II: **INDUCTION AND SPECIAL MACHINES**	9 Hours
Three phase- Construction- Working principle- Speed-torque curve- Starting speed control- Single phase- Principle of operation- types- Applications. Stepper motor- DC and AC servomotors- AC series motor- Universal motor- Printed circuit(Disc) DC motor- Reluctance motor- Hysteresis motor- Linear induction motor.	
UNIT III: **CONTROLSYSTEMMODELING**	9 Hours
Basic Elements of Control System - Open loop and Closed loop systems - Differential equation - Transfer function, Modeling of Electric systems, Translational and rotational mechanical systems - Block diagram reduction Techniques - Signal flow graph-	
UNIT IV: **TIME RESPONSE AND FREQUENCY RESPONSE ANALYSIS**	9 Hours
Time response analysis - First Order Systems - Impulse and Step Response analysis of second order systems - Steady state errors- Frequency Response - Bode Plot, Polar Plot, Nyquist Plot - Frequency Domain specifications from the plots.	
UNIT V: **STABILITY AND STATE VARIABLE ANALYSIS**	9 Hours
Stability - Routh-Hurwitz Criterion, Root Locus Technique- Construction of Root Locus-Dominant Poles- State space representation of Continuous Time systems - State equations - Transfer function from State Variable Representation - Solutions of the state equations - Concepts of Controllability and Observability	
TOTAL NUMBER OF HOURS	**45 Hours**

CONDUCT PERIODS:
Lecture:45 hours Tutorial:0 hours Practical:0 hours Total:45 hours

Text Books:

1.B.L.Theraja,"ATextBookofElectricalTechnology",VolumeII,(AC&DCMachines),S.Chand&Company Ltd,NewDelhi,2004.

2.J.Nagrath and M.Gopal, "Control System Engineering", New Age International Publishers, 5thEdition, 2007.

Reference Books:

1.I.J.Nagrath,D.P.Kothari, "ElectricMachines",TMH.2003.

2.B.R.Sharma, "Electrical Machines", SatyaPrakashanPublication.2000

3.Benjamin.C.Kuo, "Automatic Control Systems", Prentice Hall of India, 7th Edition,1995.

4.M.Gopal, "Control System – Principles and Design", Tata McGraw Hill, 2nd Edition,2002.

5.Schaum'sOutline Series, "Feedbackand Control Systems", Tata McGraw-Hill,2007.

COURSE OUTCOMES

Upon completion of this course the student will have
CO1: A basic knowledge on motors
CO2: A basic knowledge on special machines
CO3: Exposure to various types of motors, its applications and operation.
CO4: An in-depth learning of fundamental concepts of Control system modeling
CO 5: An in-depth knowledge of concepts of time response and frequency response analysis
CO6: An in-depth knowledge of stability analysis and State variable analysis of control systems

COURSE ARTICULATION MATRIX:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2										3	1	3
CO2	3	2	2										3	1	3
CO3	3	2	2										3	1	3
CO4	3	2	2										3	1	3
CO5	3	2	2										3	1	3
CO6	3	2	2										3	1	3

16LPC403 - COMMUNICATION THEORY **CATEGORY: PC**

L	T	P	C
3	0	0	3

PREREQUISITES : NIL

COURSE OBJECTIVES:

* To introduce the concepts of various analog modulations and their spectral characteristics.
*To understand the properties of random process.
*To know the effect of noise on communication systems

UNIT I: **AMPLITUDE MODULATION**	9 Hours
Introduction – communication system model – Need for modulation - Amplitude Modulation -DSB-FC - Bandwidth Requirements- Power relations - Suppressed carrier systems – DSB-SC, SSB-SC - Time and Frequency domain description of AM techniques - Generation and detection of DSB-FC waves – Square-Law Modulator, Square Law Detector, Envelope Detector - Generation and detection of DSB-SC waves - Balanced Modulator, Ring Modulator, Coherent detection –Costas Loop - Generation and detection of SSB-SC waves - Phase discrimination method, Coherent detection – Vestigial Sideband Modulation - Comparison of AM systems.	
UNIT II: **ANGLE MODULATION**	9 Hours
Phase and frequency modulation-Narrow Band and Wide band FM - Spectrum - FM modulation and demodulation – FM Discriminator- PLL as FM Demodulator - Transmission bandwidth.	
UNIT III: **RANDOM PROCESS**	9 Hours
Random variables, Central limit Theorem, Random Process, Stationary Processes, Mean, and Correlation& Covariance functions, Power Spectral Density, Ergodic Processes, Gaussian Process, and Transmission of a Random Process Through a LTI filter.	
UNIT IV: **TRANSMISSION AND RECEPTION**	9 Hours
Classification of transmitters - Block diagram of AM broadcasting transmitters- Low Level and High Level transmitters - Pilot carrier technique - FM transmitters- Armstrong FM systems. Receivers: Classifications of receivers - Block diagram – Receiver characteristics - Tuned radio frequency receiver - Super heterodyne receiver - Merits and demerits of different receivers. Block diagram of FM receiver -Automatic frequency control - Limiters - Diversity reception techniques - TDM and FDM.	
UNIT V: **NOISE CHARACTERIZATION**	9 Hours
Noise sources and types – Noise figure and noise temperature – Noise in cascaded systems. Narrow band noise – PSD of in-phase and quadrature noise –Noise performance in AM systems – Noise performance in FM systems – Pre-emphasis and de-emphasis – Capture effect, threshold effect.	
TOTAL NUMBER OF HOURS	**45 Hours**

CONDUCT PERIODS:

Lecture:45 hours Tutorial:0 hours Practical:0 hours Total:45 hours

Text books:

1.SimonHaykin, "Communication Systems", Wiley Publication, New Delhi, 2011.

2.Kennedy G, "Electronic Communication systems", Tata McGraw Hill, New Delhi, 2009.

Reference books:

1.J.G.Proakis, M.Salehi, "Fundamentals of Communication Systems", Pearson Education 2006.

2.B.P.Lathi, "Modern Digital and Analog Communication Systems", 3rd Edition, Oxford University Press, 2007.

3.Wayne Tomasi, "Electronics Communications Systems Fundamentals Through Advanced", 4th Edition, Pearson Education 2002.

4.Couch.L.,"Modern Communication Systems", Pearson, 2001.

COURSE OUTCOMES:

Upon completion of this course the student will:

CO 1: Gain knowledge on amplitude modulation.
CO 2: Acquire knowledge on angle modulation schemes.
CO 3: Apply the concepts of random process to the design of communication systems.
CO 4: Acquire knowledge on transmission and reception.
CO 5: Gain knowledge on noise sources and types.
CO 6: Analyze the noise performance of AM and FM systems.

COURSE ARTICULATION MATRIX:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	-	-	-	-	-	-	-	-	1	2	1	-
CO2	2	2	2	-	-	-	-	-	-	-	-	1	2	1	-
CO3	2	2	2	-	-	-	-	-	-	-	-	1	1	1	-
CO4	2	2	2	-	-	-	-	-	-	-	-	1	2	1	-
CO5	2	2	2	-	-	-	-	-	-	-	-	1	1	1	-
CO6	2	2	2	-	-	-	-	-	-	-	-	1	2	2	-

16LPC404 - NETWORKS AND TRANSMISSION LINES **CATEGORY: PC**

L	T	P	C
2	2	0	3

PREREQUISITES: 16LES302 CIRCUIT THEORY

COURSE OBJECTIVES:

*To understand the basic concepts of two port networks
*To study about network synthesis
*To familiarize the concepts of transmission lines

UNIT I: **SYMMETRICAL AND ASYMMETRICAL TWO PORT NETWORKS**	6+6 Hours
Symmetrical networks-Properties of L,T and Pi section types-T and pi equivalent of two port network–characteristic impedance and propagation constant-Asymmetrical networks-Image and Iterative impedances-Image transfer constant and iterative transfer constant	
UNIT II: **PASSIVE NETWORKS**	6+6 Hours
Constant K filters – m derived filters – Composite filters – Design procedures - Series and shunt equalizer - Symmetrical and asymmetrical attenuators - T and pi sections.	
UNIT III: **PASSIVE NETWORK SYNTHESIS**	6+6 Hours
Hurwitz polynomials–positive real functions-Driving point function synthesis–LC immitance functions-RC impedance/admittance functions-RL admittance/impedance functions-Foster and Cauerforms of RC,RL and LC networks	
UNIT IV: **TRANSMISSION LINE THEORY**	6+6 Hours
Line parameters and transmission constants-Transmission line equation-Physical significance of the equation-Infinite line-Input and transfer impedance-Waveform distortion-Distortion less line-Loading-Reflection phenomena-Reflection loss and insertion loss-Skin and proximity effect-T and pi equivalent of transmission lines.	
UNIT V: **LINE AT RADIO FREQUENCIES**	6+6 Hours
Parameters of open wire line and co-axial line at high frequencies – Standing waves-Standing wave ratio-Input impedance of open and short circuited lines-Relation between VSWR and reflection co-efficient-Quarter wave transformer-Single and double stub matching-Smith chart and its applications.	
TOTAL NUMBER OF HOURS	**60 Hours**

CONDUCT PERIODS:

Lecture:30 hours Tutorial:30 hours Practical:0 hours Total:60 hours

Text books:

1.John D. Ryder, "Networks, Lines and Fields", PHI, 2nd edition, 2009.

2.Sudhahar.A, ShyammohanS.P, "Circuits and Networks: Analysis and Synthesis", Tata McGraw Hill, New Delhi, FourthEdition,2010.

Reference books:

1.S.P. Ghosh and A.K. Chakraborty, "Network Analysis and Synthesis", McGraw Hill, 1st edition 2010

2.Roy, Choudhury D., "Networks and Systems," New Age International Publishers, 2nd edition reprint,2014

3.M.E. VanValkenburg,"Network Analysis, INDIA PEARSON,"3rd edition, 2015

COURSE OUTCOMES:

Upon completion of the course, the students will have:

CO1:Exposure to two port networks
CO2: Ability to design and analyze different passive network configurations
CO3 : Understanding on the concepts of network synthesis
CO4: Familiarization with transmission line phenomena
CO5:Ability to identify different types of transmission lines
CO6: Knowledge on impedance matching techniques in transmission lines

COURSE ARTICULATION MATRIX:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2										3	1	
CO2	3	2	2										3	1	
CO3	3	2	2										3	1	
CO4	3	2	2										3	1	
CO5	3	2	2										3	1	
CO6	3	2	2										3	1	

16LPC405 - ANALOG INTEGRATED CIRCUITS **CATEGORY: PC**

L	T	P	C
3	0	0	3

PREREQUISITES: 16LPC305 Electronic Circuit Design

COURSE OBJECTIVES:

* To introduce the basic building blocks of analog integrated circuits.
*To design the linear and non-linear circuits using operational amplifiers
*To acquire knowledge on analog multipliers and PLL, ADC, DAC and special function ICs.

UNIT I: **BASICS OF OPERATIONAL AMPLIFIERS**	9 Hours
Current mirror and current sources, Current sources as active loads, Voltage References, BJT Differential amplifier with active loads, Ideal Operational Amplifier - General operational amplifier stages and internal circuit diagrams of IC 741, DC and AC performance characteristics, slew rate, Open and closed loop configurations.	
UNIT II: **APPLICATIONS OF OPERATIONAL AMPLIFIERS**	9 Hours
Sign Changer, Scale Changer, Phase Shift Circuits, Voltage Follower, V-to-I and I-to-V converters, adder, subtractor, Instrumentation amplifier, Integrator, Differentiator, Logarithmic amplifier, Antilogarithmic amplifier, Comparators, Schmitt trigger, Precision rectifier, peak detector, clipper and clamper, Low-pass, high-pass and band-pass Butterworth filters.	
UNIT III: **ANALOG MULTIPLIER AND PLL**	9 Hours
Analog Multiplier using Emitter Coupled Transistor Pair - Gilbert Multiplier cell – Variable transconductance technique, analog multiplier ICs and their applications, Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator, Monolithic PLL IC 565, application of PLL for AM detection, FM detection, FSK modulation and demodulation and Frequency synthesizing.	
UNIT IV: **ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS**	9 Hours
Analog and Digital Data Conversions, D/A converter – specifications - weighted resistor type, R-2R Ladder type, Voltage Mode and Current-Mode R 2R Ladder types - switches for D/A converters, high speed sample-and-hold circuits, A/D Converters – specifications - Flash type - Successive Approximation type - Single Slope type – Dual Slope type A/D converters.	
UNIT V: **WAVEFORM GENERATORS AND SPECIAL FUNCTION ICS**	9 Hours
Sine-wave generators, Multivibrators and Triangular wave generator, Saw-tooth wave generator, Timer IC 555, IC Voltage regulators – Three terminal fixed and adjustable voltage regulators - IC 723 general purpose regulator - Frequency to Voltage and Voltage to Frequency converters, Audio Power amplifier,ICL8038 function generator.	
TOTAL NUMBER OF HOURS	**45Hours**

CONDUCT PERIODS:

Lecture:45 hours Tutorial:0 hours Practical:0 hours Total:45 hours

Text Books:

1.D.RoyChoudhry, Shail Jain, "Linear Integrated Circuits", New Age International Pvt. Ltd., 2000.

2.Ramakant A. Gayakwad, "OP-AMP and Linear ICs", 4th Edition, Prentice Hall / Pearson Education, 2001.

Reference Books:

1.Sergio Franco, "Design with Operational Amplifiers and Analog Integrated Circuits", 3rd Edition, Tata McGraw-Hill, 2007.

2.Gray and Meyer, "Analysis and Design of Analog Integrated Circuits", Wiley International, 2005.

3.Michael Jacob, "Applications and Design with Analog Integrated Circuits", Prentice Hall of India, 1996.

4.William D.Stanley, "Operational Amplifiers with Linear Integrated Circuits", Pearson Education, 2004.

COURSE OUTCOMES:

Upon completion of this course the student will be able to:

CO 1: Acquire Knowledge on Basic building blocks of linear integrated circuits
CO 2: Design linear and non-linear applications using op-amp.
CO 3: Acquire knowledge on analog multiplier and PLL.
CO 4:Design ADC and DAC using op – amps.
CO 5: Generate waveforms using op – amp circuits and analyze special function ICs
CO 6: Design real time applications using analog ICs.

COURSE ARTICULATION MATRIX:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	-	-	-	-	-	-	1	3	2	-
CO2	3	3	3	-	-	-	-	-	-	-	-	2	3	2	-
CO3	3	2	2	-	-	-	-	-	-	-	-	1	2	2	-
CO4	3	2	2	-	-	-	-	-	-	-	-	1	2	2	-
CO5	3	2	2	-	-	-	-	-	-	-	-	1	3	2	-
CO6	3	2	2	-	-	-	-	-	-	-	-	1	3	3	-

16LPC406 - DIGITAL SIGNAL PROCESSING **CATEGORY: PC**

L	T	P	C
2	2	0	3

PREREQUISITES: 16LPC306 SIGNALS AND SYSTEMS

COURSE OBJECTIVES:

*To discuss finite word length effects and multi rate signal processing
*To study the fundamentals of Digital signal processors

UNIT I: **DISCRETE FOURIER TRANSFORM**	6+6 Hours
DFTanditsproperties– FFTalgorithms–IFFT-circular convolution– Overlap – add – overlap –savemethods.	
UNIT II: **INFINITE IMPULSE RESPONSE DIGITAL FILTERS**	6+6 Hours
Design of analog Butterworth and Chebyshev Filters – Frequency transformation in analog domain Design of IIR digital filters - Impulse invariance techniques, Bilinear transformation – Realization of IIR filters - Direct, cascade and parallel forms.	
UNIT III: **FINITE IMPULSE RESPONSE DIGITAL FILTERS**	6+6 Hours
Symmetric and Anti-symmetric FIR filters – Linear phase FIR filters – FIR Design using window method– rectangular, Hamming and hanning windows – Frequency sampling method – Realization of FIR filters – Linear phase, Traversal structures-comparison of FIR and IIR filters..	
UNIT IV: **FINITE WORD LENGTH EFFECTS AND MULTI-RATE SIGNAL PROCESSING**	6+6 Hours
Fixed point and floating point number representations – Comparison – Quantization Error - Quantization Noise Power -Finite word length effects -Signal scaling - Introduction to Multi-rate signal processing-Decimation – Interpolation –multistage implementation- Applications	
UNIT V: **TMS320C67X PROCESSOR**	6+6 Hours
Harvard and modified Harvard architectures - architecture of TMS320C6X processors – Features of C67X processor – Internal architecture – CPU – General Purpose register files – Functional Units and operation – data paths – Control registers - Functional Units and instructions – Parallel and pipeline operations – Interrupts - Introduction to CCS.	
TOTAL NUMBER OF HOURS	**60 Hours**

CONDUCT PERIODS:
Lecture:30 hours Tutorial:30 hours Practical:0 hours Total:60 hours

Text Books:

*1. John G Proakis and Manolakis, "**Digital Signal Processing Principles, Algorithms and Applications**", Pearson, Fourth Edition, 2007.*

2. B. Venkataramani, M. Bhaskar, "Digital Signal Processor Architecture, Programming and Applications", Second Edition, 2011.

Reference Books:

1. Johny R. Johnson, "Introduction to Digital Signal Processing", PHI, 2008

2. E.C. Ifeachor and B.W. Jervis, "Digital signal processing – A Practical approach", Prentice Hall, 2011

3. S.K. Mitra, "Digital Signal Processing, A Computer Based approach", Tata McGrawHill, 2011 fourth international edition

COURSE OUTCOMES:

Upon completion of the course, the students will have:

CO1 : Exposure to DFT & FFT algorithms
CO2: Ability to design and realize digital IIR filters
CO3: Ability to design and realize digital FIR filters
CO4: Understanding on the finite word length effects
CO5:Exposure to Multirate signal processing and its applications
CO6: Familiarization with DSP architectural features

COURSE ARTICULATION MATRIX:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2		1								3	1	
CO2	3	3	2		1								3	1	
CO3	3	3	2		1								3	1	
CO4	3	3	2		1								3	1	
CO5	3	3	2		1								3	1	
CO6	3	3	2		1								3	1	

16LPC407 - INTEGRATED CIRCUITS LABORATORY **CATEGORY: PC**

L	T	P	C
0	0	4	2

REREQUISTES: 16LES304 DIGITAL SYSTEM DESIGN

COURSE OBJECTIVES:

*To Design, Construct and Demonstrate linear IC's applications

*To Design, Construct and Demonstrate digital IC's applications

PRACTICALS	**LIST OF EXPERIMENTS** 1. Study of simple applications of op-amps(Slew rate verifications, inverting and non-inverting amplifier, Adder, Integrator and Differentiator) 2. Design and testing of comparators(magnitude comparator, zero crossing detector, peak detector) 3. Design of Schmitt trigger circuit 4. Design of Astable and Monostablemultivibrator circuits using 555 timer IC 5. Design of active LPF and HPF. 6. Design and implementation of adders and subtractors 7. Design and implementation of different types of code converters 8. Design and implementation of Multiplexer and Demultiplexer using logic gates and study of IC74150 and IC74154. 9. Design and implementation of counters 10. Design and implementation of shift registers **TOTAL:60 PERIODS**

CONDUCT PERIODS:

Lecture:0 hours Tutorial:0 hours Practical:60 hours Total:60 hours

Reference books:

1. D.Roy Choudhury and Shail Jain, "Linear Integrated Circuits" Tun bridge Wells, Kent : New Age Science Limited Fourth edition 2011

2. Morris Mano, "Digital Design", 4th Edition, Pearson Education, 2011

3. A.Anand Kumar, "Fundamentals of Digital Circuits", 2nd Edition, PHI Learning Pvt. Ltd, NewDelhi,2011.

COURSE OUTCOMES:

Upon completion of the course, the students will have:

CO1 : Ability to analyze various applications of Op-Amp

CO2 : Ability to design and analyze various pulse circuits using linear IC

CO3: Familiarization with active filters realization using linear IC

CO4:Ability to construct and test arithmetic circuits

CO5: Familiarization with combinational logic circuits design and realization

CO6: Familiarization with sequential logic circuits design and realization

COURSE ARTICULATION MATRIX:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3		2				2	1			3	3	
CO2	3		3		2				2	1			3	3	
CO3	3		3		2				2	1			3	3	
CO4	3		3		2				2	1			3	3	
CO5	3		3		2				2	1			3	3	
CO6	3		3		2				2	1			3	3	

16LPC408 - DIGITAL SIGNAL PROCESSING LABORATORY **CATEGORY: PC**

L	T	P	C
0	0	4	2

PREREQUISITES: 16LPC306-SIGNALS AND SYSTEMS

COURSE OBJECTIVES:

*To Develop DSP algorithms for signal processing and test them using MATLAB
*To familiarize with the usage of DSP processors
*To test the DSP algorithms using CCS

PRACTICALS	LIST OF EXPERIMENTS USING MATLAB 1. Linear and circular convolution of two sequences 2. Computation of DFT/DTFT 3. Spectral Analysis- magnitude and phase spectrum of signal using DFT 4. Computation of FFT of a signal 5. Design of FIR filters 6. Design of IIR filters – Butterworth, Tchebyshev using – Impulse invariance and Bilinear Transform USING TMS320C 54XX/67XX (using Code Composer Studio) 1. Study of various addressing modes of DSP using simple programming examples 2. Implementation of correlation and convolution 3. Sampling of input signal and display 4. Computation of FFT 5. Implementation of I/II order FIR filter 6. Implementation of I/II order IIR filter **TOTAL:60 PERIODS**

CONDUCT PERIODS:
Lecture:0hours Tutorial:0 hours Practical:60 hours Total:60 hours

Reference books:

1.John G Proakis and Manolakis, "Digital Signal Processing Principles, Algorithms and Applications", Pearson, Fourth Edition, 2009.

2.B. Venkataramani, M. Bhaskar, "Digital Signal Processor Architecture, Programming and Applications", Second Edition, 2011.

COURSE OUTCOMES:

Upon completion of the course, the students will have:

CO1 : Ability to analyze convolution concepts and it's applications using MATLAB
CO2:ExposuretoDFT/FFT computation algorithms and spectral estimation using MATLAB
CO3: Ability to design and test IIR/FIR digital filters using MATLAB
CO4: Familiarization with DSP starter kit programming using simple examples
CO5: Exposure to DFT/FFT computation algorithms and spectral estimation using CCS
CO6: Ability to design and test IIR/FIR digital filters using CCS

COURSE ARTICULATION MATRIX:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3		2				2	1			3	3	
CO2	3		3		2				2	1			3	3	
CO3	3		3		2				2	1			3	3	
CO4	3		3		2				2	1			3	3	
CO5	3		3		2				2	1			3	3	
CO6	3		3		2				2	1			3	3	