ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY

Guwahati

Course Structure and Syllabus

Computer Science and Engineering (CSE)

Semester VI / CSE/ B.TECH

Sl No	Subject Code	Subject	Hrs			Credits
			L	T	P	C
	Theory					
1	EC131601	Signals and Systems	3	0	0	3
2	MA131602	Fuzzy Mathematics	3	0	0	3
3	CS131603	Data Mining	3	2	0	4
4	CS131604	Design and Analysis of Algorithms	3	2	0	4
5	CS131605	Computer Networks	3	2	0	4
6	CS131606	Modelling & Simulation	3	2	0	4
	Practical					
7	EC131611	Signals and Systems Lab	0	0	2	1
8	CS131613	Data Mining Lab	0	0	2	1
9	CS131615	Computer Networks Lab	0	0	2	1
		Total	18	8	6	**25**
Total Contact Hours : 32						
Total Credits : 25						

Course Title: SIGNALS AND SYSTEMS
Course Code: EC131601
L-T-P-C: 3-0-0-3

Class Hours/week	3
Expected weeks	12
Total hrs. of classes	36

MODULE	TOPIC	COURSE CONTENT	HOURS
1.	**AN INTRODUCTION TO SIGNALS AND SYSTEMS**	Signals and systems as seen in everyday life, and in various branches of engineering and science electrical, mechanical, hydraulic, thermal, biomedical signals and systems as examples. Extracting the common essence and requirements of signal and system analysis from these examples.	5
2.	**FORMALIZING SIGNALS**	Energy and power signals, signal properties: periodicity, absolute integrability, determinism and stochastic character. Some special signals of importance: the unit step, the unit impulse, the sinusoid, the complex exponential, some special time-limited signals; continuous and discrete time signals, continuous and discrete amplitude signals. Formalizing systems- system properties: linearity: additivity and homogeneity, shift-invariance, causality, stability, realizability. Examples.	6
3.	**CONTINUOUS TIME AND DISCRETE TIME LINEAR SHIFT-INVARIANT (LSI) SYSTEMS IN DETAIL**	Detail the impulse response and step response, convolution, input-output behaviour with a periodic convergent inputs, cascade interconnections. Characterization of causality and stability of linear shift-invariant systems. System representation through differential equations and difference equations.	5
4.	**PERIODIC AND SEMI-PERIODIC INPUTS TO AN LSI SYSTEM**	The notion of a frequency response and its relation to the impulse response, Fourier series representation, the Fourier Transform, convolution/multiplication and their effect in the frequency domain, magnitude and phase response, Fourier domain duality. The Discrete-Time Fourier Transform (DTFT) and the Discrete Fourier Transform (DFT). Parseval's Theorem.The idea of signal space and orthogonal bases of signals.	5
5.	**THE LAPLACE TRANSFORM FOR CONTINUOUS TIME SIGNALS AND SYSTEMS**	The notion of eigen functions of LSI systems, a basis of eigen functions, region of convergence, system functions, poles and zeros of system functions and signals, Laplace domain analysis, solution to differential equations and system behavior. Generalization of Parseval's Theorem. The z-Transform for discrete time signals and systems- eigen functions, region of convergence, system functions, poles and zeros of systems and sequences, z-domain analysis. Generalization of Parseval's Theorem.	7

6.	**SYSTEM REALIZATION THROUGH BLOCK-DIAGRAM REPRESENTATION**	System interconnection. State-space analysis and multi-input, multi-output representation. The state transition matrix and its role. The Sampling Theorem and its implications- Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold, first-order hold, and so on. Aliasing and its effects. Relation between continuous and discrete time systems.	4
7.	**APPLICATIONS OF SIGNAL AND SYSTEM THEORY**	Modulation for communication, filtering and so on. **Advanced topics:** time-frequency representation and the uncertainty principle, Short-time Fourier Transforms and wavelet transforms.	4

Text/Reference books:

1. A.V. Oppenheim, A.S. Willsky and I.T. Young, "Signals and Systems", Prentice Hall
2. R.F. Ziemer, W.H. Tranter and D.R. Fannin, "Signals and Systems - Continuous and Discrete", 4th edition, Prentice Hall
3. A. Papoulis, "Circuits and Systems: A Modern Approach", HRW
4. B.P. Lathi, "Signal Processing and Linear Systems", Oxford University Press.
5. Douglas K. Lindner, "Introduction to Signals and Systems", Mc-Graw Hill International Edition
6. Simon Haykin, Barry van Veen, "Signals and Systems", John Wiley and Sons (Asia) Private Limited
7. Robert A. Gabel, Richard A. Roberts, "Signals and Linear Systems", John Wiley and Sons
8. M. J. Roberts, "Signals and Systems - Analysis using Transform methods and MATLAB", TMH
9. I. J. Nagrath, S. N. Sharan, R. Ranjan, S. Kumar, "Signals and Systems", TMH New Delhi
10. Ashok Ambardar,"Analog and Digital Signal Processing", 2nd Edition, Brooks/ Cole Publishing Company

Class Hours/week	3
Expected weeks	12
Total hrs. of classes	36

Course Title: FUZZY MATHEMATICS
Course Code: MA131602
L-T-P-C: 3-0-0-3

MODULE	TOPIC	COURSE CONTENT	HOURS
1.	**DEFINITION OF A FUZZY SET**	Elements of Fuzzy logic, Relations including Operations, reflexivity, symmetry and transitivity; Pattern Classification based on fuzzy relations; Fuzzy analysis including metric spaces, distances between fuzzy sets, area, perimeter, height, width of fuzzy subsets, continuity and integrals; Applications	18
2.	**PATHS AND CONNECTEDNESS**	Clusters including cluster analysis and modelling information systems, applications; Connectivity in fuzzy graphs, application in database theory; Applications to neural networks; Fuzzy algebra including Fuzzy substructures of algebraic structures, Fuzzy subgroups, pattern recognition and coding theory.	18

Textbooks / References :

1. Fuzzy Mathematics- An Introduction for Engineers and Scientists, John N. Mordeson, Premchand S. Nair, Springer Books
2. Fuzzy Mathematics- Approximation Theory, Anastassiou George A., Springer

Class Hours/week	4
Expected weeks	12
Total hrs. of classes	36+12 = 48

Course Title: DATA MINING
Course Code: CS131603
L-T-P-C: 3-2-0-4

MODULE	TOPIC	COURSE CONTENT	HOURS
1.	**INTRODUCTION**	Basic concepts of data mining, including motivation and definition; different types of data repositories; data mining functionalities; concept of interesting patterns; data mining tasks; current trends, major issues and ethics in data mining	6
2.	**DATA**	Types of data and data quality; Data Preprocessing: data cleaning, data integration and transformation, data reduction, discretization and concept hierarchy generation; Exploring Data: summary statistics, visualization, multidimensional data analysis	8
3.	**ASSOCIATION AND CORRELATION ANALYSIS**	Basic concepts: frequent patterns, association rules - support and confidence; Frequent item set generation - Apriori algorithm, FP-Growth algorithm; Rule generation, Applications of Association rules; Correlation analysis.	10
4.	**CLUSTERING ALGORITHMS AND CLUSTER ANALYSIS**	Concept of clustering, measures of similarity, Clustering algorithms: Partitioning methods - k-means and k-medoids, CLARANS, Hierarchical methods - agglomerative and divisive clustering, BIRCH, Density based methods - Subspace clustering, DBSCAN; Graph-based clustering - MST clustering; Cluster evaluation; Outlier detection and analysis.	12
5.	**CLASSIFICATION**	Binary Classification - Basic concepts, Bayes theorem and Naive Bayes classifier, Association based classification, Rule based classifiers, Nearest neighbour classifiers, Decision Trees, Random Forest; Perceptrons; Multi-category classification; Model overfitting, Evaluation of classifier performance - cross validation, ROC curves.	8
6.	**APPLICATIONS**	Text mining, Web data analysis, Recommender systems. Prerequisites: Familiarity with basic Linear Algebra and Probability will be assumed.	4

Text Books:

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Introduction to Data Mining. Pearson (2005), India.
2. Jiawei Han and Micheline Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann, 3rd edition
3. Ian H. Witten and Eibe Frank, Data Mining: Practical Machine Learning Tools and Techniques, Morgan Kaufmann, 3rd edition (January 2011).

Reference Books:

1. T. Hastie, R. Tibshirani and J. H. Friedman, The Elements of Statistical Learning, Data Mining, Inference, and Prediction. Springer, 2nd Edition, 2009.
2. C. M. Bishop, Pattern Recognition and Machine Learning. Springer.

Course Title: DESIGN AND ANALYSIS OF ALGORITHMS
Course Code: CS131604
L-T-P-C: 3-2-0-4

Class Hours/week	4
Expected weeks	12
Total hrs. of classes	36+12 = 48

MODULE	TOPIC	COURSE CONTENT	HOURS
1.	**INTRODUCTION**	Fundamental characteristics of an algorithm. Basic algorithm analysis –Asymptotic analysis of complexity bounds – best, average and worst-case behaviour, standard notations for expressing algorithmic complexity. Empirical measurements of performance, time and space trade-offs in algorithms. Using recurrence relations to analyze recursive algorithms – illustrations using recursive algorithms.	12
2.	**FUNDAMENTAL ALGORITHMIC STRATEGIES**	Brute-Force, Greedy, Branch-and-Bound, Backtracking and Dynamic Programming methodologies as techniques for design of algorithms – Illustrations of these techniques for Problem-Solving. Heuristics – characteristics and their domains of applicability. Design of algorithms for String/ Texmatching problems, Huffman Code and Data compression problems, Subset-sum and Knapsack problems.	14
3.	**GRAPH AND TREE ALGORITHMS**	Depth- and Breadth- First traversals. Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sort, Network Flow problems.	8
4.	**TRACTABLE AND INTRACTABLE PROBLEMS**	Computability. The Halting problem. Computability classes – P, NP, NP-complete and NP-hard. Cook's theorem. Standard NPcomplete Problems Reduction techniques.	8
5.	**ADVANCED TOPICS**	Approximation algorithms, Randomized algorithms, Class of problems beyond NP – PSPACE.	6

Text Books:

1. Algorithm Design – Jon Kleinberg and Eva Tardos
2. Introduction to Algorithms – T.H. Corman et. al.

Reference Books:

1. Fundamentals of Algorithms – E. Horowitz et al.
2. Combinatorial Optimization: Algorithms and Complexity – C.H. Papadimitriou et al.

Course Title: COMPUTER NETWORKS
Course Code: CS131605
L-T-P-C: 3-2-0-4

Class Hours/week	4
Expected weeks	12
Total hrs. of classes	36+12 = 48

MODULE	TOPIC	COURSE CONTENT	HOURS
1.	**INTRODUCTION**	Hardware and software, Data communication, Networking, Protocols and Protocol architecture, standards. Data transmission concepts.Analog and digital transmission. Transmission impairments. Layered Architecture of Computer Networks, OSI and TCP/IP architectures	5
2.	**PHYSICAL LAYER**	Guided transmission media and wireless transmission, Data encoding - Digital and analog data and signals, spread spectrum. Data communication interface - asynchronous and synchronous transmission, line configuration and interfacing. Data link control - Flow control. Error detection and error control. HDLC and other data link protocols. Multiplexing – Frequency-division, synchronous time-division, and statistical time-division multiplexing	7
3.	**LINK LAYER :MEDIUM ACCESS CONTROL: CDMA, ALOHA, AND ETHERNET**	Link Layer Addressing and Forwarding; Spanning Trees; The Channel Allocation Problem, Multiple Access Protocols, Ethernet, Wireless LANs, Broadband Wireless, Bluetooth, Data Link Layer Switching, Switched networks. Circuit-switched networks. Switching concepts. Routing in circuit-switched networks. Control signaling. Packet switching principles. Routing and congestion control, x.25 protocol standard. LAN Technology - LAN architecture. Bus/tree, ring, star, and wireless LANs. LAN Systems - Ethernet and Fast Ethernet (CSMA/CD) Token ring and FDDI, ATM LANs, Fiber channel, wireless LANs. Bridges - Bridge operation and routing with bridges.	8
4.	**NETWORK LAYER**	Network layer design issues. Routing algorithms , Flooding, Shortest path routing, Link Sate routing, Hierarchical routing, Broadcast and multicast routings, Routing in the Internet, Path Vector routing, OSPF routing. The network layer in the Internet: IP protocol,ARP and RARP, BOOTP, ICMP, DHCP, Network Address Translation(NAT) Internetworking	7
5.	**TRANSPORT LAYER**	TCP introduction, Reliable/Un- Reliable Transport ,TCP , UDP, Congestion Control,Intra-Domain Routing: Distance-Vector, Intra-Domain Routing: Link- State, Wireless Networks: 802.11 MAC,	4

		Efficiency considerations	
6.	**APPLICATION LAYER**	DNS-The Domain Name System,Electronic Mail, HTTP, FTP, Simple network management protocol (SNMP),The World Wide Web	6
7.	**WEB AND MULTIMEDIA**	The World Wide Web – client and server side of www, HTML and webpages, JAVA language, Locating on the web. Multimedia- Audio & Video, Data compression, Video on demand, Multicast backbone.	6
8.	**SECURITY**	Introduction, Cryptography and Cryptanalysis, Public Key Cryptography Algorithms, RSA Algorithm, DES, Authentication and Authorization.	5

Text Books:

1 .Computer Networks, by Andrew S Tanenbaum, PHI. (2010)

2. *Data and Computer Communications,* by Walliam Stallings, PHI

Reference Books:

1. Data Communications, Computer networking on OSI , by Fred Halsall, Addison Wesley Publishing Co.

2. *Computer Networking -A Top-Down Approach Featuring the Internet,* James F. Kurose and Keith W. Ross, Addison Wesley Publishing Co.

3. *Computer Networks: Protocols standards and interfaces,* by Uyless Black, Prentice Hall.

4. Data communication & Networks, by Behrou A. Forouzan, Tata McGraw Hill.

Course Title: MODELLNG AND SIMULATION
Course Code: CS131606
L-T-P-C: 3-2-0-4

Class Hours/week	4
Expected weeks	12
Total hrs. of classes	36+12 = 48

MODULE	TOPIC	COURSE CONTENT	HOURS
1.	**INTRODUCTION**	When simulation is appropriate and when not, advantages and disadvantages of simulation, application areas in communication, computer and software design, systems and systems environment, components of a system, discrete and continuous systems, model of a system, types of models, discrete-event simulation, steps in a simulation study. Simulation Examples- Simulation of queueing systems, on-demand and inventory systems, simulation for reliability analysis etc	5
2.	**GENERAL PRINCIPLES**	Concepts in discrete event simulation: event scheduling/time advance algorithms, world views. List Processing: properties and operations, data structures and dynamic allocation, techniques	3
3.	**SIMULATION SOFTWARE**	Integrated environments. Examples and review of some existing software popular and useful in the industry, e.g., Arena, AutoMod, Extend, Flexsim, Micro Saint, ProModel, Quest, SIMUL8, WITNESS etc. Simulation using languages and environments like C++/Java/GPSS/SSF etc. Experimentation and Statistical-Analysis Tools: common features and relevant current products	4
4.	**STATISTICAL MODELS IN SIMULATION**	Terms and concepts. Statistical Models. Review of discrete and continuous distributions. Review of Poisson (stationary and non-stationary) processes. Empirical Distributions; Elementary Queueing Theory- Basic Structure of Queueing Models. Input Source (Calling Population). Queue, Queue Discipline, Service Mechanisms. Notations and relationships between *L*, *W*, *Lq*, and *Wq*. Little's Formula. Role of Exponential Distribution and Properties. Birth and Death Processes. M/M/s queues. Finite queue variation in M/M/s/K models with different s values. Finite Calling Population cases. Queueing Models involving Non-Exponential Distributions: M/G/1, M/D/s, M/Ek/s (involving Erlang distribution), Models without a Poisson Input, Models involving hyperexponential	8

		distributions, Priority Discipline Queueing Models: Preemptive and Non-Preemptive with results, properties and server number variations, Queueing Networks: Equivalence Property. Infinite Queues in Series and Product Form Solutions. Jackson Networks	
5.	**APPLICATION OF QUEUING MODELS**	Review of Characteristics (calling population system capacity, arrival processes, behaviour and disciplines, service times and mechanisms etc) and notations, Application of Long-Run Measures of Performance: Time average in system, average time spent per customer, Little's Formula and server utilization, costs. Steady State behaviour of Infinite (M/G/1, M/M/c/infinity, M/M/c/N/infinity) and finite (M/M/c/K/K) Calling Population Models, Use of Network of Queues.	4
6.	**RANDOM NUMBER GENERATION**	Properties. Generation of Pseudo-Random Numbers, Techniques for Generation of Pseudo-Random Numbers: Linear Congruential, Combined Linear Congruential, Random Number Streams. Tests for Random Numbers: Frequency Tests and Tests for Autocorrelation. Random Variate Generation- Inverse Transform Techniques for Exponential, Uniform, Weibull, Triangular and for Empirical Continuous Distributions. Acceptance-Rejection Techniques for Poisson (Stationary and Non-Stationary) Distribution and Gamma Distribution. Special Properties like the Direct Transformation for the Normal and Lognormal Distributions,Convolution Method and others.	7
7.	**INPUT MODELLING**	Data collection, Identifying the Distribution with Data: Histograms, Selection of the Appropriate Family of Distributions, Quantile-Quantile Plots. Parameter Estimation: Sample Mean and Sample Variance and various biased and unbiased Estimators. Goodness of Fit Tests applied to Simulation inputs: Chi-Square and Chi-Square with Equal Probabilities, Kolmogorov-Smirnov Tests, p-Values and Best Fits.Verification and Validation of Simulation Models- Verification and Validation of Simulation Models. Calibration and Validation: Face Validity, Validation of Assumptions, Input-Out Transformation Validation	7
8.	**OUTPUT ANALYSIS OF A SINGLE MODEL**	Output analysis and types of simulation. Stochastic Nature of the Output Data. Measures of Performance and Estimation: Point Estimation	3

		and Confidence-Interval Estimation. Output Analysis for Terminating Simulations and Estimation of Probabilities. Output Analysis of Steady State Simulations: Initialization Bias, Error Estimation, Replications, Sample Size and Batch Means for Interval Estimation.	
9.	**COMPARISON AND EVALUATION OF ALTERNATIVE SYSTEM DESIGNS**	Comparison of Two System Designs.; Sampling with Equal and Unequal Variances. Common Random Numbers. Confidence Intervals with Specified Precision. Comparison of Several System Designs: Bonferroni Approaches to Multiple Comparisons and to Screening and to Selection of the Best. Metamodeling L Sample Linear Regression, Testing for Significance, Multiple Linear Regression. Random Number Assignment for Regression. Optimization via Simulation: Robust Heuristics.	4
10	**SIMULATION OF COMPUTER SYSTEMS**	Simulation Tools: Process Orientation and Event Orientation. Model Input: Modulated Poisson Process and Virtual-Memory Referencing. High-Level Simulation. CPU and Memory Simulations. Simulation of Computer Networks- Traffic Modelling, Media Access Control: Token-Passing Protocols and Ethernet, Data Link Layer, TCP, Model Construction.	3

Text Books:

1. Jerry Banks, John S. Carson II, Barry L. Nelson and David M. Nicol, *Discrete-Event System and Simulation,* Prentice Hall of India, New Delhi
2. Averill M. Law, *Simulation modelling and analysis (SIE),* Tata McGraw Hill India
3. David Cloud, Larry Rainey, A*pplied Modelling and Simulation,* Tata McGraw Hill, India.

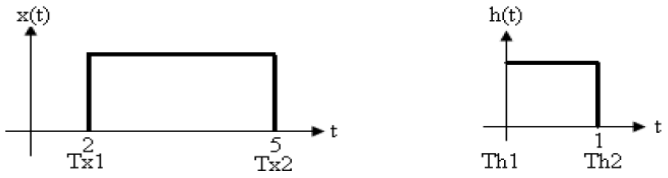
Reference Books:

1. Gabriel A. Wainer, *Discrete-event modeling and simulation: a practitioner's approach,* CRC Press
2. Bernard P. Zeigler, Herbert Praehofer, Tag Gon Kim, *Theory of modeling and simulation: integrating discrete event and continuous complex dynamic systems,* Academic Press.
3. Averill M. Law, W. David Kelton, *Simulation modeling and analysis,* McGraw Hill
4. Walter J. Karplus, George A. Bekey, Boris Yakob Kogan, *Modeling and simulation: theory and practice,* Springer
5. Stanislaw Raczynski, *Modeling and simulation: the computer science of illusion,* Wiley
6. Mohammad Salameh Obaidat, Georgios I. Papadimitriou, *Applied system simulation: methodologies and application,* Springer
7 .van Dijk, Nico M.; Boucherie, Richard J. (Eds.) 2011. *Queueing Networks: A Fundemental Approach.* 798 p.148 illus. Springer.
8. Bhat, U. Narayan, *An Introduction to Queueing Theory: Modeling and Analysis in Applications,* Springer

PRACTICALS

Course Title: SIGNALS AND SYSTEMS LAB
Course Code: EC131611
L-T-P-C: 0-0-2-1
Expected No. of weeks : 12 (approx)

EXPERIMENT NO	AIM OF THE EXPERIMENT	HOURS
1	Define and Sketch the following discrete time signals: a) unit step function u(n) b) unit impulse signal δ(n) c) unit ramp signal r(n) d) rectangular pulse signal of width 10 Use Subplot to plot the graphs in the same window.	2
2	Sketch the following shifted unit step signals using subplot to plot on the same figure window. a) u(n+2) b) u(n-3) c) u(n+2) – u(n-3)	1
3	Generate the signal x(n)= u(n) - u(n-10). Decompose x(n) into odd and even components. Plot x(n) and the odd and even components using subplot.	1
4	Define and Sketch the following continuous time signals: a) unit step function u(t) b) unit impulse function δ(t) c) unit ramp r(t) d) rectangular pulse signal of width 2 using sign function in MATLAB. Use Subplot to plot the graphs in the same window.	2
5	WAP to generate the following a) A 50 Hz sinusoidal signal sin(2πft) samples at 600 Hz. b) A sinc function c) A square wave.	2
6	Plot signals cos (2πt), cos(2πt+ π/2) and cos(2πt-π/2) on the same figure window on the same axis. Make use of proper markers, colour and legends to distinguish between the graphs.	2
7	Consider a continuous time signal x(t)=2sin πt for an interval 0≤t≤2π. Sample the continuous time signal with a sampling period of T=0.2s. Sketch the continuous time signal and discrete time signal using subplot.	2
8	Plot the exponentially varying sinusoid $x(t)=4e^{-2t}\sin(6t-60^{\circ})$, 0<t<4	1
9	Define the following piecewise continuous functions in MATLAB and plot them: a) x(t)= 1, -1 ≤ t < 0 -1, 0≤ t < 2 b) $x(t) = e^{t}$, -5 ≤ t ≤ 0 e^{-t} , 0 < t ≤ 5	2

	c) $x(t)= \sin(t), \quad t < 0$ $t^2, \quad 0 \le t \le 1$ $1/t, \quad t>1$	
10	Plot the signal $x(t)=\cos(\pi t)$, $-5 \le t \le 5$. On the same plot, same axis, also show $x(2t)$ and $x(t/2)$	2
11	Plot signal $x(t)= e^{t/2}$, $-5 \le t \le 1$. using subplot, plot $x(-t)$.	2
12	Plot the continuous time signals x(t) and h(t) given below using MATLAB commands. Find the convolution of the two signals and plot the convolution result. Use subplot to show all the three signals. 	2
13	Determine the convolution of two sequences x(n)={1,4,3,2} and h(n)={1,3,2,1} and then plot it.	2
14	Given unit impulse response h(n)=sin(0.5n) for $n \ge 0$ and input x(n)=sin(0.2n) for $n \ge 0$. Compute the output response y(n). Plot x(n), h(n) and y(n) using subplot.	2
15	Write a function to plot the unit step function and using that function plot a) u(n), $-7<n<7$ b) u(n-3), $-10<n<10$ c) u(n+2), $-6<n<6$	2
16	WAP to find the Laplace transform of the following signals a) t b) te^{-at} c) $t^{n-1}/(n-1)!$ d) 3 sin(2t) + 3 cos(2t)	2
17	WAP to find the inverse Laplace transform of the following s-domain signals a) $2/s(s+1)(s+2)$ b) $1/(s^2+s+1)(s+2)$	2
18	WAP to find the convolution of signals x(t)=t2-3t and h(t)=t using Laplace transform. WAP to find the Z transform of the following signals a)n b)an c) e-anT d) 1+n(0.4)n-1 WAP to find the inverse Z transform of the following signals 1/(1-1.5z-1 + 0.5 z-2) b) 1/(1+z-1)(1-z-1)2	2
19	WAP to perform the convolution of the following signals $x(n)=(0.4)^n u(n)$ and $h(n)=(0.5)^n u(n)$ using z transform.	2
		TOTAL 35

Course Title: DATA MINING LAB
Course Code: CS131613
L-T-P-C: 0-0-2-1
Expected No. of weeks : 12 (approx)

EXPERIMENT NO	AIM OF THE EXPERIMENT	HOURS
1	To install open source data mining software such as Weka, XL Miner etc.	1
2	To do experiments with respect to a) Data preprocessing, attribute oriented analysis and visualization b) Mining association rules c) Classifier design: Naive Bayes Classifier, Rule based classifiers, Decision Trees and Perceptions (both for binary and multiclass Classification), Random Forests d) Evaluation of classifiers e) Clustering algorithms: k-means and k-medoids, hierarchical, CLARANS, BIRCH and DBSCAN f) Cluster evaluation	8
3	To extend the data mining algorithms implemented in open source data mining software	6
4	To propose, implement and test new data mining algorithms	4
5	To apply the new algorithms to some sample data sets such as KDD CUP data sets and compare them with some existing algorithms.	8
	TOTAL	**27**

Course Title: COMPUTER NETWORKS LAB
Course Code: CS131615
L-T-P-C: 0-0-2-1
Expected No. of weeks : 12 (approx)

EXPERIMENT NO	AIM OF THE EXPERIMENT	HOURS
1	Study of different network cables and devices.	3
2	Study of college LAN with references to network IP and design a LAN for it.	3
3	Study of basic network command and network configuration command	3
4	Study of LAN transmission media's, topologies, interconnection devices & LAN standards.	3
5	Write a program in 'C' for PC to PC communication using RS-232 port. Implement Dijkstra's algorithm to compute the Shortest path in a graph.	3
6	Study of Different network simulators for simulations	3
7	Token bus and token ring protocol To create scenario and study the performance of token bus and token ring protocols through simulation. Implement Transfer of files from PC to PC using Windows / Unix socket programming	3
8	Case study of client/server scenario. Observing the difference between UDP and TCP servers. To observe the working of TCP three-way-hand-shaking procedure. Locating different packets like, SYN, SYN-ACK and ACK. Comparing different fields of these packets	3
9	Write a program for Hamming Code generation for error detection and correction Using TCP/IP sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present.	3
10	Study & Simulation of Routing Protocols using Standard Network Simulator	3
	TOTAL	**30**