Bachelor of Engineering

SoE & Syllabus 2014

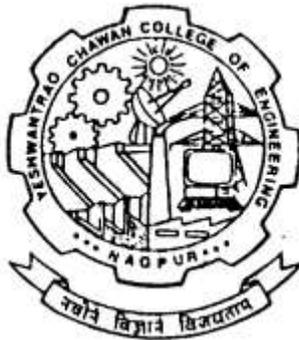# 7 & 8 Semester

Information Technology

Update on June 2020

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.E. SCHEME OF EXAMINATION 2014

(Revised Scheme of Examination w.e.f. 2020-21 onward)

**SoE No.
IT-101**

Information Technology

Sr. No.	Course Code	Course Title	L	T	P	Total Contact	Credits	MSEs*	TA**	ESE	ESE Duration Hrs.
								% Weightage			
			CONTACT HOURS								
		SEVENTH SEMESTER (Group "A")									
1	IT1403	Principle of Compiler Design	3	1	0	4	4	30	30	40	3 Hrs
2	IT1404	**Lab:** Principle of Compiler Design	0	0	2	2	1		60	40	
3	IT1417	Network Programming	4	0	0	4	4	30	30	40	3 Hrs
4	IT1418	Lab: Network Programming	0	0	2	2	1		60	40	
5	IT1427	Data Mining	4	0	0	4	4	30	30	40	3 Hrs
6	IT1428	**Lab:** Data Mining	0	0	2	2	1		60	40	
7	IT1422	Network Security	3	0	0	3	3	30	30	40	3 Hrs
8		**Professional Elective III**									
	IT1407	PE III: Real Time Systems									
	IT1423	PE III: Human Computer Interaction									
	IT1429	PE III: Advanced Computer Architecture	3	0	0	3	3	30	30	40	3 Hrs
	IT1430	PE III: E-Commerce									
	IT1432	PE III: Cloud Computing									
	IT1436	PE III: Coding Standard and Technical Documentation									
9		**Professional Elective IV**									
	IT1415	PE IV : Neural Networks & Fuzzy Logic									
	IT1405	PE IV: Pattern Recognition	3	0	0	3	3	30	30	40	3 Hrs
	IT1421	PE IV: Distributed Systems									
10		**Lab: Professional Elective IV**									
	IT1416	Lab.: PE IV : Neural Networks & Fuzzy Logic									
	IT1439	Lab.: PE IV: Pattern Recognition	0	0	2	2	1		60	40	
	IT1440	Lab.: PE IV: Distributed Systems									
		Total	20	1	8	29	25				

Sr. No.	Course Code	Course Title	L	T	P	Total Contact	Credits	MSEs*	TA**	ESE	ESE Duration Hrs.
		SEVENTH SEMESTER (Group "B")									
1	IT1424	**Industrial Project (Industry Visit / Training / Seminar)**	0	0	30	30	20		60	40	
2	IT1425	Comprehensive Viva-Voce	0	0	0	0	3			100	
3	IT1426	Extra Curricular Activities	0	0	0	0	2		100		
		Total	0	0	30	30	25				
		Total Group(A+B)	20	1	38	59	50				

* MSEs = 3 MSEs of 15 Marks each will be conducted and marks of better 2 of these 3 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 20 marks on lecture quizzes, 8 marks on assignments, 2 marks on class performance

TA** = for Practical : MSPA will be 15 marks each

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.E. SCHEME OF EXAMINATION 2014

(Revised Scheme of Examination w.e.f. 2020-21 onward)

Information Technology

SoE No.
IT-101

Sr. No.	Course Code	Course Title	L	T	P	Total Contact	Credits	MSEs*	TA**	ESE	ESE Duration Hrs.
			CONTACT HOURS					% Weightage			
		EIGHTH SEMESTER (Group "A")									
1	IT1424	Industrial Project (Industry Visit / Training / Seminar)	0	0	30	30	20		60	40	
2	IT1425	Comprehensive Viva-Voce	0	0	0	0	3			100	
3	**IT1426**	Extra Curricular Activities	0	0	0	0	2	100			
		Total	0	0	30	30	25				

Sr. No.	Course Code	Course Title	L	T	P	Total Contact	Credits	MSEs*	TA**	ESE	ESE Duration Hrs.
		EIGHTH SEMESTER (Group "B")									
1	IT1403	Principle of Compiler Design	3	1	0	4	4	30	30	40	3 Hrs
2	IT1404	**Lab:** Principle of Compiler Design	0	0	2	2	1		60	40	
3	IT1417	Network Programming	4	0	0	4	4	30	30	40	3 Hrs
4	IT1418	Lab: Network Programming	0	0	2	2	1		60	40	
5	IT1427	Data Mining	4	0	0	4	4	30	30	40	3 Hrs
6	IT1428	**Lab:** Data Mining	0	0	2	2	1		60	40	
7	IT1422	Network Security	3	0	0	3	3	30	30	40	3 Hrs
8		**Professional Elective III**									
	IT1407	PE III: Real Time Systems									
	IT1423	PE III: Human Computer Interaction									
	IT1429	PE III: Advanced Computer Architecture	3	0	0	3	3	30	30	40	3 Hrs
	IT1430	PE III: E-Commerce									
	IT1432	PE III: Cloud Computing									
	IT1436	PE III: Coding Standard and Technical Documentation									
9		**Professional Elective IV**									
	IT1415	PE IV : Neural Networks & Fuzzy Logic									
	IT1405	PE IV: Pattern Recognition	3	0	0	3	3	30	30	40	3 Hrs
	IT1421	PE IV: Distributed Systems									
10		**Lab: Professional Elective IV**									
	IT1416	Lab.: PE IV : Neural Networks & Fuzzy Logic									
	IT1439	Lab.: PE IV: Pattern Recognition	0	0	2	2	1		60	40	
	IT1440	Lab.: PE IV: Distributed Systems									
		Total	20	1	8	29	25				
		Total Group(A+B)	20	1	38	59	50				

* MSEs = 3 MSEs of 15 Marks each will be conducted and marks of better 2 of these 3 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 20 marks on lecture quizzes, 8 marks on assignments, 2 marks on class performance

TA** = for Practical : MSPA will be 15 marks each

Chairperson		Version	1.03	Applicable for AY 2018-19 Onwards
Dean (Acad. Matters)		Date of Release	June 2020	

7th & 8th Semester (Group A & B)

IT1403	Principles of Compiler Design	L=3	T=1	P=0	Credits=4

Course Learning Objective	Course Outcomes
Student will able: 1. To study the basic concept of compiler fundamentals & design of lexical analysis 2. To study the different parsing techniques. 3. To study the construction of parsers for different CFG. 4. To study Syntax Directed Translation of different programming language constructs. 5. To study symbol table organization & error detection & recovery 6. To study code optimization & designing of code generation scheme.	After completion of the course: 1. Students will be able to understand the designing approaches of compiler & designing of Lexical analyzer. 2. Students will be able to apply & design Top Down Parser for the recognition of Programming Language constructs. 3. Students will be able to apply &design Bottom Up parser for CFG & simulation of Language. 4. Students will able Analyze and Apply Syntax Directed Translation scheme to CFG & development of Three Address Code Statement. 5. Students will be able to understand the Symbol Table Organization & able to apply error detection and recovery methods. 6. Students will be able to Understand& apply different code optimization techniques for the development of target code.

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT1403.1	To understand the designing approaches of compiler & designing of Lexical analyzer.	3.0	2.0	3.0											
IT1403.2	To apply & design Top Down Parser for the recognition of Programming Language constructs	2.0		3.0											
IT1403.3	To apply &design Bottom Up parser for CFG & Simulation of Language.	2.0		3.0											
IT1403.4	Analyze and Apply Syntax Directed Translation scheme to CFG & development of Three Address Code Statement.	3.0	3.0	3.0											
IT1403.5	To understand the Symbol Table Organization & able to apply error detection and recovery methods	2.0	3.0												
IT1403.6	To Understand& apply different code optimization techniques for the development of target code.	3.0	2.0	3.0											
IT1403		2.5	2.5	3.0											

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | 1

7th & 8th Semester (Group A & B)

IT1403	Principles of Compiler Design	L=3	T=1	P=0	Credits=4

UNIT I [05 Hrs.]

Introduction to Abstract Model & Grammar , Introduction to Compilation Process, Compilers & Translators, Linker & Loader Phase structure of Compiler, Role of Lex, Design of Lexical Analysis.

UNIT II [08 Hrs.]

Specifying Syntactic Structure of Programming Language using Context Free Grammars, The role of Parser, Top-down Parsing, and Bottom up Parsing, Predictive Parsers, and Recursive Decent Parser.

UNIT III [07 Hrs.]

Construction of efficient LR Parsers (SLR, CLR & LALR), Canonical Collection of set of items and construction of Parsing table, Implementation of LR Parsing table

[08 Hrs.]

UNIT IV

Syntax Directed Translation: Intermediate Code, Postfix notation, Parse tree and Syntax Trees, Three address codes, quadruples, triples, Translation of Arithmetic Expression, Boolean expressions, Control Statements. Array references, Procedure Calls, Declarations, Case Statements, Use of Compiler writing tools (Lex/Flex, Yacc /Biason).

UNIT V [06 Hrs.]

Symbol Tables: Contents, Representing scope information. Error detection and Recovery: Error handling, Lexical-phase, Syntactic phase and semantic phase

UNIT VI [08 Hrs.]

Introduction to Code Optimization, The principle sources of optimization, Loop optimization, The DAG representation, Introductory Data Flow analysis, Introduction to Code Generation: Object programs, Problems in Code Generation, Register allocation and assignment, Code generation from DAG, Peephole optimization.

Textbooks:			
Compilers Principles, Techniques & Tools	2nd Edition	Alfred V. Aho , Ravi Sethi , Jeffrey D.	Addison Wesley.
Principles of Compiler Design	2nd Edition	Alfred V. Aho ,Jeffrey D. Ullman	Addison Wesley.
Reference Book			
Compiler Design	4th edition	O.G. Kakde	Laxmi Publication
Introduction to Compiling Techniques: First Course Using ANSI C, LEX and YACC	2nd Revised edition Edition	J.P. Bennett	Alfred Waller Ltd

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

IT 1404	**Lab: Principles Compiler Design**	L = 0	T = 0	P = 2	Credits =1

Course Learning Objective	Course Outcomes
Students will study: 1. To study the different phases and passes of compiler design. 2. To write a program using Lex Tool. 3. To write a program using YACC Tool	After completion of the course: 1. Students will be able to understand and apply Lex Tool for the development of program. 2. Students will be able to understand and apply YACC Tool for the development of program.

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT1404.1	To understand and apply Lex Tool for the development of program.					3									
IT1404.2	To understand and apply YACC Tool for the development of program.	2				3									
IT1404		2.0				3.0									

Sr. No.	Name Of The Practical
1	Study of lex.
2	Write a lex program that contains no patterns and no actions. Thus, any string matches and default action, i.e. printing takes place.
3	A lex program which adds line numbers to the given file and displays the same onto the standard output
4	A lex program that replaces all the occurrences of "rama" with "RAMA" and "sita" with "SITA.
5	Write lex program to count and print the number of pages lines, words and characters in a given file.
6	Write lex program to count all instance of she and he, including the instances of he that are included in she.
7	Write lex program to count the number of printf and scanf statements
8	Write lex program to find simple and compound statements
9	Write lex program to count the number of identifiers
10	Write lex program to find the number of constants
11	STUDY OF YACC
12	Write Yacc and Lex specification programs are used to generate a Calculator.
13	Study of latest compilers (BEYOND SYLLABUS)

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

7th & 8th Semester (Group A & B)

IT1417	Network Programming	L=4	T=0	P=0	Credits=4

Course Learning Objective	Course Outcomes
Student will able: 1. To focus on the foundations of network Models and the application of IP addressing in real world 2. To introduce the network layer and various services related to network LAYER and protocols working. 3. To demonstrate Transport layer via TCP and UDP protocols 4. To know various Routing protocols and its working 5. To know the working of Application Layer and its protocols and services 6. To understand real time managing and securing of network.	After completion of the course: 1. Understand the basics of TCP/IP model and IP Addressing scheme and design IP scheme for a given network. 2. Understand the working of network layer protocols. 3. Understand the working of TCP & UDP protocols and its packages and operation. 4. Understand interposes communication in Unix. 5. Understand the concept of Socket Programming and its functions. 6. Able to apply knowledge of socket programming to develop network based application.

Course Outcomes	Statement	Mapped PO 1	2	3	4	5	6	7	8	9	10	11	12	PSO 1	2
IT1417.1	Students will be able to understand the basics of TCP/IP model and IP Addressing scheme and design IP scheme for a given network.	3	3	3											
IT1417.2	Students will be able to understand the working of network layer protocols	2													
IT1417.3	Students will be able to Effectively use protocols and understanding its headers for the formation of segments	2													
IT1417.4	Students will be able to understand the basics of routing mechanism and study various routing algorithms.	2													
IT1417.5	Students will be able to understand client- server Models and also analysing various protocols for communication such FTP, SMTP, etc	2													
IT1417.6	Students will be able to build systems based on basics network design and managing ; also securing it form internet	3												3	
	IT1417	2.3	3.0	3.0										3.0	

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | **4**

7th & 8th Semester (Group A & B)

IT1417	Network Programming	L=4	T=0	P=0	Credits=4

UNIT I [07 Hrs.]

Internetworking- Concepts, architecture and Protocol, Comparison of OSI model and TCP/IP model. Internet Protocol (IPv.4)- IP addresses, Classful and Classless IP addresses, IP datagrams, IP datagram Forwarding. ARP, RARP. Problems on IP address, Internet Protocol (IPv.6)-Characteristics of features, datagram frame format, base address format, addressing. Problems: IP addressing , Subnet mask, IP configuration commands, IP Packet Headers

UNIT II [08 Hrs.]

IP, ICMP and IGMP : Datagram, fragmentation, options, checksum, IP package, ICMP, messages, formats, error reporting, query, checksum, ICMP package, IGMP, messages, operation, encapsulation, IGMP package. Problems: Headers of protocols

UNIT III [07 Hrs.]

UDP: UDP datagram, checksum, operation, uses, UDP package. TCP: TCP, Services, flow, congestion and error control, TCP package and operation. Problems: Headers of protocols such as TCP and UDP.

UNIT IV [08 Hrs.]

Unicast And Multicast Routing Protocols: unicast routing protocols, RIP, OSPF, BGP, multicast routing, trees, protocols, MOSPF, CBT, PIM .Problems : Routing.

UNIT V [06 Hrs.]

Application Layer, Sockets: Client server model, concurrency, processes, sockets, byte ordering, socket system calls, TCP and UDP client-server programs, BOOTP -DHCP, Services: Domain Name System , name space, resolution, types of records, concept, mode of operation, , FTP, TFTP and electronic Mail: SMTP, MIME, IMAP, POP. Problems: Headers of protocols

UNIT VI [07 Hrs.]

Network management: SNMP, Middleware: RPC, RMI. Internet Security: IPSec, PGP, Firewalls, SSL.
Live Demo: RPC, SNMP, RMI, PGP, Firewall configuration, SSL, Network management on Ether

Textbooks:			
TCP/IP protocol suite	4th edition	Behrouz Forouzan	Tata McGrawhill
Internetworking with TCP / IP	4th edition (2000)	Douglas Comer	PHI
Reference Book			
Computer networks	4th edition	Andrew S.Tanenbuam	PHI
TCP/IP illustrated Volume 2	2003	W.Richard Stevens	Pearson Education

Chairperson	Dean (Acad.Matters)	1.02 / Version	Septerm-2017 / Date of Release	Applicable for AY 2018-19 Onwards

P a g e | 5

7th & 8th Semester (Group A & B)

IT 1418	Lab: Network Programming	L = 0	T = 0	P = 2	Credits =1

Course Learning Objective	Course Outcomes
Students will be able : 1. To develop skills to configure various protocols 2. To develop skills and able to configure and monitor real time networks To Gain knowledge in practical applications of data structures 3. To develop and analysis of data at various layers	After completion of the course: 1. Students will be able to understand and solve the concepts of Interprocess Communication in network programming using JAVA. 2. Students will be able to understand the use of client/server architecture and apply the knowledge for application development.

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT1418.1	Students will be able to understand and solve the concepts of Intercrosses Communication in network programming using JAVA.	2.0	2.0		2.0									3.0	
IT1418.2	Students will be able to understand the use of client/server architecture and apply the knowledge for application development.	3.0	3.0	3.0										3.0	
IT1418		2.5	2.5	3.0	2.0									3.0	

Sr. No	List of Practical
1	Study of Different Networking Commands in Windows and Linux.
2	To Implement Client-Server application using Java Networking Programming.
3	Implementation of TCP/IP
4	Implementation of E-mail Service
5	Implement the Following forms of IPC a) PIPE b)FIFO
6	Design a TCP Concurrent Server to convert a given text into uppercase using multiplexing system call "SELECT".
7	Design RPC application to add and subtract a given pair of integer
8	Program to determine host byte order

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | **6**

7th & 8th Semester (Group A & B)

IT1427	Data Mining	L=4	T=0	P=0	Credits=4

Course Learning Objective	Course Outcomes
Student able to: 1. Introduce the data mining fundamentals, different techniques and identify the scope and necessity of Data Mining for the society. 2. Understand the basic concepts of data mining functionality Association mining, its algorithms and applications. 3. Understand the basic concepts of data mining functionality: classification and prediction, its algorithms and applications. 4. Understand the basic concepts of data mining functionality: clustering its algorithms and applications. 5. Understand the importance of web mining, and its types. 6. Get acquainted with analysis and mining of text data and different approaches for text mining.	After completion of the course: 1. Students will be able to describe basic concepts in data mining, Identify the scope and necessity of Data Mining for the society and effectively apply data mining technique in variety of business applications. 2. Students will be able to derive association rules for a given data set by applying appropriate algorithm. 3. Students will be able to describe the basic concepts in classification, use decision trees for classification and apply regression techniques for prediction, compare classification with prediction and clustering. 4. Students will be able to describe the basic concepts in clustering, apply clustering techniques for a given data set. 5. Students will be able to describe the concepts in web data mining, its types and its importance. 6. Students will be able to describe the techniques of mining text data and its applications

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT1427.1	Students will be able to describe basic concepts in data mining, Identify the scope and necessity of Data Mining for the society and effectively apply data mining technique in variety of business applications.	3.0					3.0							2.0	2.0
IT1427.2	Students will be able to derive association rules for a given data set by applying appropriate algorithm	3.0	3.0												
IT1427.3	Students will be able to describe the basic concepts in classification, use decision trees for classification and apply regression techniques for prediction, compare classification with prediction and clustering.	3.0	3.0												
IT1427.4	Students will be able to describe the basic concepts in clustering, apply clustering techniques for a given data set	3.0	3.0												
IT1427.5	Students will be able to describe the concepts in web data mining, its types and its importance	3.0	2.0												
IT1427.6	Students will be able to describe the techniques of mining text data and its applications	3.0	2.0												
IT1427		3.0	2.6				3.0							2.0	2.0

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

---

7th & 8th Semester (Group A & B)

IT1427	Data Mining	L=4	T=0	P=0	Credits=4

UNIT I [08 Hrs.]

Introduction to data mining: Data mining definitions & task, data mining on what kind of data ,Knowledge Discovery vs. Data mining, DBMS vs. Data Mining, Data mining functionalities, data mining task primitives , Major issues in data mining , applications of data mining.

UNIT II [08 Hrs.]

Association Rule Mining: what is Frequent itemsets, closed itemsets, and association rules, frequent pattern mining, applications of Association Rule mining, The Apriori algorithm for finding frequent itemset using candidate generation, generating association rules from frequent itemsets .Improving effieciency of Apriori , FP- growth algorithm.

UNIT III [08 Hrs.]

Classification and prediction: What is classification , prediction., Issues regarding Classification and prediction, Decision tree construction principle, Decision tree construction algorithms ID3, C4.5, Classification using decision tree Induction , prediction using Linear regression.

UNIT IV [08 Hrs.]

Cluster Analysis : What is cluster analysis, its applications, clustering paradigms, Partioning algorithms: K- means, K-medoids, Hierarchial clustering: Agglomerative and Divisive hierarchical clustering.

UNIT V [08 Hrs.]

Web Mining: Introduction, web content mining, web structure mining, web usage mining, mining multimedia data on web.

UNIT VI [08 Hrs.]

Text mining: Text data analysis and Information retrieval, Unstructured texts, text mining approaches, episode rule discovery for texts, Hierarchy of categories, text clustering.

	Text books:			
1	Data mining Techniques	2nd edition,	Jiawei Han and Micheline Kamber	Elsevier
2	Data mining techniques	2nd edition	Arun Pujari	University press (India) 2010

	Reference books:			
1	Introduction to data mining	ISBN: 0321321367.	Pang-Ning Tan, Michael Steinbach, vipin kumar	Addison- Wesley 2005
2	Data mining methods and models	second reprint 2007	Daniel Larose	Wiley Interscience

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | **8**

7th & 8th Semester (Group A & B)

IT 1428	Lab: Data Mining	L = 0	T = 0	P = 2	Credits =1

Course Learning Objective	Course Outcomes
Student will able: 1. To be able to differentiate between RDBMS schemas & Data Warehouse Schemas. 2. To understand the concept of Analytical Processing (OLAP) and its similarities & differences with respect to Transaction Processing (OLTP). 3. Understand the details of different algorithms made available by popular commercial data mining software; 4. Understand the regression analysis and its application 5. Understand data visualization	After completion of the course: 1. Students will be able to demonstrate the ability to perform data preprocessing tasks, data cleaning, and integration. 2. Students will be able to demonstrate the ability to implement and apply the principle algorithms and techniques used in data mining, such as clustering, association mining, classification and prediction on different types of datasets. and Analyze their results 3. Students will be able to demonstrate the ability to interpret the results using different visualization techniques.

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT1428.1	Demonstrate the ability to perform data preprocessing tasks	3.0	3.0			3.0									
IT1428.2	Demonstrate the ability to implement and apply the principle algorithms and techniques used in data mining, such as clustering, association mining, classification and prediction on different types of datasets. and Analyze their results	3.0	3.0			3.0								3.0	
IT1428.3	Demonstrate the ability to interpret the results using different visualization techniques		3.0			3.0									
	IT1428	3.0	3.0			3.0								3.0	

Sr. No	Experiments Base On
1	Study WEKA tool
2	Creation of .ARFF file for applying data mining techniques on following data sets (in ARFF file Format)i.e customer's data, weather forecasting data, agricultural data etc 1
3.	Usage of WEKA for Data cleaning task(filtering, discretization)
5.	Implementation / Usage of WEKA for classification of above mentioned data set
6.	Implementation / Usage of WEKA for Association rule mining
7.	Implementation / Usage of WEKA for clustering
8.	Implement a regression analysis and show the prediction on sample data. Compare predicted and actual value and calculate error in your system
9.	Draw scatter plot of your data and find whether linear regression can be used or not

Chairperson	Dean (Acad.Matters)	1.02 Version	Septerm-2017 Date of Release	Applicable for AY 2018-19 Onwards

P a g e | **9**

7th & 8th Semester (Group A & B)

IT1422	Network Security	L=3	T=0	P=0	Credits=3

Course Learning Objective	Course Outcomes
Student able to: 1. To focus on the foundations of Security 2. The basic concepts of public key encryption and number theory 3. To demonstrate network security tools and applications 4. To know the working of authentication and hash functions- 5. To know various authentication and security features 6. To understand managing and securing of network	After completion of the course: 1. Students will be able to understand the Security Attacks, mechanism and encryption techniques. 2. Students will be able to Analyze and understand the knowledge of Conventional Encrypting Algorithm and Encryption function for solving the Network Security Problems. 3. Students will be able to Analyze and understand the various types of Cryptographic. 4. Students will be able to Able to apply different authentication and authorization services for identification of User. 5. Students will be able to Able to understand various aspects of IP security. 6. Students will be able to Able to identify & understand various threats & can apply preventive measure to ensure system security.

Course Outcomes	Statement	1	2	3	4	5	6	7	8	9	10	11	12	PSO 1	PSO 2
IT1422.1	Understand the Security Attacks, mechanism and encryption technique's	3.0	2.0												
IT1422.2	Analyze and Understand the knowlededge of Conventional Encrypting Algorithm and Enyption function for solving the Network Security Problems.	2.0	2.0	2.0											
IT1422.3	Analyze and understand the various types of Cryptographic algorithms and Cryptographic hash functions	2.0	2.0	2.0											
IT1422.4	Able to apply different authentication & authorization services for identification of User	3.0		2.0											
IT1422.5	Able to understand various aspects of IP security	2.0		2.0										2.0	
IT1422.6	Able to identify & understand various threat& can apply preventive measure to ensure system security.	2.0	2.0	2.0		2.0									
	IT1422	2.3	2.0	2.0		2.0								2.0	

Note: The header row above shows "Mapped PO" spanning columns 1–12 and "PSO" spanning PSO 1 and PSO 2.

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | 10

7th & 8th Semester (Group A & B)

IT1422	Network Security	L=3	T=0	P=0	Credits=3

UNIT I [07 Hrs.]

Introduction- attacks services, mechanisms, security attacks, security services, model for internet work security, conventional encryption- classical techniques- encryption model, steganography, classical encryption techniques, modern techniques-simplified DES, differential and linear cryptanalysis, block cipher design principles, Block Cipher modes of operation

UNIT II [08 Hrs.]

Conventional encryption-algorithm RC5, Blowfish, DES, triple DES etc. characteristics of advanced symmetric block cipher, confidentiality using conventional encryption- placement of encryption function, traffic confidentiality, key distribution, random number generation.

UNIT III [08 Hrs.]

Public key encryption- principle of public –key cryptosystems, the RSA algorithm, key management, Diffie-Hellman key exchange ,Ellipse Curve Cryptography, Introduction to number theory prime and relatively prime numbers, modular arithmetic, Fermats and Euler's theorems ,testing for primarily, discrete Logarithms.

UNIT IV [08 Hrs.]

Message authentication and hash functions- authentication requirements, functions, codes, hash functions, security of hash functions and MACs, SHA-1, HMAC, digital signatures, authentication protocols, digital signature standard.

UNIT V [07 Hrs.]

Authentication applications-Kerberos, Directory authentication service, E-mail security-pretty good privacy, S/MIME, IP security-overview, architecture, authentication header, encapsulating security pay load, combining security associations, key management.

UNIT VI [07 Hrs.]

Web security-requirements, secure sockets layer, secure electronic transaction, network management security-SNMP, System security-intruders, viruses and related threats, firewall-design principles, trusted systems.

Text books:				
1	Cryptography and Network Security	6th Edition	William Stallings	Pearson Education
2	Network Security	2008	Behrouz A. Forouzan	McGraw-Hill Higher Education
Reference books:				
1	Networks Security Essentials, applications and standards	5th Edition	William Stallings	Pearson Education
2	Cryptography in C and C++	2nd Edition	Michael Welschenbach	Apress

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | **11**

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

BE SoE and Syllabus 2014
Information Technology

7th & 8th Semester (Group A & B)

IT1407	PE III : Real Time Systems	L=3	T=0	P=0	Credits=3

Course Learning Objective	Course Outcomes
Student will able: 1. To study the concepts of Real Time Systems and the different design issues of Real Time Systems. 2. To learn and understand the techniques for real time scheduling. 3. To study and understand formal specification and verification of timing constraints and properties. 4. To study and understand the concepts of priority driven scheduling and schedulability test. 5. To learn and understand the concepts of scheduling aperiodic & sporadic jobs in priority-driven systems. 6. To study the techniques resource access control and validation and Provide experience in the implementation of typical algorithms used in real time systems	After completion of the course: 1. Students will be able to understand the basics and importance of real-time systems and explain & address the fundamental problems of real-time systems. 2. Students will be able to analyze real-time scheduling and systems designs. 3. Students will be able to apply formal methods for scheduling real-time systems. 4. Students will be able to know the various task assignment and scheduling methods. For example RM and DM scheduling. 5. Students will be able to Analyze and Design basic multi-task scheduling algorithms for periodic, aperiodic, and sporadic tasks as well as understand the impact of the latter two on scheduling. 6. Students will be able to Analyze and examine how resource contention affects the execution behavior and Schedulability of jobs.

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT1407.1	Understand the basics and importance of real-time systems and explain & address the fundamental problems of real-time systems.	3.0	2.0												
IT1407.2	Analyze real-time scheduling and systems designs.	3.0	2.0	2.0												
IT1407.3	Apply formal methods for scheduling real-time systems.		3.0	2.0												2.0
IT1407.4	Know the various task assignment and scheduling methods. For example RM and DM scheduling		3.0	3.0												2.0
IT1407.5	Analyze and Design basic multi-task scheduling algorithms for periodic, aperiodic, and sporadic tasks as well as understand the impact of the latter two on scheduling.		3.0	3.0												2.0
IT1407.6	Analyze and examine how resource contention affects the execution behavior and Schedulability of jobs.	2.0	2.0													
IT1407		2.7	2.5	2.5												2.0

Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards
		1.02	Septerm-2017	Applicable for AY 2018-19

P a g e | 12

7th & 8th Semester (Group A & B)

IT1407	PE III : Real Time Systems	L=3	T=0	P=0	Credits=3

UNIT I [06 Hrs.]

Introduction to real time systems: Digital control, high-level controls, signals processing, real time applications. Hard and soft real time system: Jobs & processors, release times, deadlines, timing, constraint, Hard & Soft timing constraint, Hard real time systems, soft real time systems. Modeling of real time systems.

UNIT II [06 Hrs.]

Approach to real time scheduling: Clock-driven approach, weighted round-robin approach, priority-driven approach, dynamic versus static systems, effective release times and deadlines, optimality of EDF & LST algorithms, non-optimality of the EDF & LST, challenges in validating timing constraints in priority-driven systems, off line versus on-line scheduling.

UNIT III [07 Hrs.]

Clock driven scheduling: Notations & assumptions, static timer-driven scheduler, general structure of cyclic schedules, cyclic executives, improving the average response time of a periodic jobs, scheduling sporadic jobs, practical consideration and generalizations, algorithms for constructing static schedules, pros-cons of clock-driven scheduling.

UNIT IV [08 Hrs.]

Priority-driven scheduling: Static assumptions, fixed-priority versus dynamics priority algorithms, maximum schedulable utilization, optimality of the RM & DM algorithms, a schedulability test for fixed priority tasks with short response times & with arbitrary response times, sufficient schedulability conditions for the RM & DM algorithms.

UNIT V [08 Hrs.]

Scheduling aperiodic & sporadic jobs in priority-driven systems: assumptions & approaches, deferrable servers, sporadic servers, constant utilization, total bandwidth and weighted fair-queuing servers, slack stealing in dead-line driven systems, slack stealing in fixed-priority systems, scheduling of sporadic jobs

UNIT VI [07 Hrs.]

Resources and resource access control : assumption on resources and their usage, effects of resource contention & resource access control, non-preemptive critical sections, basic priority-inheritance protocol, basic priority-ceiling protocol, stack-based priority –ceiling protocol, use of priority-ceiling protocol in dynamic-priority systems, preemption-ceiling protocol, controlling accesses to multiple-unit resources, controlling concurrent accesses to data object.

Text books:		
1	Real Time Systems	Jame W.S.Liu	Pearson education

Reference books:		
1	Real Time Systems	C.M. Krishna & Kang G. Shin	McGraw Pub.

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | **13**

7th & 8th Semester (Group A & B)

IT1423	PE III :Human Computer Interaction	L=3	T=0	P=0	Credits=3

Course Learning Objective	Course Outcomes
Student will able: 1. To study and understand interface design tools 2. To study and demonstrate the Interaction between the human and computer components 3. To study and understand the screen designing and its various concepts. 4. To Study Design rules. 5. To study and understand software tools related to HCI process. 6. To understand the interaction devices.	After completion of the course: 1. Students will be able to apply the knowledge of human components for interaction with computer. 2. Students will be able to understand basics of Computer components functions regarding interaction with human. 3. Students will be able to demonstrate Understanding of Interaction between the human and computer components using screen designing concept. 4. Students will be able to apply Design rules to various interfaces 5. Students will be able to apply the knowledge of software tools for HCI. 6. Students will be able to Produce Implementation supports for HCI by using various tools.

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT1423.1	Apply the knowledge of human components for interaction with computer	2.0	2.0												
IT1423.2	To understand basics of Computer components functions regarding interaction with human.	2.0	2.0												
IT1423.3	Demonstrate Understanding of Interaction between the human and computer Components using screen designing concept.	3.0	2.0								2.0		1.0		
IT1423.4	Apply Design rules to various interfaces.			2.0											
IT1423.5	Apply the knowledge of software tools for HCI.	2.0													
IT1423.6	To Produce Implementation supports for HCI by using various tools.	3.0						1.0							
IT1423		2.4	2.0	2.0				1.0			2.0		1.0		

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | **14**

7th & 8th Semester (Group A & B)

IT1423	**PE III :Human Computer Interaction**	L=3	T=0	P=0	Credits=3

UNIT I [07 Hrs.]

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design, a brief history of Screen design, The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, Principles of user interface

UNIT II [07 Hrs.]

Design process –The Human, Human interaction with computers, importance of human characteristics, human consideration, Human interaction speeds, and understanding business functions.

UNIT III [08 Hrs.]

Screen Designing:- Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information–focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics– Technological consideration in interface design.

UNIT IV [06 Hrs.]

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT V [06 Hrs.]

Software tools – Specification methods, interface – Building Tools.

UNIT VI [06 Hrs.]

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

Text books:				
1	Human Computer Interaction	3rd Edition	Janet Finlay, Gregory D. Abowd, Russell Beale Alan Dix	Prentice Hall
2	The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques	3rd Edition	Wilbert O. Galitz	John Wiley & Sons
Reference books:				
1	Interaction Design: Beyond Human - Computer Interaction	3rd Edition	Yvonne Rogers, Helen Sharp, Jenny Preece	Wiley

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | **15**

7th & 8th Semester (Group A & B)

IT1429	PE III : Advanced Computer Architecture	L=3	T=0	P=0	Credits=3

Course Learning Objective	Course Outcomes
Student will able: 1. To understand the basic concept of different computer architecture and parallelism. 2. To study of different pipelining processor and its applications. 3. To understand the basic concept of array processor and SIMD. 4. To understand basic concept of Multiprogramming/Multiprocessing Architecture. 5. To study different data dependence for improvement of system performance. 6. To understand different techniques of parallelism and its extraction.	After completion of the course: 1. Students will be able to analyze classification of Computer architecture and its parallelism. 2. Students will be able to apply different pipelining techniques in an application. 3. Students will be able to Design solution for solving complex problems using Array processor and SIMD. 4. Students will be able to Apply the knowledge of Multiprogramming/Multiprocessing for the improvement of system performance. 5. Students will be able to Analyze different data flow dependent and its effects on parallelism. 6. Students will be able to Apply different parallelism techniques and its extraction to application.

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT1429.1	Analyze classification of Computer architecture and its parallelism		2.0												2.0
IT1429.2	Apply different pipelining techniques in an application	3.0													2.0
IT1429.3	Design solution for solving complex problems using Array processor and SIMD			3.0											2.0
IT1429.4	Apply the knowledge of Multiprogramming/Multiprocessing for the improvement of system performance	3.0													3.0
IT1429.5	Analyze different data flow dependent and its effects on parallelism		3.0												2.0
IT1429.6	Apply different parallelism techniques and its extraction to application	2.0													2.0
IT1429		2.7	2.5	3.0											2.2

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | **16**

7th & 8th Semester (Group A & B)

IT1429	PE III : Advanced Computer Architecture	L=3	T=0	P=0	Credits=3

UNIT I [10 Hrs.]

Introduction to parallel processing : memories and IO subsystem : Evolution of computer system, parallelism in uniprocessor system, parallel computer structure, architecture classification schemes, parallel processing application, Hierarchical memory structure, virtual memory system, memory allocation and , management, I/O subsystem.

UNIT II [08 Hrs.]

Pipelining and vector processing : Pipeline, overlapped pipelining, instruction and arithmetic pipelining, pipelined processor, vector processing, vector processor, architecture of cray-1, parallel memory organization

UNIT III [08 Hrs.]

Array Processor : SIMD array processor, (organization and inter connection networks), Parallel algorithms for array processor, SIMD matrix multiplication, parallel sorting on array processor, associative array processing, associative memory organization associative processors.

UNIT IV [08 Hrs.]

SIMD Computer and Multiprocessor Architecture : III iac-IV System architecture and its applications, performance enhancement methods, parallel memory allocation, array processing, languages, multiprocessors, loosely and tightly coupled multiprocessor, time shared and crossbar interconnection networks, parallel memory organization, interleaved memory configuration.

UNIT V [08 Hrs.]

Multiprocessing control and Data Flow Computers: Interprocess communication mechanisms system deadlocks and protection parallel algorithms for multiprocessors, classifications of parallel algorithms data driven computing, data flow computer architecture.

UNIT VI [05 Hrs.]

Techniques for Extraction of parallelism.

Text books:				
1	Advanced Computer Architecture	2nd edition,	Kai Hwang	McGraw-Hill
Reference books:				
1	Computer Architecture and Parallel Processing	1st edition	Hwang & Briggs	Mc-Graw Hill Pub

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | 17

7th & 8th Semester (Group A & B)

IT1430	PE III : E-Commerce	L=3	T=0	P=0	Credits=3

Course Learning Objective	Course Outcomes
Student will able: 1. To understand the scope of e-commerce in the realm of modern Business. 2. To learn the marketing methods& Business strategies used in e-commerce. 3. To know how the electronic data interchange and how to manage-commerce solutions. 4. Recognize the business impact and potential of e-Commerce 5. Assess the impact of the Internet and Internet technology on business-electronic commerce and electronic business 6. Understand the security threats &electronic payment system.	After completion of the course: 1. Students will be able to understand of contemporary ecommerce concepts and terminology, and the processes and management decisions that are involved in launching, operating and managing business activity on the World Wide Web. 2. Students will be able to analyze and understand the human, technological and business environment associated with e-commerce. 3. Students will be able to define and analyze the concept of electronic data interchange and its legal, social and technical aspects. 4. Students will be able to evaluate the key aspects of B2C e-commerce. 5. Students will be able to discuss the trends in e-Commerce and the use of the Internet. 6. Students will be able to define and analyze the security issues over the web, the available solutions, future aspects of e-commerce security, concept of E-commerce and electronic payment system.

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT1430.1	Students will able to understand of contemporary ecommerce concepts and terminology, and the processes and management decisions that are involved in launching, operating and managing business activity on the World Wide Web.	2	1												
IT1430.2	Students will able to analyze and understand the human, technological and business environment associated with e-commerce.	3	3												
IT1430.3	Students will able to define and analyze the concept of electronic data interchange and its legal, social and technical aspects.	3	3				3								
IT1430.4	Students will able to evaluate the key aspects of B2C e-commerce.	2	1												
IT1430.5	Students will able to discuss the trends in e-Commerce and the use of the Internet.	1	1												
IT1430.6	Students will able to define and analyze the security issues over the web, the available solutions, future aspects of e-commerce security, concept of E-commerce and electronic payment system.	2	3				3							2	
	IT1430	2.2	2.0				3.0							2.0	

Chairperson	Dean (Acad.Matters)	1.02 Version	Septerm-2017 Date of Release	Applicable for AY 2018-19 Onwards

P a g e | **18**

7th & 8th Semester (Group A & B)

IT1430	PE III : E-Commerce	L=3	T=0	P=0	Credits=3

UNIT I [07 Hrs.]

Internet &Introduction to Electronic Commerce: The basics of internet access, email, FTP, TELNET, Introduction to WWW: The basics of WWW & browsing working of Web Browser & Web Server, Web Browser architecture. Introduction to Electronic Commerce: The scope of Electronic Commerce, Definition of Electronic Commerce, Electronic Commerce and the Trade.

UNIT II [07 Hrs.]

Business Strategy in an Electronic Age: The Value Chain System, Competitive Advantage, Business Strategy.

[08 Hrs.]

UNIT III

Business to Business Electronic Commerce: Inter-organisational Transactions, Electronic Markets, Electronic Data Interchange, EDI: EDI Technology, EDI Standards, EDI, Communication, EDI Implementation, EDI Security, EDI and Business, Inter-organisational e-Commerce.

UNIT IV [07Hrs.]

Business to Consumer Electronic Commerce: Consumer Trade transactions, What you want, when you want it, internet e-commerce, Internet Shopping and the Trade cycle, Advantage and Disadvantage of Consumer e-commerce.

UNIT V [07 Hrs.]

The Elements of e-Commerce& e-Business: Elements, e-Visibility, The e-shop, Online Payments, Delivering the Goods, After-Sales Service.
e-Business: Introduction, Internet Bookshops, Software Supplies and support, Electronic Newspapers, Internet Banking, Virtual Auctions, Online Share Dealing, Gambling on the Net.

UNIT VI [08 Hrs.]

Security Threats to E-Commerce, Electronic Payment Systems (EPS).

Text books:				
1	E-Commerce	2001	David Whiteley	McGrew Hill Pub
2	Electronic Commerce	2nd Edition	Gary P. Schneider & James T. Perry	Course Technology
Reference books:				
1	Teach Yourself Web Technologies - Part 1	2003	Ivan Bayross	BPB Publications
2	Web Technologies TCP/IP Architecture, and Java Programming	2nd Edition	Achyut S. Godbole and Atul Kahate	McGraw-Hill Education (India)

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

7th & 8th Semester (Group A & B)

IT1432	PE III :Cloud Computing	L=3	T=0	P=0	Credits=3

Course Learning Objective	Course Outcomes
1. To study the different Computing Systems with the comprehensive and in-depth knowledge of Cloud Computing. 2. To study the basics of Cloud Computing Concepts and Technology 3. To study the Cloud Computing architecture and its applications, Fundamental issues and Technologies. 4. To Study of Cloud application design considerations and its methodology 5. To Study basics of Cloud Computing Security mechanisms. 6. To Study applications of Hadoop and MapReduce in Cloud Computing	After completion of the course students will be able to: 1. Understand different computing Environment and apply the knowledge of cloud computing for solving Engineering Problems 2. Understand and Elaborate the various concepts and techniques in cloud computing 3. Identify and apply cloud computing architectures for the development of applications 4. Develop solutions for the designing of cloud applications 5. Apply cloud computing security mechanism to make computing system more secure 6. Apply Hadoop and MapReduce techniques for the development of cloud applications

Course Outcomes	Statement	Mapped PO 1	2	3	4	5	6	7	8	9	10	11	12	PS PO 1	2
IT1432.1	Understand different computing Environment and apply the knowledge of cloud computing for solving Engineering Problems	3													
IT1432.2	Understand and Elaborate the various concepts and techniques in cloud computing	2													
IT1432.3	Identify and apply cloud computing architectures for the development of applications	3	2												2
IT1432.4	Develop solutions for the designing of cloud applications			3											2
IT1432.5	Apply cloud computing security mechanism to make computing system more secure	3													3
IT1432.6	Apply Hadoop and MapReduce techniques for the development of cloud applications					3									3
IT1432		**3**	2	3		3									3

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

7ᵗʰ & 8ᵗʰ Semester (Group A & B)

IT1432	PE III :Cloud Computing	L=3	T=0	P=0	Credits=3

UNIT I **[06 Hrs.]**
Overview of Computing Paradigm, Recent trends in Computing, Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Fog computing, Cloud Computing, Sky Computing; Introduction to Cloud Computing: Defining Cloud Computing, Characteristics of Cloud Computing, Cloud Models: Service Model, Deployment Model, Benefits and Disadvantages of Cloud computing

UNIT II **[07 Hrs.]**
Cloud Concepts and Technology: Virtualization, Load Balancing, Scalability& elasticity, Deployment, Replication, Monitoring, Software Define network, Network Function Virtualization, Identify and Access Management, Service Level Agreement, Billing

UNIT III **[09 Hrs.]**
Cloud Computing Architecture: Cloud computing stack, Comparison with traditional computing architecture (client/server)
Infrastructure as a Service(IaaS): Introduction to IaaS,IaaS definition, Introduction to virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine(VM),Resource Virtualization: Server, Storage, Network ,Virtual Machine(resource) provisioning and manageability, storage as a service, Data storage in cloud computing(storage as a service) with Example, Platform as a Service (PaaS): Introduction to PaaS, What is PaaS, Service Oriented Architecture (SOA), Cloud Platform and Management: Computation, Storage, Software as a Service (SaaS) Introduction to SaaS, Web services, Web 2.0

UNIT IV **[08 Hrs.]**
Cloud Application Design: introduction, Design Consideration for Cloud applications: Scalability, Reliability and Availability, Security, maintenance and Upgradation, Performance; Reference Architecture for Cloud application, Cloud application Design methodology, Data storage Approaches: Relational Approach and Non-Relational Approach

UNIT V **[07 Hrs.]**
Cloud Security: Introduction, CSA Cloud Security Architecture, Authentication, Authorization, Identity & Access Management, Data Security: Securing Data at rest, Securing Data in Motion, Key Management, Auditing

UNIT VI **[08 Hrs.]**
Hadoop and Map reduce: apache Hadoop, Hadoop job reduce job execution: Name node, Secondary Name Node, Job Tracker, Data node, MapReduce job execution Workflow; Hadoop scheduling ,Hadoop Cluster Setup

Text books:				
1	Cloud Computing A hands-on Approach	2014	Arshdeep Bahga, VijayMadisetti	University press
Reference books:				
1	Cloud Computing: Principles and Paradigms	1ˢᵗ Edition	Rajkumar Buyya, James Broberg , Andrzej M. Goscinski	Wiley-Blackwell
2	Cloud Security: A Comprehensive Guide to Secure Cloud Computing,	1ˢᵗ Edition	Ronald L. Krutz, Russell Dean Vines	John Wiley

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | 21

7th & 8th Semester (Group A & B)

IT1436	PE III: Coding Standards & Technical Documentation	L=3	T=0	P=0	Credits=3

Course Learning Objective	Course Outcomes
Student will able: 1. To learn various concepts of coding & document standards. 2. To understand various coding guidelines. 3. To learn basic programming elements of Java programming. 4. To learn various coding standards. 5. To understand various technical documents needed in software development. 6. To understand basics of report writing.	After completion of the course: 1. Students will be able to differentiate between various programming standards and styles of programming. 2. Students will be able to write good programs based on the guidelines of the coding. 3. Students will be able to write efficient Java programs based on styles of Java. 4. Students will be able to differentiate between different patterns and standards of coding in Java. 5. Students will be able to prepare better manuals, case reports and software documents. 6. Students will be able to write proper reports

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT1436.1	Students will be able to differentiate between various programming standards and styles of programming	3.0	3.0	2.0											
IT1436.2	Students will be able to write good programs based on the guidelines of the coding	3.0		3.0	3.0										
IT1436.3	Students will be able to write efficient Java programs based on styles of Java	3.0	3.0		2.0	2.0									
IT1436.4	Students will be able to differentiate between different patterns and standards of coding in Java	3.0	3.0	2.0		2.0									
IT1436.5	Students will be able to prepare better manuals, case reports and software documents	3.0				3.0									2.0
IT1436.6	Students will be able to write proper reports			2.0	2.0	3.0									
IT1436		3.0	3.0	2.3	2.3	2.5									2.0

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | **22**

7th & 8th Semester (Group A & B)

IT1436	PE III: Coding Standards & Technical Documentation	L=3	T=0	P=0	Credits=3

UNIT I [05 Hrs.]

Introduction to general coding standards, Internal document Standards, Coding Standards: Indentation, Inline comments, procedure oriented programming, Object based programming, Structured Programming, Classes, Function, Subroutines, Methods, Source Files, and Variable Names.

UNIT II [05 Hrs.]

Coding Guidelines: Line Length, Spacing, Wrapping Lines, Variable declarations, Program Statements, use of parentheses, Coding for efficiency vs. Coding for readability, Meaningful error messages, Reasonable sized Functions and Methods, Number of routines per File, Elements of Programming Style.

UNIT III [06 Hrs.]

The elements of Java Style: Introduction, General Principles, Formatting Conventions, Naming Conventions: Package Names, Method Names, Constant Names. Documentation Conventions, Programming Conventions: Type safety, Statements & Expressions, Construction, Exception Handling, Assertions, Concurrency, Synchronization, Efficiency. Packaging Conventions.

UNIT IV [08 Hrs.]

Java Coding Standards: The Prime Directive: Naming conventions, Documentation, Java comments, Standards for member functions, Member function visibility, Documenting Member Functions, Techniques for writing clean code, standards for fields (Attributes/Properties), standards for local variables, Standards for parameters, Standards for classes, standards for Interfaces, standards for Packages, standards for Compilation Units (Source code file).

UNIT V [08 Hrs.]

Introduction to Technical Writing: Prewriting, Writing & Rewriting, Objectives in technical writing, correspondence: Memos, Letters, Writing effective resumes, Visual appeal: document design, graphics, electronics communication: writing email, online help & websites, writing instructions & user's manuals

UNIT VI [08 Hrs.]

Report strategies: writing research reports, feasibility reports, Lab reports, Progress reports, Writing proposals

Text books:			
1	The elements of Programming Style	2nd edition	Brain W. Kernighan and P.J. Plauger	MGraw Hill
2	The elements of Java Style	2000	Allan Vermeulen, Scoff W. Ambler, Greg Bumgardner, Eldon Metz, Trevor Misfeldt, Jim Shur, Cao Tieou	Cambridge University
3	Technical Writing Process & Product	5th edition, 2005	T Sjaron J. Gerson & Steven M. Gerson	Prentice Hall

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | 23

7th & 8th Semester (Group A & B)

IT1415	PE IV : Neural Networks & Fuzzy Logic	L=3	T=0	P=0	Credits=3

Course Learning Objective	Course Outcomes
Student will able: 1. To focus on the foundations of neural network theory and the application of neural network models in engineering, cognitive science, and artificial intelligence 2. To introduce the neural networks as means for computational learning and to present the basic network architectures and learning algorithms for classification and regression 3. To demonstrate neural network applications on real-world tasks 4. To emphasize the need for fuzzy logic as a means to model linguistic knowledge in human experts 5. To know fuzzy Arithmetic and inference techniques 6. To understand fuzzy inference and reasoning so as to build systems based on fuzzy control	After completion of the course: 1. Students will be able to focus on the mathematical foundations of neural network theory and to understand the working of Neural Networks as pattern classifier. 2. Students will be able to comprehend the neural networks as means for computational learning and to analyze the basic network architectures and algorithms for supervised learning. 3. Students will be able to comprehend the neural networks as means for computational learning and to analyze the basic network architectures and algorithms for unsupervised learning. 4. Students will be able to understand the basics of fuzzy sets, its operations and the need for fuzzy logic. 5. Students will be able to understand fuzzy numbers, fuzzy relations and extension principle. 6. Students will be able to understand fuzzy inference system and to design a fuzzy controller.

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT415.1	Students will be able to focus on the mathematical foundations of neural network theory and to understand the working of Neural Networks as pattern classifier.	3	3												
IT415.2	Students will be able to comprehend the neural networks as means for computational learning and to analyze the basic network architectures and algorithms for supervised learning.	3	3	3											
IT415.3	Students will be able to comprehend the neural networks as means for computational learning and to analyze the basic network architectures and algorithms for unsupervised learning.	3	3	3											
IT415.4	Students will be able to understand the basics of fuzzy sets, its operations and the need for fuzzy logic.	3													

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

7th & 8th Semester (Group A & B)

IT1415	PE IV : Neural Networks & Fuzzy Logic	L=3	T=0	P=0	Credits=3

IT415.5	Students will be able to understand fuzzy numbers, fuzzy relations and extension principle.	3													
IT415.6	Students will be able to understand fuzzy inference system and to design a fuzzy controller.	3	3	3											
IT415		3.0	3.0	3.0											

UNIT I **[07 Hrs.]**

Fundamentals concepts and models of artificial neural systems: Biological neurons and their artificial models, models of artificial neural networks, learning and adaption, neural network learning rules, feed forward and feedback networks, single-layer perceptron classifiers, Discriminant functions, linear machine and minimum distance classification, training and classification using the perceptron, SDTA algorithm, MCPTA algorithm.

UNIT II **[06 Hrs.]**

Single layer perceptron networks for linearly separable classification, RDPTA algorithm. Multilayer feed forward networks: linearly non-separable pattern classification, delta learning rule. Feed forward recall and error back-propagation training, learning factors.

UNIT III **[07 Hrs.]**

Mathematical foundations of Discrete time Hopfield networks,, Hopfield learning algorithm, clustering and similarity measures, Self-Organizing Feature Maps, Applications of artificial neural networks

UNIT IV **[06 Hrs.]**

From classical (CRISP) sets to fuzzy sets, characteristics and significance of the paradigm shift, fuzzy sets versus crisp sets, representation of fuzzy sets, properties of fuzzy sets. Operations on fuzzy sets: types of operations, fuzzy complements, fuzzy intersection s-norms, fuzzy unions: t-Conorms.

UNIT V **[07 Hrs.]**

Fuzzy Arithmetic: fuzzy numbers, Linguistics variables, arithmetic operations on fuzzy numbers, Fuzzy relations, extension principles for fuzzy sets.

UNIT VI **[07 Hrs.]**

Fuzzy rules and reasoning, fuzzy inference, fuzzification, evaluation of fuzzy rules, aggregation of output fuzzy sets Defuzzification methods, design of a fuzzy controller

Text books:				
1	Introduction to Artificial Neural Systems	2nd Edition	J. M. Zurada	Jaico Publishing House.
2	Fuzzy sets and Fuzzy logic, Theory and Applications	1st Edition	George J. Klir and Bo Yuan	Prentice Hall,
Reference books:				
1	Fuzzy Logic With Engineering Applications	2004	T. J. Ross	McGraw Hill
2	An introduction to Fuzzy Control	2nd Edition	D. Driankov	Narosa Pub. House,
3	Artificial Neural Networks	1999	Yegnanarayan	PHI
4	Neuro-fuzzy and Soft Computing	1996	Jang.Sun and E. Mizutani	Prentice Hall

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | 25

7ᵗʰ & 8ᵗʰ Semester (Group A & B)

IT1405	PE IV : Pattern Recognition	L=3	T=0	P=0	Credits=3

Course Learning Objective	Course Outcomes
Student will able to: 1. Understand basic principles of pattern recognition system. 2. Understand probabilistic distributions and to estimate parameters of density from the data available in the training samples. 3. Understand parametric classification/ decision making concept and to determine optimal boundary between two classes. 4. Comprehend non-parametric classification/ decision making concept and to choose an appropriate decision making technique for solving the classification problem. 5. Understand basic principles of different clustering methods. 6. Understand concept of artificial neural networks & its application to pattern recognition.	After completion of the course: 1. Students will be able to understand the fundamentals of pattern recognition, design cycle, application. 2. Students will be able to analyze classification problems probabilistically and estimate classifier performance. 3. Students will be able to understand the principles of Bayesian parameter estimation and apply them in relatively simple probabilistic models. 4. Students will be able to understand and analyze methods of classification techniques, able to choose a decision-making technique. 5. Students will be able to select appropriate clustering method for solving the given problem. 6. Students will be able to Understands Nets with & without Hidden Layers, Back-Propagation Algorithm, and Hopfield Nets.

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT1405.1	Students will able to understand the fundamental of pattern recognition, design cycle, application.	3.0												2.0	2.0
IT1405.2	Students will able to analyze classification problems probabilistically and estimate classifier performance.	3.0	3.0												
IT1405.3	Students will able to understand the principles of Bayesian parameter estimation and apply them in relatively simple probabilistic models.	3.0	3.0												
IT1405.4	Students will able to understand and analyze methods of classification techniques, able to choose a decision-making technique.	3.0	3.0												
IT1405.5	Students will be able to select appropriate clustering method for solving the given problem.	3.0	3.0												
IT1405.6	Students will be able to Understands Nets with & without Hidden Layers, Back-Propagation Algorithm, and Hopfield Nets.	2.0													
	IT1405	2.8	3.0											2.0	2.0

Chairperson	Dean (Acad.Matters)	1.02 Version	Septerm-2017 Date of Release	Applicable for AY 2018-19 Onwards

7th & 8th Semester (Group A & B)

IT1405	PE IV : Pattern Recognition	L=3	T=0	P=0	Credits=3

UNIT I [06 Hrs.]

Introduction: Machine perception, Components of Pattern recognition systems, the design cycle, Statistical Decision Theory, Applications of Pattern Recognition.

UNIT II [07 Hrs.]

Probability: probabilities of events, random variables, joint distribution & densities, moments of random variables, estimation of parameters from samples.

UNIT III [07 Hrs.]

Statistical Decision Making: Baye's Theorem, Decision boundaries, estimation of error rates.

UNIT IV [08 Hrs.]

Non parametric decision Making: Histograms, kernel and window estimators, nearest neighbour classification techniques, adaptive decision boundaries, adaptive discriminate functions, minimum squared error, estimation functions.

UNIT V [07 Hrs.]

Clustering: Introduction, hierarchical clustering, partition clustering

UNIT VI [06 Hrs.]

Artificial Neural Networks: Introduction, Nets without Hidden layer, Nets with Hidden Layers, The Back-Propagation Algorithm, Hopfield Nets

Text books:				
1	Pattern recognition & Image processing	2003	EarlGose, Richard Johnsonbaugh & Steve Jost	Pearson Education
Reference books:				
1	Pattern Classification	2nd Edition	Richard Duda, Peter Hart and David G. Stork	Wiley

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | 27

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

BE SoE and Syllabus 2014
Information Technology

7ᵗʰ & 8ᵗʰ Semester (Group A & B)

IT1421	PE IV : Distributed Systems	L=3	T=0	P=0	Credits=3

Course Learning Objective	Course Outcomes
Student will able: 1. To study the different design issues of Distributed Systems, and Create an awareness of the major technical challenges in distributed systems design and implementation; 2. To study and understand the concepts of Distributed Objects, Distributed file system and Remote Procedure Calls; 3. To study the concepts of Clock synchronization & Timing models; 4. To gain knowledge on Distributed systems concepts that includes architecture and Mutual exclusion algorithms. 5. To study the safety and progress properties of concurrent and distributed algorithms. 6. To study and understand the concepts of failure recovery and fault tolerance in distributed environment.	After completion of the course: 1. Students will be able to define distributed systems & identify models of distributed computing. 2. Students will be able to describe the message communication, remote procedure call and Remote method invocation (RPC and RMI) along with group communication. 3. Students will be able to analyze algorithms for coordination, communication, and synchronization in distributed systems. 4. Students will be able to demonstrate the Mutual exclusion protocols of Distributed Systems. 5. Students will be able to design distributed algorithms for deadlocks detection and Agreement. 6. Students will be able to specify the use of fault tolerance and failure recovery in the design of distributed application software.

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT1421.1	Define distributed systems & Identify models of distributed computing.	2.0	3.0												
IT1421.2	Describe the message communication, remote procedure call and Remote method invocation (RPC and RMI) along with group communication.	3.0	2.0												
IT1421.3	Analyze algorithms for coordination, communication, and synchronization in distributed systems.	3.0	2.0	3.0											2.0
IT1421.4	Demonstrate the Mutual exclusion protocols of Distributed Systems.		3.0	3.0											2.0
IT1421.5	Design distributed algorithms for deadlocks detection and Agreement.		3.0	3.0											
IT1421.6	Specify the use of fault tolerance and failure recovery in the design of distributed application software.		3.0	2.0											
	IT1421	2.7	2.7	2.8											2.0

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | 28

7th & 8th Semester (Group A & B)

IT1421	PE IV : Distributed Systems	L=3	T=0	P=0	Credits=3

UNIT I   Architecture of Distributed Systems   **[06 Hrs.]**
Characteristics of Distributed System, Motivation, challenges /Issues in the design & development of Distributed System. Architecture Model, System Architecture, Types of Architectural Model: Client server model, Search engine, Proxy server & caches, Variation on client server model: mobile code, mobile agents. Fundamental Models: Interaction model, failure model, Security model,

UNIT II   Distributed Objects & Distributed file system   **[06 Hrs.]**
Inter-process communication, Sockets, middleware, Group communication, and Remote procedure calls. CORBA, RMI, Distributed file system, Name services, Directory services, File Service types, download/upload model, File sharing semantics, session semantics, Server design: stateless & stateful server, Cache update policies. Case studies on Distributed file system: NFS, AFS.

UNIT III   Theoretical Foundations   **[07 Hrs.]**
Inherent limitations of distributed systems, Timing issues, clock synchronization, Network time protocol, Lamport's logical clocks, Vector clocks, Casual ordering of messages, Global state, Cuts of Distributed computation, Termination detection.

UNIT IV   Distributed Mutual Exclusion   **[08 Hrs.]**
Classification of mutual exclusion algorithms, Requirements and performance measures of mutual exclusion algorithms, Leader election, Chang Robert: Ring based leader election algorithm, Bully algorithm. Non Token Based Algorithms: Lamport's Algorithm, The Ricart-Agrawala Algorithm, Maekawa's Algorithm.Token Based Algorithms: Suzuki-Kasami's Algorithm, Raymond's Algorithm, Comparative performance analysis

UNIT V   Distributed Deadlock Detection & Agreement Protocols   **[08 Hrs.]**
Resource vs Communication deadlocks, graph theoretic model, deadlock prevention, avoidance, detection, Issues in deadlock detection, Centralized deadlock detection algorithms, distributed deadlock detection algorithms
Agreement Protocols
Synchronous vs. asynchronous computations, model of process failures, authenticated vs. non-authenticated messages. A classification of Agreement problems, Solutions to Byzantine Agreement problem, Lamport –Shostak-Pease algorithm.

UNIT VI   Failure recovery and Fault Tolerance   **[06 Hrs.]**
Classification of failures. Backward and forward error recovery, Basic approaches of backward error recovery, recovery in concurrent systems, consistent set of checkpoints, synchronous check pointing and recovery, asynchronous check pointing and recovery. Fault Tolerance: Atomic actions and committing, commit protocols, non-blocking commit protocols, Voting protocols, Dynamic voting protocols, Dynamic Vote Reassignment Protocols.

Text books:				
1	Advanced Concepts In Operating Systems: Distributed, Multiprocessor and Database Operating Systems	1993	Mukesh Singhal and Niranjan G. Shivaratri	McGraw Hill
2	Distributed Operating Systems Concepts and Design	3rd Edition	G Coulouris, Jean Dollimore, Tim Kindberg	Addison Wesley
Reference Books				
1	Distributed Algorithms	2013	Lynch N	Morgan Kaufman
2	Modern Operating Systems	4th Edition	Tanenbaum	Pearson Education
3	Distributed Operating Systems: Concepts and Design	1st Edition	Pradeep K. Sinha	Prentice-Hall of India Pvt.Ltd

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

7th & 8th Semester (Group A & B)

IT1416	Lab Course Name: Neural Network and Fuzzy Logic	L = 0	T = 0	P = 2	Credits =1

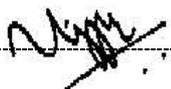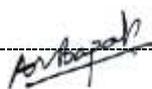| Course Learning Objective	Course Outcomes
1. To familiarize with neural networks and learning methods for neural networks 2. To introduce the neural networks as means for computational learning and to present the basic network architectures and learning algorithms for classification 3. To demonstrate neural network applications on real-world tasks 4. To introduce the ideas of fuzzy sets, fuzzy logic and to emphasize the need for fuzzy logic to model linguistic knowledge in human experts 5. To know fuzzy Arithmetic and inference techniques along with its applications 6. To understand fuzzy inference and reasoning to build systems based on fuzzy control and to understand of Neuro-Fuzzy Systems	Students who complete this course will be able to 1. Focus on the mathematical foundations of neural network theory and to understand the working of Neural Networks as pattern classifier 2. Comprehend the neural networks as means for computational learning and to analyze the basic network architectures and algorithms 3. Effectively use existing software tools to solve real problems using a neural network approach\ 4. To understand the basics of fuzzy sets, its operations and the need for fuzzy logic 5. To apply fuzzy numbers, their operations and fuzzy inference techniques to model the human intelligence 6. To build systems based on fuzzy control and to understand the basics of fuzzy inference and reasoning and Neuro-Fuzzy Systems

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT1416.1	Focus on the mathematical foundations of neural network theory and to understand the working of Neural Networks as pattern classifier		3												
IT1416.2	Comprehend the neural networks as means for computational learning and to analyze the basic network architectures and algorithms	2		3		3							3	2	
IT1416.3	Effectively use existing software tools to solve real problems using a neural network approach\						2								
IT1416.4	To understand the basics of fuzzy sets, its operations and the need for fuzzy logic	2		2									2		
IT1416.5	To apply fuzzy numbers, their operations and fuzzy inference techniques to model the human intelligence	3		3		2							3		
IT1416.6	To build systems based on fuzzy control and to understand the basics of fuzzy inference and reasoning and Neuro-Fuzzy Systems	3													
	IT1416	3	3	3		3	2						3	2	

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | **30**

7th & 8th Semester (Group A & B)

IT1416	Lab Course Name: Neural Network and Fuzzy Logic	L = 0	T = 0	P = 2	Credits =1

Sr. No	Problem Statements
1	Implement McCulloch-Pits Neuron Model using NAND and NOR gate.
2	Implement two-layer Feedforward Neural Network.
3	Implement Feedback Neural Network.
4	Implement A-Z character recognition using Feedforward Neural Network.
5	Implement clustering algorithm.
6	Implement Dichotmizer using threshold logic unit (TLU).
7	Implement T-norms and S-norms.
8	Implement fuzzy system for dilation and concentration.
9	Implement a fuzzy system for Fan Speed Controller.
10	Implement classical relationship between Fuzzy set.
11	Implement following relation of composition Min-max Max-product Max-average
12	Implement neuro fuzzy system

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | **31**

7th & 8th Semester (Group A & B)

IT 1439	Lab: PE IV : Pattern Recognition	L = 0	T = 0	P = 2	Credits =1

Course Learning Objective	Course Outcomes
Student will able: 1. To develop skills to understand, design and analyze simple concepts of pattern recognition system 2. To strengthen the ability to identify and apply the suitable model of pattern recognition for the given real-world problem 3. To gain knowledge in practical applications of pattern recognition	After completion of the course: 1. Students will be able to understand, design and analyze the basics of pattern recognition system. 2. Students will be able to capable to identity the appropriate model of pattern recognition for given problem. 3. Students will be able to have practical knowledge on the application of pattern recognition.

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT 1439.1	Students will be able to understand, design and analyze the basics of pattern recognition system	3.0	3.0											2.0	2.0
IT 1439.2	Students will be able to capable to identity the appropriate model of pattern recognition for given problem.	3.0	2.0												
IT 1439.3	Students will be able to have practical knowledge on the application of pattern recognition.	3.0	3.0											2.0	2.0
	IT 1439	3.0	2.7											2.0	2.0

Sr. No.	Name of Practical
1	Study of Design Cycle of Pattern Recognition.
2	To Plot Histogram for two Classes & find a Decision Boundary. To Plot Scatterplot for each Feature Vector of two Classes & find a Decision Boundary.
3	To Plot Binomial Distribution Function $P(k)$ for $n = 6$ & $\Theta = 0.6$. To Plot Poisson Distribution Function $P(n)$ for $\lambda = 1.5$ up to n.
4	To Plot Uniform Density & Cumulative Distribution Function. To Plot Exponential Density & Cumulative Distribution Function.
5	To Study & Perform Experiment on Bayes' Theorem.
6	To Plot Two-Dimensional Decision Boundary Between Two Classes.
7	To study & perform experiments on Single Linkage Clustering Technique.
8	To study & perform experiments on Complete Linkage Clustering Technique.
9	To study & perform experiments on Average Linkage Clustering Technique.
10	To study Artificial Neural Networks

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | 32

7th & 8th Semester (Group A & B)

IT1440	Lab: PE IV : Distributed Systems	L = 0	T = 0	P = 2	Credits =1

Course Learning Objective	Course Outcomes
Student will able: 1. Understand the fundamentals of distributed computing. 2. Learn the Concepts of Socket Programming; 3. Understand the concepts of Remote procedure calls and IPC mechanisms in distributed systems environment. 4. Understand the concepts of timing and event relation in distributed environment.	After the completion, of course: 1. Students will be able to create applications using techniques such as forking, multithreading. 2. Students will become familiar with several common programming interfaces for network communication; and have a detailed knowledge of the TCP/UDP Sockets. 3. Students will be able to implement timing and event relation in distributed environment.

Course Outcomes	Statement	Mapped PO												PSO	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
IT1440 .1	Create applications using techniques such as forking, multithreading.	2.0													
IT1440 .2	Familiar with several common programming interfaces for network communication; and have a detailed knowledge of the TCP/UDP Sockets.			3.0											
IT1440 .3	Implement timing and event relation in distributed environment			3.0											
IT1440		2.0		3.0											

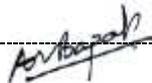| Sr. No	Experiments Base On
1	Concepts of process creation and communication
2	Simulate the functioning of Lamport's Logical Clock .
3	Simulate the functioning of Lamport's Vector Clock .
4	Simulate the Distributed Mutual Exclusion.
5	Implement a Distributed Chat Server using TCP Sockets.
6	Implement a Distributed Chat Client using TCP Sockets.
7	Implement a Distributed Chat Server using UDP Sockets.
8	Implement a Distributed Chat Client using UDP Sockets.
9	Implement RPC mechanism for a file transfer across a network.
10	Implement 'Java RMI' mechanism for accessing methods of remote systems.
11	Implement CORBA mechanism by using 'C++' program at one end and 'Java' program on the other.

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | 33

7th & 8th Semester (Group A & B)

IT1424	Industrial Project (Industry Visit / Training / Seminar)	L=0	T=0	P=30	Credits=20

IT1425	Comprehensive Viva-Voce		L=0	T=0	P=0	Credits=3
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration
	-	-	-	100	100	-

IT1426	Extra Curricular Activities		L=0	T=0	P=0	Credits=2
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration
	-	-	100	-	100	-

		1.02	Septerm-2017	Applicable for AY 2018-19
Chairperson	Dean (Acad.Matters)	Version	Date of Release	Onwards

P a g e | **34**