

**Jabalpur Engineering College, Jabalpur**  
(Declared Autonomous by MP Govt., Affiliated to RGPV, Bhopal)  
(AICTE Model Curriculum Based Scheme)  
**Bachelor of Technology (B.Tech.) VI Semester (Information Technology)**

w.e.f. July 2023

w.e.f. July 2023													
S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours Per Week			Total Credits
				Theory			Practical			L	T	P	
				End. Sem.	Mid Sem. Exam.	Quiz/ Assignment	End Sem.	Lab Work					
1	IT61	PEC	Professional Elective Course-II	70	20	10	-	-	100	3	1	-	4
2	IT62	OEC	Open Elective Course-I	70	20	10	-	-	100	3	1	-	4
3	IT63	PCC	Network Management	70	20	10	30	20	150	3	-	2	4
4	IT64	PCC	Data Mining	70	20	10	30	20	150	3	-	2	4
5	IT65	PCC	Cloud Computing	70	20	10	30	20	150	3	-	2	4
6	IT66	PI	Minor Project	-	-	-	60	40	100	-	-	4	2
7		MC	Industrial Training	Minimum Four weeks Duration. Evaluation will be done in 7th semester.									
Total				350	100	50	150	100	750	15	2	10	22
8	IT67	DLC	Self-Learning Presentation (SWAYAM/NPTEL/MOOC)	-	-	-	-	-	-	-	-		8
9	IT68	MC	NSS/NCC/Swatchhata Abhiyan/Rural Outreach	Qualifier									
Additional Course for Honours or Minor Specialization				Permitted to opt for maximum 8 credits against additional MOOC courses in subject code IT67 for the award of Honours (Minor Specialization).									

**Note:** 01. Departmental BOS will decide list of three/four optional subjects those are available in MOOC, OEC as well for PEC.

02. MOOC/NPTEL subjects shall be taken with permission of HOD/Coordinator.

03. Industrial training should be apart from laboratory work undertaken in the college rather it should have industrial orientation and practical aspects/field work. Report to be submitted at the beginning of 7th semester and students have to give a presentation in the Department. Evaluation will be done in 7th semester.

Professional Elective Course-II		
S.No.	Subject Code	Subject Name
1	IT61A	Information Theory and Coding
2	IT61B	E-Commerce and E-Governance
3	IT61C	Artificial Intelligence

1 hour lecture (L) = 1 credit

Open Elective Course-I		
S.No.	Subject Code	Subject Name
1	IT62A	Microprocessor and Interfacing Coding
2	IT62B	Intellectual Property Rights-Governance
3	IT62C	Digital Signal and Image Processing

1 hour Tutorial (T) = 1 credit

2 hour Practical (P) = 1 credit

PEC: Professional Elective Course, OEC: Open Elective Course, PCC: Professional Core Course, PI: Project and Internship, DLC: Distance Learning Course, MC: Mandatory Course

  
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**COURSE CONTENT**

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		Theory			Practical		Total	L	T	P	
		End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work					
IT61A	Information Theory & Coding	70	20	10	-	-	100	3	1	-	4

**Module I**

Introductory Concepts Information Theory: Entropy and Uncertainty; Information Content; Information rate, classification of codes, Kraft McMillan inequality, Source coding theorem, Shannon-Fano coding, Huffman coding, Extended Huffman coding Joint and conditional entropies, Mutual information - Discrete memoryless channels – BSC, BEC – Channel capacity, Shannon limit.

**Module II**

Compression Algorithms Optimal Compression; Compression Algorithms; Huffman Coding; Adaptive Huffman Compression; Statistical Modelling; Dictionary Based Compression; Sliding Window Compression; Speech Compression; LZW, RLE; Lossy Compression schemes; Image Compression using DCT.

**Module III**

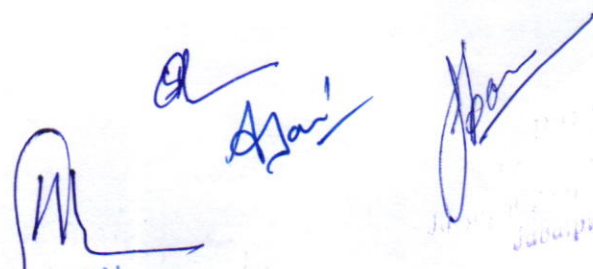
Error Control Coding Coding for reliable digital transmission and storage; Types of codes; Error Checking codes; Error Correcting Codes; Coding Schemes; Linear Block Codes; Cyclic Codes; Error Trapping; Decoding for cyclic codes; Convolution codes. Run length encoding, CCITT group 3 1-D compression, CCITT group 3 2D compression, CCITT group 4 2D compression.

**Module IV**

Video Image Compression: Requirement of full motion video compression. CITT H 261 Video coding algorithm, MPEG compression methodology. MPEG-2 compression, Audio (speech) compression.

**Module V**

Cryptography: Encryption, Decryption, Cryptogram (hypertext). Concept of cipher, Crypto analysis. Keys: Single key (secret key) cryptography, two-key (public-key) cryptography. Single key cryptography Ciphers: Block cipher codes, Stream ciphers, Requirement for secrecy, The Data Encryption Standard Public Key Cryptography: Diffie-Hellman public key distribution, The Rivest-ShamirAdelman (R-S-A) system for public key cryptography. Digital signature.

  
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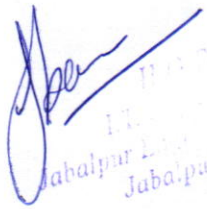

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**Reference Books:**

1. Error correcting codes by W.W Peterson and E.J. Welton, The Mit Press (1978) ISBN0262160390
2. Multimedia System Design by P.K. Andleigh & Kiran Thapar, Prentice Hall PTR Upper Saddle River, NJC (1996)
3. Bruce Schneier, Applied Cryptography: Protocol Algorithms & Source Code in C, John Wiley & sons, NY, 1994
4. Network Security by Stalling, PHI
5. Communication Systems, 3/e by Simon Haykin, John Wiley & sons (1995)

**Course Outcome :**

- CO1: Understand need of information coding.
- CO2: Understand the different coding algorithm.
- CO3: Understand different error correction and checking methods.
- CO4: Understand video compression technique.

  
  
  
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IT61B	E-Commerce and E-Governance	70	20	10	-	-	100	3	1	-	4

**Unit I:** Introduction to e-commerce: History of e-commerce, e-business models B2B, B2C, C2C, C2B, legal; environment of e-commerce, ethical issues, electronic data interchange, value chain and supply chain, advantages and disadvantages of e-commerce.

**Unit II:** Electronic Payment Systems: Credit cards, debit cards, smart cards, e-credit accounts, e-money, Marketing on the web, marketing strategies, advertising on the web, customer service and support, introduction to m-commerce, case study: e-commerce in passenger air transport.

**Unit III:** E-Government, theoretical background of e-governance, issues in e-governance applications, evolution of e-governance, its scope and content, benefits and reasons for the introduction of e-governance, e-governance models- broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G.

**Unit IV:** E-readiness, e-government readiness, E- Framework, step & issues, application of data warehousing and data mining in e-government, Case studies: NICNET-role of nation wide networking in egovernance, e- seva.


**Unit V:** E-Government systems security: Challenges and approach to e-government security, security concern in e-commerce, security for server computers, communication channel security, security for client computers.

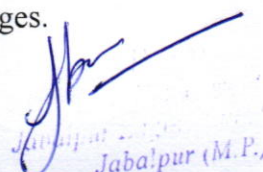
**References Books:-**

1. Gary P. Schneider, "E-commerce", Cengage Learning India.
2. C.S.R. Prabhu, "E-governance: concept and case study", PHI Learning Private Limited.
3. V. Rajaraman, "Essentials of E-Commerce Technology", PHI Learning Private Limited.
4. David Whiteley, "E-commerce study , technology and applications", TMH.
5. J. Satyanarayan, "E-government: The science of the possible", PHI Learning Private Limited.
6. P.T. Joseph, "E-Commerce An Indian Perspective", PHI Learning Private Limited.
7. Hanson and Kalyanam, "E-Commerce and Web Marketing", Cengage Learning India.

**Course Outcomes:**

- CO 1. Familiarize with e-commerce terms and e-business models. +
- CO2. Distingue in among various electronic payment systems.
- CO 3. Compare various e-governance models and their benefits.
- CO 4. To provide approaches to various e-government security challenges.

  
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		End Sem	Mid Sem Exam	Quiz Assignm ent	EndSem	Lab Work					
IT61C	Artificial Intelligence	70	20	10	-	-	100	3	1	-	4

**Unit I:**

Meaning and definition of artificial intelligence, Various types of production systems, Characteristics of production systems, Study and comparison of breadth first search and depth first search. Techniques, other Search Techniques like hill Climbing, Best first Search. A\* algorithm, AO\* algorithms etc, and various types of control strategies.

**Unit II:**

Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, Resolution, refutation, deduction, theorem proving, inferencing, monotonic and nonmonotonic reasoning.

**Unit III:**

Probabilistic reasoning, Baye's theorem, semantic networks, scripts, schemas, frames, conceptual dependency, fuzzy logic, forward and backward reasoning.

**Unit IV:**

Game playing techniques like minimax procedure, alpha-beta cut-offs etc, planning, Study of the block world problem in robotics, Introduction to understanding and natural languages processing.

**Unit V:**


Introduction to learning, Various techniques used in learning, introduction to neural networks, applications of neural networks, common sense, reasoning, some example of expert systems.

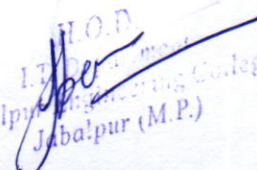
**References Books:-**

- Rich E and Knight K, "Artificial Intelligence", TMH, New Delhi.
- Nelsson N.J., "Principles of Artificial Intelligence", Springer Verlag, Berlin.

**Course Outcomes:**

- CO 1. To discuss and compare various search techniques in AI.
- CO2. Formulation of various knowledge representation schemes.
- CO3. Learn and differentiate among various game playing techniques.
- CO 4. Apply AI learning techniques in the design of expert system.

  
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		End Sem	Mid Sem Exam	Quiz Assignme nt	EndSem	Lab Work					
IT62A	Microprocessor And Interfacing Coding	70	20	10	-	-	100	3	1	-	4

**Module I**

Intel 8086 Microprocessor: Introduction to 16-bit microprocessors, 8086 pin functions, Minimum and maximum mode operations. 8086 Architecture, register organization, addressing Modes, 8086 Memory banks and Memory organization, 8086 Instruction set and Assembly language programming.

**Module II**

Advanced microprocessors: Salient features of advanced microprocessors. Review of evolution of advanced microprocessors: 186 / 286 / 386 / 486 / Pentium. Super scalar architecture of Pentium. 80286/386 Memory segmentation with descriptor tables, Privilege levels, Changing privilege levels, Paging including address translation, Page level protection, MMU, cache memory, Virtual memory.

**Module III**

I/O INTERFACING: Introduction to the interfacing chips 8255. Interfacing keyboards, printers, LEDs with Intel 8086 Microprocessor. Interfacing of 8254 programmable interval timer, 8259A Programmable interrupt controller & 8257 DMA controller with Intel 8086 Microprocessor.

**Module IV**

Memory Interfacing: Interfacing of RAM and ROM with Intel 8086 Microprocessor. Serial communication interface: RS 232C standards, Interfacing of USART chip 8251 with Intel 8086 Microprocessor.

**Module V**

Microcontroller: Introduction to micro controller 8051, its architecture, Register set, operational features, pin description, I/O configuration, interrupts, addressing modes, an overview of 8051 instruction set.

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**Reference Books:**

1. B.B. Brey (PHI), "The Intel Microprocessors, Architecture, Programming and Interfacing".
2. A Triebel & Avtar Singh (PHI), "The 8088 & 8086 Microprocessor".
3. D. Hall (Mc-Graw Hill), "Advanced Microprocessor and Interfacing".
4. A. Pal (TME), "Microprocessors Principles & Applications".
5. A.P. Mathur (TMA), "Introduction to Microprocessors".
6. Intel Corporation Microprocessors Datamanuals.
7. Microprocessor Training Inc., "Microprocessor Fundamentals & Applications (Handson)".

**Course Outcomes:**

- CO1: To understand the architecture of 8086.
- CO2: To understand the advantages of micro processor.
- CO3: Compare the different interfacing chips.
- CO4: Understand the memory interfacing.
- CO5: Understand the micro controllers.



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		End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work					
IT62B	Intellectual propertyRights-Governance	70	20	10	-	-	100	3	1	-	4

**Module I**

OVERVIEW OF INTELLECTUAL PROPERTY: Introduction and the need for intellectual property right (IPR) IPR in India-Genesis and Development IPR in abroad Some important examples of IPR PATENTS: Macro economic impact of the patent system, Patent and kind of inventions protected by a patent, Patent document, How to protect your inventions, Granting of patent Rights of a patent, how extensive is patent protection, why protect inventions by patents, Searching a patent, Drafting of a patent, Filing of a patent, The different layers of the international patent system (national, regional and International options). Utility models, Differences between a utility model and a patent, Trade secrets and know-how agreements.

**Module II**

COPYRIGHT: What is copyright, what is covered by copyright, how long does copyright last, why protect, copyright RELATED RIGHTS: What are related rights, Distinction between related rights and copyright, Rights covered by copyright. TRADEMARKS: What is a trademark, Rights of trademark, What kind of signs can be used as trademarks, types of trademark, function does a trademark perform, How is a trademark protected, How is a trademark registered. How long is a registered trademark protected for, How extensive is trademark protection, What are well-known marks and how are they protected, Domain name and how does it relate to trademarks.

**Module III**

GEOGRAPHICAL INDICATIONS: What is a geographical Indication, How is a geographical indication protected Why protect geographical indications. INDUSTRIAL DESIGNS: What is an industrial design, How can Industrial designs be protected. What kind of protection is provided by industrial designs, How long does the protection last, Why protect industrial designs. NEW PLANT VARIETIES: Why protect new varieties of plants, How can new plants be protected, What protection does the breeder get, How long do the breeder's rights last, How extensive is plant variety protection. UNFAIR COMPETITION: What is unfair competition, relationship between unfair competition and intellectual property laws.

**Module IV**

ENFORCEMENT OF INTELLECTUAL PROPERTY RIGHTS: Infringement of intellectual property rights; Enforcement Measures, EMERGING ISSUES IN INTELLECTUAL PROPERTY: Overview of Biotechnology and Intellectual Property, Biotechnology Research and Intellectual Property Rights Management, Licensing and Enforcing Intellectual Property, Commercializing Biotechnology Invention, Case studies of Biotechnology, Case studies of patents in other areas.

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**Module V**

IT ethics: Theoretical basis of Computer Ethics, defining Computer Ethics, computer professional's behavior, and social conduct, ease of misuse, do and don'ts with proprietary data, Understanding computercrime, Social Networking. Understanding Software Compliance, Software Piracy, Software/OS licensing Policies, Understanding Professional Responsibility, IT act provisions.

**TEXT BOOKS**

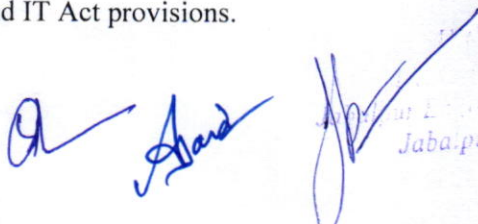
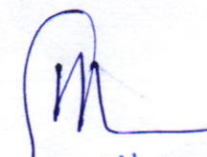
- T. M Murray and MJ. Mehlman, Encyclopedia of Ethical, Legal and Policy issues in Biotechnology. John Wiley & Sons 2000

**References Books:**

1. P.N. Cheremisinoff, R.P. Ouellette and R.M. Bartholomew, Biotechnology Applications and Research, Technomic Publishing Co., Inc. USA, 1985, Concepts in
2. D. Balasubramaniam, C.F.A. Bryce, K. Dharmalingam, J. Green and K. Jayaraman Biotechnology, University Press (Orient Longman Ltd.), 2002.
3. Bourgagaize, Jewell and Buiser, Biotechnology: Demystifying the Concepts, Wesley Longman, USA, 2000.
4. Ajit Parulekar and Sarita D'Souza, Indian Patents Law - Legal & Business Implications; Macmillan India Ltd, 2006
5. B.L. Wadehra; Law Relating to Patents, Trade Marks, Copyright, Designs & Geographical Indications; Universal law Publishing Pvt. Ltd., India 2000
6. P. Narayanan; Law of Copyright and Industrial Designs; Eastern law House, Delhi, 2010,

**Course Outcomes:**

- CO 1. To understand the need of Intellectual Property Rights.
- CO 2. To recommend patent systems to protect inventions.
- CO3. Compare copyrights, trademarks and related terms.
- CO4. To relate unfair competition and IPR.
- CO5. Understand the computer crime and IT Act provisions.

  
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IT62C	Digital Signal & Image Processing	70	20	10	-	-	100	3	1	-	4

**Module I**

Introduction and Fundamentals : Motivation and Perspective, Applications, Components of Image Processing System, Element of Visual Perception, A Simple Image Model, Sampling and Quantization. Image Enhancement in Spatial Domain : Introduction; Basic Gray Level Functions – Piecewise-Linear Transformation Functions: Contrast Stretching; Histogram Specification; Histogram Equalization; Local Enhancement; Enhancement using Arithmetic/Logic Operations – Image Subtraction, Image Averaging; Basics of Spatial Filtering; Smoothing - Mean filter, Ordered Statistic Filter; Sharpening –The Laplacian.

**Module II**

Image Enhancement in Frequency Domain : Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Filters – Low-pass, High-pass; Correspondence Between Filtering in Spatial and Frequency Domain; Smoothing Frequency Domain Filters – Gaussian Lowpass Filters; Sharpening Frequency Domain Filters – Gaussian Highpass Filters; Homomorphic Filtering. Image Restoration : A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only- Spatial Filtering – Mean Filters: Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters – Median Filter, Max and Min filters; Periodic Noise Reduction by Frequency Domain Filtering – Bandpass Filters; Minimum Mean-square Error Restoration.

**Module III**

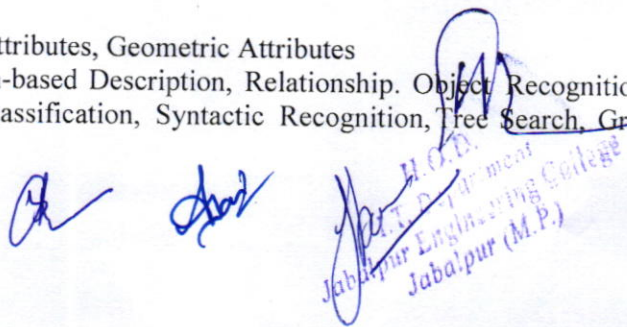
Color Image Processing : Color Fundamentals, Color Models, Converting Colors to different models, Color Transformation, Smoothing and Sharpening, Color Segmentation. Morphological Image Processing : Introduction, Logic Operations involving Binary Images, Dilation and Erosion, Opening and Closing, Morphological Algorithms – Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening

**Module IV**

Registration : Introduction, Geometric Transformation – Plane to Plane transformation, Mapping, Stereo Imaging– Algorithms to Establish Correspondence, Algorithms to Recover Depth Segmentation. Introduction, Region Extraction, Pixel-Based Approach, Multi-level Thresholding, Local Thresholding, Region-based Approach, Edge and Line Detection: Edge Detection, Edge Operators, Pattern Fitting Approach, Edge Linking and Edge Following, Edge Elements Extraction by Thresholding, Edge Detector Performance, Line Detection, Corner Detection.

**Module V**

Feature Extraction: Representation, Topological Attributes, Geometric Attributes  
 Description: Boundary-based Description, Region-based Description, Relationship. Object Recognition : Deterministic Methods, Clustering, Statistical Classification, Syntactic Recognition, Tree Search, Graph Matching








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**Reference Books:**

1. Digital Image Processing 2nd Edition, Rafael C. Gonzalvez and Richard E. Woods. Published by: Pearson Education.
2. Digital Image Processing and Computer Vision, R.J. Schalk off. Published by: John Wiley and Sons, NY.
3. Fundamentals of Digital Image Processing, A.K. Jain. Published by Prentice Hall, Upper Saddle River, NJ.
4. Digital Image Processing by A.K. Jain, 1995, -PHI

   
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IT63	Network Management	70	20	10	30	20	150	3	-	2	4

**Module I**

Protocols and architecture, Protocols, Characteristics, Functions, Need for multiple protocols, Conceptual layers of multiple protocol software, Protocol layering principles, Multiplexing and Demultiplexing.

**Module II**

Internet Protocol , Virtual network , Internet architecture and philosophy , Purpose of the internet protocol , Internet diagram , Routing in an internet , table driven IP internet , IP routing algorithm , Internet control message protocols (ICMP) , Internet protocol version 6 , Features , Format , Source routing , Options , address space assignment , User data gram protocol , Format of UDP messages , UDP encapsulation and protocol layering.

**Module III**

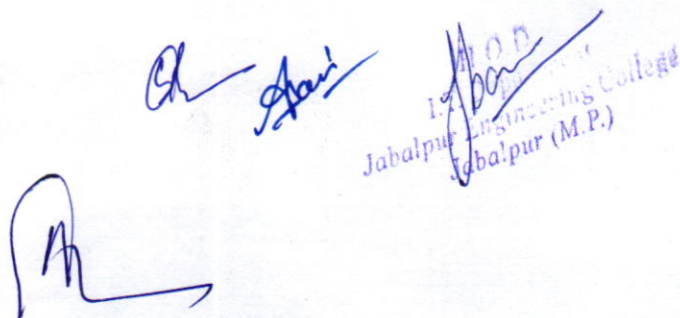
Introduction, layering, OSI Layering, TCP/IP Layering, Protocols & Standards, Internet standards, Internet administration, Internet Addresses, Internet protocol: introduction, IP header, IP routing, subnet addressing, subnet mask, special case of IP addresses, Comparative Study of IPV4 & IPV6, port numbers Address Resolution Protocol, ARP packet format, Proxy ARP, ARP command, ARP Example, Reverse Address Resolution Protocol (RARP): Introduction, RARP Packet format, RARP Examples, RARP server design

**Module IV**

Delivery and Routing of IP Packets, Routing Methods, Static versus Dynamic Routing, Routing table and Routing Module, Classless Addressing: CIDR. Internet Protocol (IP), Datagram, Fragmentation, Options, IP Package. Interior and Exterior Routing, Routing information protocol (RIP), Open shortest path first protocol (OSPF), BGP, GGP. Private Networks. Virtual Private Network (VPN), Network Address Translation (NAT).

**Module V**

Configuration management, Configuration management functions, Inventory managements, Network topology services, Order processing and provisioning, Charge management directory services. Fault management, Processes and procedure, Fault management functions, Performance management, Security management, accuracy management, Network capacity planning.







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IT64	DATA MINING	70	20	10	30	20	150	3	-	2	4

**Module I**

DATA WAREHOUSING: Data warehousing Components , Building a Data warehouse, Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support ,Data Extraction, Cleanup, and Transformation Tools –Metadata.

**Module II**

BUSINESS ANALYSIS: Reporting and Query tools and Applications ,Tool Categories, The Need for Applications , Cognos Impromptu, Online Analytical Processing (OLAP) ,Need, Multidimensional Data Model ,OLAP Guidelines, Multidimensional versus Multirelational OLAP , Categories of Tools, OLAP Tools and the Internet.

**Module III**

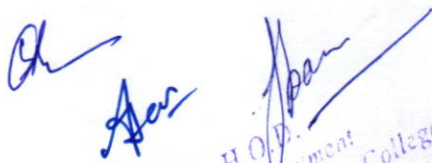
DATA MINING: Introduction, Data, Types of Data, Data Mining Functionalities, Interestingness of Patterns, Classification of Data Mining Systems, Data Mining Task Primitives, Integration of a Data Mining System with a Data Warehouse , Issues Data Preprocessing.

**Module IV**

ASSOCIATION RULE MINING AND CLASSIFICATION: Mining Frequent Patterns, Associations and Correlations , Mining Methods , Mining Various Kinds of Association Rules , Correlation Analysis , Constraint Based Association Mining , Classification and Prediction - Basic Concepts, Decision Tree Induction , Bayesian Classification , Rule Based Classification, Classification by Backpropagation , Support Vector Machines , Associative Classification , Lazy Learners , Other Classification Methods, Prediction

**Module V**

CLUSTERING AND APPLICATIONS AND TRENDS IN DATA MINING: Cluster Analysis , Types of Data , Categorization of Major Clustering Methods , Kmeans , Partitioning Methods , Hierarchical Methods , Density-Based Methods ,Grid Based Methods , Model Based Clustering Methods , Clustering High Dimensional Data , Constraint, Based Cluster Analysis , Outlier Analysis , Data Mining Applications.

  
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**w.e.f. July 2023**

**Text Books:**

1. Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", Tata McGraw –Hill Edition, Tenth Reprint 2007.
2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier, 2007.

**Reference Books:**

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction To Data Mining", Person Education, 2007.K.P.
2. Soman, Shyam Diwakar and V. Ajay, "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
4. Daniel T. Larose, "Data Mining Methods and Models", Wile-Interscience, 2006.

**Course Outcomes:**

CO1: To introduce with data warehousing components.

CO2: To familiarize with data mining and integration with a data warehousing.

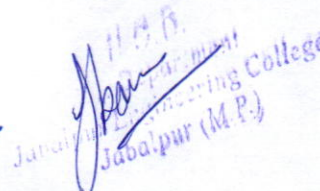
CO3: To understand association rules and its classifications.

CO4: To introduce various software vulnerabilities.

**Experiment List**

1. Evolution of data management technologies, introduction to data warehousing concepts.
2. Develop an application to implement defining subject area, design of fact dimension table, data mart.
3. Develop an application to implement OLAP, roll up, drill down, slice and dice operation
4. Develop an application to construct a multidimensional data.
5. Develop an application to implement data generalization and summarization technique.
6. Develop an application to extract association rule of data mining.
7. Develop an application for classification of data.
8. Develop an application for one clustering technique
9. Develop an application for Naïve Bayes classifier.
10. Develop an application for decision tree.



  
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**COURSE CONTENT**

Subject Code	Subject Name and Title	Maximum Marks Allotted						Hours/Week			Total Credits
		Theory			Practical		Total	L	T	P	
		End Sem	Mid Sem Exam	Quiz Assignment	End Sem	Lab Work					
IT65	CLOUD COMPUTING	70	20	10	30	20	150	3	-	2	4

**Module I**

Cloud Introduction Cloud Computing Fundamentals Cloud Computing definition, Types of Cloud, Cloud services: Benefits and challenges of cloud computing, usage scenarios and Applications, Business models around Cloud - Major players in Cloud Computing-Issues in Cloud- Eucalyptus Nimbus{pen Nebula, Cloudsim. Challenges in Cloud Computing: Migration, Integration, Proprietary VS Open Sources.

**Module II**

Cloud Services And File System BIGDATA : Introduction; Types of Cloud services: Software as a Service- Platform as a Service- Infrastructure as a Service- Database as a Service - Monitoring as a Service - Communication as services, Service providers -Google App Engine, Amazon EC2.Introduction to MapReduce, HDFS, Hadoop Framework.

**Module III**

Virtualization For Cloud Need for Virtualization -pros and cons of Virtualization -Types of Virtualization- System Vm, Process VM, Virtual Machine monitor- Virtual machine properties - Interpretation and binary translation, HLL VM-Hypervisors -Xen, KVM, VMW are Virtual Box, Hyper-V

**Module IV**

Collaborating with Cloud Collaborating on Calendars, Schedules and Task Management- Collaborating on Event Management, Contact Management , project Management - Collaborating on word processing, Databases- Storing and Sharing Files- Collaborating via Web- Based Communication Tools Evaluating Web Mail Services- Collaborating via Social Networks- Collaborating via Blogs and Wikis.

**Module V**

Security, Standards, And Applications Security in Clouds: Cloud security challenges- Software as a Service Security, Common Standards: The Open Cloud Consortium- The Distributed management Task Force-Standards for application Developers - Standards for Messaging - Standards for Security End user access to cloud computing, Mobile Internet devices and the cloud.

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**Reference Books:**

1. Cloud Computing "A Practical Approach" Anthony T. Velte, Toby J. Velte, Robert Elsenpeter. McGraw Hill. Kai Hwang, Geoffrey C Fox, Jack G Dongarra,
2. "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
3. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
4. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.
5. Kumar Saurabh, "Cloud Computing - insights into New -Era Infrastructure", Wiley India, 2011.
6. Ronald L. Krutz, Russell Dean Vines, "Cloud Security - A comprehensive Guide to Secure Cloud Computing", Wiley - India,

**Experiment List:**

1. Study and do the Configuration of CCloudSim. Also execute & check the performance of existing algorithms.
  - a) Install a Cloud Analyst and Integrate with Eclipse/Netbeans. Monitor the performance of an Existing Algorithms.
  - b) Modify or propose a new load balancing algorithm compatible with Cloud Analyst.
2. Integrating Google App Engine API's in Eclipse and develop an application in Java/Python on the top of Google Cloud.
3. Make the registration groupwise on Google and register your application by using google application-ID
4. Private cloud configuration (Eucalyptus/OpenNebula)
5. Building an application on cloud
6. Amazon instance (Demo Version) Exploring
7. Utilizing the instance by deploying some application
8. Demonstration of Cloud Monitoring tool
9. Exploring Open Stack.

**Course Outcomes:**

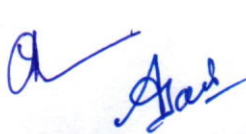
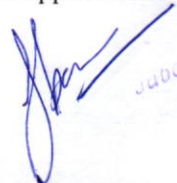

CO1: To understand the benefits and the challenges of cloud computing.

CO2: To understand the types of cloud services.

CO3: To outline about the need and types of virtualization.

CO4: To discuss collaborating with the cloud.

CO5: To analyze the security challenges and standards for security and application.

  
  
  
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