



Department of Computer Science & Engineering

MATS University

Aarang, Raipur (C.G.)

Syllabus Scheme of B. Tech.

VII Semester



S. No.	Code	Subject	Periods per Week			Scheme of Marks		Total Credit
			L	T	P	ESE	IM	
1.	BT720	Artificial Intelligence & Expert System	4	0	-	70	30	4
2.	BT721	Network Security	4	0	-	70	30	4
3.	BT722	Parallel Processing & Computing	4	0	-	70	30	4
4.	BT723	Soft Computing	4	0	-	70	30	4
5.	BT724x	Professional Elective – II	4	0	-	70	30	4
6.	BT725	Artificial Intelligence & Expert System Lab	-	0	2	30	20	1
7.	BT726	Android Application Development Lab	-	-	2	30	20	1
8.	BT727	Soft Computing Lab (MATLAB/ Sci Lab)	-	-	2	30	20	1
9.	BT728	Scripting Language Lab (Python, Ruby, Perl)	-	-	2	30	20	1
Total			20	0	8	470	230	24

L – Lecture, T – Tutorial, ESE – End Semester Examination,

P – Practical, IM – Internal Marks (Include Class Test & Teacher’s Assessments)

Professional Elective – II

Subject Code	Subject Name
BT7241	Network Programming
BT7242	Cloud Computing
BT7243	Robotics
BT7244	IOT & Applications
BT7245	Cellular & Mobile Computing



Department of Computer Science & Engineering

MATS University

Aarang, Raipur (C.G.)

Syllabus Scheme of B. Tech.

ARTIFICIAL INTELLIGENCE & EXPERT SYSTEM (BT720)



Course Objective:

1. To give basic concepts of AI towards problem solving, inference, perception, knowledge representation and learning.
2. To investigate applications of AI techniques in Intelligent Agents, Expert Systems, Artificial Neural Networks and other machine learning models.
3. To explore the current scope, potential, limitations, and implications of intelligent systems.

UNIT – I INTRODUCTION TO AI & SEARCH TECHNIQUES

Introduction to AI, Problem Solving, State space search, Blind search: Depth first search, Breadth first search, Informed search: Heuristic function, Hill climbing search, Best first search, A* & AO* Search, Constraint satisfaction. Game tree, Evaluation function, Mini-Max search, Alpha-beta pruning, Games of chance.

UNIT – II KNOWLEDGE REPRESENTATION

Introduction to KR, Knowledge agent, Predicate logic, WFF, Inference rule & theorem proving: forward chaining, backward chaining, resolution; Propositional knowledge, Boolean circuit agents. Rule Based Systems, Forward reasoning: Conflict resolution, backward reasoning, Use of backtracking. Structured KR: Semantic Net-slots, Inheritance, Frames-exceptions and default attached predicates, Conceptual Dependency formalism, Other knowledge representations.

UNIT – III HANDLING UNCERTAINTY & LEARNING

Source of uncertainty, Probabilistic inference, Bayes' theorem, Limitation of naïve Bayesian system, Bayesian Belief Network (BBN), Inference with BBN, Dempster-Shafer Theory, Fuzzy Logic, Fuzzy function, Fuzzy measure, Non monotonic reasoning: Dependency directed backtracking, Truth maintenance systems. Learning: Concept of learning, Learning model, learning decision tree, Paradigms of machine learning, Supervised & Unsupervised learning, Example of learning, Learning by induction, Learning using Neural Networks.

UNIT – IV NATURAL LANGUAGE PROCESSING & PLANNING

Overview of NLP tasks, Parsing, Machine translation, Components of Planning System, Planning agent, State-Goal & Action Representation, Forward planning, Backward chaining, Planning example: partial-order planner, Block world.

UNIT – V EXPERT SYSTEM & AI LANGUAGES

Need & Justification for expert systems, Cognitive problems, Expert System Architectures, Rule based systems, Non production system, Knowledge acquisition, Case studies of expert system. AI language: Prolog syntax, Programming with prolog, Back tracking in prolog, Lisp syntax, Lisp programming.

Text Books:

1. Elaine Rich and Kevin Knight: Artificial Intelligence- Tata McGraw Hill.
2. Dan W.Patterson Introduction to Artificial Intelligence and Expert Systems- Prentice Hall of India.

Reference Books:

1. Nils J.Nilsson: Principles of Artificial Intelligence- Narosa Publishing house.
2. Clocksin& C.S. Melish; Programming in PROLOG- Narosa Publishing house.
3. M. Sasikumar, S.Ramani, et. al.: Rule based Expert Systems (A practical Introduction) Narosa Publishing House.

Course Outcome:

After completion of the course study, students will be able to

1. Demonstrate fundamental understanding of artificial intelligence (AI) and expert systems.
2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
3. Demonstrate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.



Department of Computer Science & Engineering

MATS University

Aarang, Raipur (C.G.)

Syllabus Scheme of B. Tech.

NETWORK SECURITY (BT721)



Course Objective:

1. To understand the principles and practices of cryptography and network security.
2. To understand the practical applications that has been implemented and is in use to provide network security.

UNIT – I INTRODUCTION

Security Trends, OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security. Symmetric (Private Key) Ciphers: Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography. Block Ciphers And The Data Encryption Standard: Block Cipher Principles, The Data Encryption Standard (DES), The Strength Of DES, Differential And Linear Cryptanalysis, Block Cipher Design Principles.

UNIT – II SYMMETRIC CIPHERS

Basic Concepts in Number Theory and Finite Fields: Groups, Rings, and Fields, Modular Arithmetic, The Euclidian Algorithm, Finite Fields of the Form $GF(P)$, Polynomial Arithmetic, Finite Fields of the Form $GF(2^n)$. Advanced Encryption Standard: The Origins AES, Evaluation Criteria for AES, the AES Cipher. Stream Cipher: Stream Ciphers and RC4. Confidentiality using Symmetric Encryption: Placement of Encryption Function, Traffic Confidentiality, Key Distribution.

UNIT – III ASYMMETRIC (PUBLIC KEY) CIPHERS: INTRODUCTION TO NUMBER THEORY

Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithms. Public-Key Cryptography and RSA: Principles of Public-Key Cryptosystems. Key Management-Other Public-Key Cryptosystems: Key management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

UNIT – IV ASYMMETRIC CIPHERS (CONTINUED): MESSAGE AUTHENTICATION AND HASH FUNCTIONS

Message Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MAC, SHA, HMAC, CMAC. Digital Signatures and Authentication protocols: Digital Signature, Authentication Protocols, Digital Signature Standards.

UNIT – V NETWORK SECURITY APPLICATIONS

Authentication Applications: Kerberos, X.509 Authentication Services, Public key infrastructure. Electronic mail security: PGP, S/MIME. Overview of IP Security. Web Security: Web security considerations, SSL and TLS, Secure electronic transaction. System Security: Intruders, Intrusion detection, password management, viruses and related threats, virus counter measures, Firewall design principles, and trusted systems.

Text Book:

1. Cryptography and Network Security, Principles and Practices, William Stallings, Pearson Education Prentice Hall, 4th Edition.
2. Cryptography and Network Security, Atul Kahate, McGraw Hill Education (India) Private Limited.

Reference books:

1. Applied Cryptography: Protocols & Algorithms, Schneier & Bruce, MGH International.
2. Cryptography and Security – by Dr T R Padmanabhan N Harini , Wiley India Pvt Ltd, 2011.

Course Outcome:

After completion of the course study, students will be able to

1. Explain conventional encryption algorithms.
2. Explain public key encryption algorithms and their design principles.
3. Use message authentication codes, hash functions, digital signature and public key certificates.
4. Explain network security tools and applications.
5. Explain system level security issues like threat of and countermeasures for intruders and viruses, and the use of firewalls and trusted systems.



Department of Computer Science & Engineering

MATS University

Aarang, Raipur (C.G.)

Syllabus Scheme of B. Tech.

PARALLEL PROCESSING AND COMPUTING (BT722)



Course Objectives:

1. To give idea about working of hardware and software from simple systems to complex shared resource architectures.
2. To understand parallel computer architecture and different models for parallel computing.
3. To understand concepts related to memory consistency models, cache coherence, interconnection networks, and latency tolerating techniques.
4. To know about current practical implementations of parallel architectures.
5. To have idea about design of parallel programs and how to evaluate their execution.

UNIT – I INTRODUCTION & TECHNIQUE OF PARALLELISM

Trends towards Parallel Computing, Parallelism in Uniprocessor Systems, Architectural Classification Schemes, Amdahl's Law, Moore's Law, Principles of Scalable Performance, Parallel Processing in Memory, Parallel Algorithms, Parallel Algorithm Complexity, Models of Parallel Processing, Cache Coherence, Cache Coherence Protocols.

UNIT – II PIPELINE & VECTOR PROCESSING

Conditions of Parallelism: Data & Resource Dependencies, Program Flow Mechanisms: Control-flow vs. Data flow Computers, Principle of Pipelining and Vector Processing: Principles of Linear Pipelining, Classification of Pipeline Processors, General Pipelines and Reservation Tables. Instruction and Arithmetic Pipelines, Vector Processing, Architecture of Cray-1, Pipeline Hazards, VLIW computers, Array Processing.

UNIT – III PARALLEL MODELS & MESH-BASED ARCHITECTURES

PRAM and Basic Algorithms, Data Broadcasting, Parallel Prefix Computation, Shared- Memory Algorithms, Parallel Selection Algorithm, Sorting and Selection Networks, Selection Networks, Circuit-Level Examples, Tree-Structured Dictionary Machine, Parallel Prefix Networks, Sorting on a 2D Mesh or Torus, Routing on a 2D Mesh or Torus, Types of Data Routing Operations, Greedy Routing Algorithms, Wormhole Routing, Numerical 2 D Mesh Algorithms, Other Mesh-Related Architectures, Meshes of Trees, Low-Diameter Architectures, Hyper-cubes and Their Algorithms, Sorting and Routing on Hypercubes, Bitonic Sorting on a Hypercube, Dimension-Order Routing, Broadcasting on a Hypercube, Other Hypercubic architectures, Butterfly and Permutation Networks, Plus-or-Minus-2'Network, The Cube-Connected Cycles Network, Shuffle and Shuffle-Exchange Networks, A Sampler of Other Networks, Star and Pancake Networks, Ring-Based Networks.

UNIT – IV MULTIPROCESSOR ARCHITECTURE AND PROGRAMMING

Emulation and Scheduling, Emulations among Architectures, Distributed Shared Memory, Data Storage, Input, and Output, Multithreading and Latency Hiding, Parallel I/O Technology, Defect-Level Methods, Fault-Level Methods, Error-Level Methods, Parallel Programming Parallel Operating Systems, Parallel File Systems.

UNIT – V PARALLEL SYSTEM IMPLEMENTATIONS

Shared-Memory MIMD Machines, Variations in Shared Memory, MIN-Based BBN Butterfly, Vector-Parallel Cray Y-MP, CC-NUMA Stanford DASH, Message-Passing MIMD Machines, Data-Parallel SIMD Machines, Processor and Memory Technologies.

Text Books:

1. Computer Architecture & Parallel processing - Kai Hwang 7 Briggs, MGH.
2. Parallel Computers: Arch.& Prog., Rajaraman & Siva Ram Murthy, PHI.

Reference Books:

1. Advanced Computer Architecture with Parallel Programming", K. Hwang, MGH.
2. Parallel computing- Theory and practice - Michael J Quinn- Mc Graw Hill

Course Outcome:

After completion of the course study, students will be able to

1. Have an understanding of parallel architectures and algorithms.
2. Reason about ways to parallelize a problem.
3. Design and analyze the algorithms that implement efficiently on parallel computers



Department of Computer Science & Engineering
MATS University
Aarang, Raipur (C.G.)
Syllabus Scheme of B. Tech.



SOFT COMPUTING (BT723)

Course Objective:

1. To introduce basics of soft computing (neural networks, fuzzy system).
2. To give idea of genetic algorithm and its applications.

UNIT – I INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS

Evolution of Computing, Soft Computing Constituents, From Conventional AI to Computational Intelligence, Machine Learning Basics.

UNIT – II GENETIC ALGORITHMS

Introduction to Genetic Algorithms (GA), Applications of GA in Machine Learning, Machine Learning Approach to Knowledge Acquisition, Chromosome representation, Encoding, Decoding, Genetic Operators, Selection, Crossover, Mutation, Elitism, Schema Theorem, EGA, Convergence Theorem, Real-Coded GA, Ordered GA, Steady-State GA, Multi-Objective Evolutionary Algorithms, Applications in Search and Optimization, Recent Advances in Evolutionary Computing (Particle Swarm Optimization, Ant Colony Optimization).

UNIT – III NEURAL NETWORKS

Machine Learning using Neural Network, Adaptive Networks, Feed Forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks, Reinforcement Learning, Unsupervised Learning Neural Networks, Adaptive Resonance Architectures, Advances in Neural networks.

UNIT – IV FUZZY LOGIC

Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions, Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making.

UNIT – V NEURO-FUZZY MODELING

Adaptive Neuro-Fuzzy Inference Systems, Coactive Neuro-Fuzzy Modeling, Classification and Regression Trees, Data Clustering Algorithms, Rule base Structure Identification, Neuro Fuzzy Control, Case studies.

Text Books:

1. Neuro-Fuzzy and Soft Computing, Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, Prentice-Hall of India, 2003.
2. Fuzzy Sets and Fuzzy Logic-Theory and Applications, George J. Klir and Bo Yuan, Prentice Hall, 1995.
3. Neural Networks Algorithms, Applications, and Programming Techniques, James A. Freeman and David M. Skapura, Pearson Edn., 2003.

Reference Books:

1. An Introduction to Genetic Algorithm, Mitchell Melanie, Prentice Hall, 1998.
2. Genetic Algorithms in Search, Optimization and Machine Learning, David E. Goldberg, Addison Wesley, 1997.
3. Introduction to Fuzzy Logic using MATLAB, S. N. Sivanandam, S. Sumathi and S. N. Deepa, Springer, 2007.
4. Introduction to Genetic Algorithms, S.N.Sivanandam · S.N.Deepa, Springer, 2007.
5. Introduction to Artificial Neural Systems, Jacek M. Zurada, PWS Publishers, 1992.

Course Outcome:

After completion of the course study, students will be able to

1. Explain the neural network, fuzzy set theory.
2. Implement numerical methods in soft computing
3. Apply genetic algorithm in real time applications.



Department of Computer Science & Engineering
MATS University
Aarang, Raipur (C.G.)
Syllabus Scheme of B. Tech.



ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM LAB (BT725)

1. Write a Prolog program to find the rules for parent, child, male, female, son, daughter, brother, sister, uncle, aunt, ancestor given the facts about father and wife only.
2. Write a program to find the length of a given list.
3. Write a program to find the last element of a given list.
4. Write a program to delete the first occurrence and also all occurrences of a particular element in a given list.
5. Write a program to find union and intersection of two given sets represented as lists.
6. Write a program to read a list at a time and write a list at a time using the well-defined read & write functions.
7. Write a program for the given knowledge base:
If x is on the top of y, y supports x. If x is above y and they are touching each other, x is on top of y.
A cup is above a book. The cup is touching that book.
Convert the above into wffs, clausal form. Is it possible to deduce that "The book supports the cup".
8. Write a program for given knowledge base:
If Town x is connected to Town y by highway z and bikes are allowed on z, you can get to y from x by bike.
If Town x is connected to y by z then y is also connected to x by z. If you can get to town q from p and also to town r from town q, you can get to town r from town p.
Town A is connected to Town B by Road 1. Town B is connected to Town C by Road 2.
Town A is connected to Town C by Road 3. Town D is connected to Town E by Road 4.
Town D is connected to Town B by Road 5. Bikes are allowed on roads 3, 4, 5.
Bikes are only either allowed on Road 1 or on Road 2 every day. Convert the following in to wff's, clausal form and deduce that "One can get to town B from town D".
9. Solve the classical Water Jug problem of AI.
10. Solve the classical Monkey Banana problem of AI.
11. Solve the classical Crypt arithmetic problems such as DONALD + GERALD = ROBERT of AI.
12. Solve the classical Missionary Cannibals problem of AI.
13. Solve the classical Travelling Salesman Problem of AI.
14. Solve the classical Blocks World Problem of AI.
15. Write a program to search any goal given an input graph using AO* algorithm.

List of Equipments/Machine required:

1. PC with Windows.
2. Visual prolog compiler.

Recommended Books:

1. Ivan Bratko : Logic & Prolog programming.
2. Carl Townsend: Introduction to Turbo Prolog, (BPB, Publication).
3. W.F. Clocksin&Mellish : Programming in PRLOG (Narosa Publication House)



Department of Computer Science & Engineering
MATS University
Aarang, Raipur (C.G.)
Syllabus Scheme of B. Tech.



ANDROID APPLICATION DEVELOPMENT LAB (BT726)

1. Develop an application that uses GUI components, Font, and Colours.
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop an application that makes use of RSS Feed.
7. Implement an application that implements Multi threading.
8. Develop a native application that uses GPS location information.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.
11. Write a mobile application that creates alarm clock.

Reference Books:

Head First Android- By Jonathan Simon



Department of Computer Science & Engineering
MATs University
Aarang, Raipur (C.G.)
Syllabus Scheme of B. Tech.



SOFT COMPUTING LAB (BT727)

1. Write a MATLAB/SCILAB program for following:
 - A. $AREA = \pi r^2$ (Using Arithmetic Operator).
 - B. $y = \sin 2\pi/3 + \cos 2\pi/3$ (Using Trigonometry Operator).
 - C. $y = \cos \pi/4 + i \sin \pi/4$ (Using Complex Number).
 - D. $y = \log_{10}(10^6)$ (Using Logarithms Operator).
2. Compute y- coordinates of a Straight Line $y = mx + c$, where slope of line $m = 0.5$, intercept $c = -2$ and x- coordinates: $x = 0$ to 10 for 0.5 increments.
3. Create following vectors t with 10 elements 1 to 10.
 - a. $x = t \sin(t)$ [A Multiple Vectors]
 - b. $y = (t-1) / (t+1)$ [A Divide Vector]
 - c. $z = [\sin(t^2) / (t^2)]$ [An Exponential Vectors]
4. Plot $y = \sin x$ where $0 \leq x \leq 2$.
5. Plot $y = e^{-0.4x} \sin x$ where $0 \leq x \leq 4$.
6. Write a script file to draw a unit circle.
7. Write a function factorial to compute the n! of any given integer n.
8. Write a function factorial to compute the factorial n! using RECURSION for any integer n.
9. Write a function file *crossprod* to compute the cross product of two vectors u and v.
10. Write a function to compute the geometric series $1 + r + r^2 + r^3 + \dots + r^n$ for given r and n.
11. Write a function that outputs a conversion – table for Celsius and Fahrenheit.
12. Write a function to compute the interest on your account for a given principle amount, period and rate of interest.
13. Check following linear algebra rule for three matrix A,B, AND C of any ranks.
 - a. ADDITION COMMUTATIVE.
 - b. ADDITION ASSOCIATIVE.
 - c. MULTIPLICATION WITH A SCALAR DSTRIBUTIVE.
 - d. MULTIPLICATION WITH A MATRIX DSTRIBUTIVE
 - e. MATRICES ARE DIFFERENT FROM SCALAR.
14. Find the solution of following linear algebraic equations.
$$\begin{aligned}x + 2y + 3z &= 1 \\3x + 3y + 4z &= 1 \\2x + 3y + 3z &= 2\end{aligned}$$
15. Find Eigen values and eigenvector of a 3 X 3 matrix.
16. Use Matlab's Fuzzy Logic Toolbox to model the tip given after a dinner for two, where the food can be disgusting, not good, bland, satisfying, good, or delightful, and the service can be poor, average, or good. To get started, you type fuzzy in a Matlab window. Then use the fuzzy inference system and membership function editors to define and tune your rules.
17. Compute and plot the histogram of lena.png (show the image and its histogram).
18. Extract the gradient parts from the input image brain.png. Perform edge detection, Segmentation and Object recognition.
19. Develop an imaging application to detect and count text lines and number of words in a scanned document.

Reference Books:

1. Matlab Programming: B. Chaudhri & Singh ; Prentice Hall of India
2. Matlab- Rudrpratap
3. Matlab- Hamitre, Thompson publication



Department of Computer Science & Engineering
MATS University
Aarang, Raipur (C.G.)
Syllabus Scheme of B. Tech.



SCRIPTING LANGUAGE LAB (BT728)

1. Write a Python program to find ASCII value of a Character.
2. Write a Python program
 - I. To find largest among three numbers.
 - II. To check if a number is odd or even.
 - III. To check whether a string is Palindrome or not.
3. Write a Python program
 - I. To display Fibonacci series using recursion.
 - II. To find factorial of number using recursion.
4. Write a Python program
 - I. To add two matrices.
 - II. To multiply two matrices.
5. Write a Python program to count the number of vowels in a given sentence.
6. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
7. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria: Grade A: Percentage ≥ 80 , Grade B: $80 > \text{Percentage} \geq 70$, Grade C: $70 > \text{Percentage} \geq 60$ Grade D: $60 > \text{Percentage} \geq 50$, Grade E: $50 > \text{Percentage} \geq 40$, Grade F: Percentage < 40 .
8. Write a menu-driven program to create mathematical 3D objects
 - I. Curve
 - II. Sphere
 - III. Cone
 - IV. Arrow
 - V. Ring
 - VI. Cylinder
9. WAP to read n integers and display them as a histogram.
10. WAP to display sine, cosine, polynomial and exponential curves.
11. WAP to plot a graph of people with pulse rate p vs. Age a. The values of p and a are to be entered by the user.



Department of Computer Science & Engineering
MATs University
Aarang, Raipur (C.G.)
Syllabus Scheme of B. Tech.



NETWORK PROGRAMMING (BT7241)

Course Objective:

1. To understand network management protocols and basics of TCP & UDP sockets.
2. To learn sockets and socket programming.
3. To learn client server programming.
4. To give idea of developing robust & high performance scalable network applications.

UNIT- I NETWORKING & TCP/IP

Communication Protocols, Network Architecture, UUCP, XNS, IPX/SPX For LANS, TCP & IP Headers, IPv4 & IPv6 Address Structure, Programming Applications: Time & Date Routines, Internet Protocols: Application Layer, Transport Layer, Network Layer, Data Link Layer Protocols, Chat, Email, Web Server Working Method & Programming.

UNIT-II SOCKET PROGRAMMING

Creating Sockets, POSIX Data Type, Socket Addresses, Assigning Address to a Socket, Java Socket Programming, Thread Programming, Berkeley Sockets: Overview, Socket Address Structures, Byte Manipulation & Address Conversion Functions, Elementary Socket System Calls–Socket, Connect, Bind, Listen, Accept, Fork, Exec, Close, TCP Ports (Ephemeral, Reserved), Berkeley Sockets: I/O Asynchronous & Multiplexing Models, Select & Poll Functions, Signal & Fcntl Functions, Socket Implementation (Client & Server Programs), UNIX Domain Protocols.

UNIT- III APIs & WINSOCK PROGRAMMING

Windows Socket API, Window Socket & Blocking I/O Model, Blocking Sockets, Blocking Functions, Timeouts for Blocking I/O, API Overview, Different APIs & their Programming Technique, DLL & New API's, DLL Issues, Java Beans.

UNIT- IV WEB PROGRAMMING & SECURITY

Java Network Programming, Packages, RMI, Overview Of Java Script, WAP Architecture & WAP Services, Web Databases, Component Technology, CORBA Concept, CORBA Architecture, CGI Programming, Firewall & Security Technique, Cryptography, Digital Signature.

UNIT- V CLIENT SERVER PROGRAMMING

Client Side Programming: Creating Sockets, Implementing Generic Network Client, Parsing Data Using String Tokenizer, Retrieving File from an http server, Retrieving Web Documents by using the url class. Server Side Programming: Steps for Creating Server, Accepting Connection from Browsers, Creating an http server, Adding Multithreading to an http server.

Text Books:

1. Steven.W.R: UNIX Network Programming, PHI (VOL I& II).
2. Window Socket Programming by Bobb Quinn and Dave Schutes.

Reference Books:

1. Davis.R.: Windows Network Programming, Addison Wesley.
2. NETWORK PROGRAMMING With Windows Socket By Baner .P., PH New Jersey.

Course Outcome:

After completion of the course study, students will be

1. Familiar with protocols, network interfaces, and Design/performance issues of a network.
2. Familiar with basics of Socket and Socket programming.
3. Familiar with network tools and network programming.
4. Familiar with client server programming.



Department of Computer Science & Engineering
MATS University
Aarang, Raipur (C.G.)
Syllabus Scheme of B. Tech.



CLOUD COMPUTING (BT7242)

Course Objective:

1. To give the idea of cloud computing.
2. To provide students a sound foundation of the Cloud Computing so that they are able to start using and adopting Cloud Computing services and tools in their real life scenarios.

UNIT – I INTRODUCTION TO CLOUD COMPUTING

The Emergence of Cloud Computing, Cloud-Based Service Offerings, Benefits of using a Cloud Model, Key Characteristics of Cloud Computing, Understanding- Public & Private Cloud Environments, The Evolution of Cloud Computing – Hardware & Internet Software Evolution.

UNIT – II CLOUD SECURITY CHALLENGES

Software-as-a-Service, Security Management People, Security Governance, Security Portfolio Management, Security Architecture Design, Identity Access Management (IAM), Data Security.

UNIT – III CLOUD AS

Communication-as-a-Service (CAAS), Infrastructure-as-a-Service (IAAS), Monitoring-as-a-Service (MAAS), Platform-as-a-Service (PAAS), Software-as-a-Service (SAAS).

UNIT – IV THE MSP MODEL Evolution from the MSP Model to Cloud Computing and Software-as-a-Service, The Cloud Data Center, Basic Approach to a Data Center-Based SOA, Open Source Software, Service- Oriented Architectures as a Step Toward Cloud Computing.

UNIT – V VIRTUALIZATION CONCEPTS & SMARTPHONE

Virtualization Benefits, Hardware Virtualization, Software Virtualization, Memory Virtualization, Storage Virtualization, Data Virtualization, Network Virtualization, Virtualization Security Recommendations, Introduction To Various Virtualization OS Vmware , KVM, Virtual Machine Security, Smartphone, Mobile Operating Systems For Smartphone's (Iphone, Windows Mobile), Google(Android) Blackberry, Ubuntu Mobile Internet.

Text Book:

1. Cloud Computing: A Practical Approach, Toby Velte, Anthony Vote and Robert Elsenpeter, McGraw Hill.

Reference Books:

1. Cloud Application Architectures: Building Applications and Infrastructures in the Cloud, George Reese, O'Reilly Media, 2003.
2. "Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Matherm, SubraKumaraswamy and ShahedLatif, O'Reilly Media, 2005.

Course Outcome:

After completion of the course study, students will be to

1. Understand the key dimensions of the challenges of cloud computing.
2. Students will be able to perform cloud oriented analysis.
3. Assess economics, financial, and technological implications for selecting cloud computing for an organization.
4. Design the composition of a cloud services.
5. Design application services for technology abstraction.



Department of Computer Science & Engineering
MATS University
Aarang, Raipur (C.G.)
Syllabus Scheme of B. Tech.



ROBOTICS (BT7243)

Course Objective:

1. To study microcontroller operations for robotics.
2. To study implementation of interfaces in a microcontroller.
3. To study Microchip PIC micro PIC16F627 erasing and reprogramming,
4. To learn about sensors, connectors, and peripheral wiring to a microcontroller.
5. To design a robot.

UNIT – I MICROCONTROLLER IN ROBOTS

Support components - Memory and Device Programming, Interrupts, Built in Peripherals, Interfacing the Controller to Robots.

UNIT – II SOFTWARE DEVELOPMENT

Source Files, Object Files, Libraries, Linkers and Hex Files, Assemblers, Interpreters, Compilers, Simulators and Emulators, Integrated Development Environments.

UNIT – III THE MICROCHIP & MICROCONTROLLER

Different PIC Micro MCU Devices and Features, Application Development Tools, Basic Circuit Requirements, PIC16F627, EL Cheapo PIC Micro Programmer Circuit.

UNIT – IV THE MICROCONTROLLER CONNECTIONS

Hardware Interface Sequencing, Robot C Programming Template, Prototyping with the PIC micro Microcontroller, Inter-Computer Communications, RS232, HyperTerminal RS 232 Terminal Emulator, RS 232 Interface Example between PC and PIC Micro MCU, Bidirectional Synchronous Interfaces, Output Devices, LEDS, PWM Power Level Control, Sensors, Whiskers for Physical Object Detection, IR Collision Detection Sensors, IR Remote Controls, Ultrasonic Distance Measurement, Light Level Sensors, Sound Sensors, Odometry for Motor Control and Navigation, Radio control servos.

UNIT – V BRINGING ROBOTS TO LIFE

Real Time Operating System (RTOS), Example Application Running in an RTOS, State Machines, Randomly Moving a Robot Application with IR Remote Control, Behavioral programming, Neural Networks and Artificial Intelligence.

Text Book:

1. Programming Robot Controllers, Myke Predko, McGrawHill, 1st Edition, 2003.

Reference Books:

1. Microprocessor Based Design: A comprehensive Guide to Effective Hardware Design, Michael Slater, Prentice Hall, 1989.
2. Programming and customizing the 8051- micro-controller, Myke Predko, Tata McGraw-Hill, New Delhi, 2000.
3. The 8051 micro-controller architecture, programming and applications, Kenneth J. Ayala, Penram International publishers, Mumbai, 1996.
4. Introduction to AI Robotics, Murphy Robin R, MIT Press, 2000.
5. Introduction to Autonomous mobile Robots, Siegwart R and Nourbakhsh I.R, Prentice Hall India, 2005.

Course Outcome:

After completion of the course study, students will be to

1. Explain microcontroller operations of Robotics.
2. Explain sensors, connectors, and peripheral wiring to a microcontroller.
3. Implement basic microprogramming required for robot design.



Department of Computer Science & Engineering
MATs University
Aarang, Raipur (C.G.)
Syllabus Scheme of B. Tech.



IOT & APPLICATIONS (BT7244)

Course Objective:

1. To introduce IoT basics.
2. To understand IoT market perspective.
3. To learn data and knowledge management and use of devices in IoT technology.
4. To understand state of the art – IoT architecture.
5. To get idea about real world IoT applications and design constraints.

UNIT – I IOT & WEB TECHNOLOGY

The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics.

UNIT – II M2M to IOT

A Basic Perspective, Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An Emerging Industrial Structure for IoT, The International Driven Global Value Chain and Global Information Monopolies. M2M to IoT: An Architectural Overview, Building an architecture, Main Design Principles and Needed Capabilities, An IoT Architecture Outline, Standards Considerations.

UNIT – III IOT ARCHITECTURE

State of the Art – Introduction, Architecture Reference Model- Introduction, Reference Model and Architecture, IoT Reference Model, IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

UNIT – IV IOT APPLICATIONS FOR VALUE CREATIONS

Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management, eHealth.

UNIT – V INTERNET OF THINGS PRIVACY, SECURITY AND GOVERNANCE

Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security.

Text Books:

1. From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence, Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, 1st Edition, Academic Press, 2014.
2. Internet of Things (A Hands-on-Approach), Vijay Madisetti and Arshdeep Bahga, 1st Edition, VPT, 2014.

Reference Books:

1. Rethinking the Internet of Things: A Scalable Approach to Connecting Everything, Francis daCosta, 1st Edition, Apress Publications, 2013.
2. Getting Started with the Internet of Things, Cuno Pfister, O'Reilly Media, 2011.

Course Outcome:

After completion of the course study, students will be to

1. Understand the vision of IoT from a global context.
2. Determine the market perspective of IoT.
3. Use devices, gateways and data management in IoT.
4. Build state of the art architecture in IoT.
5. Develop IoT applications with real world design constraints.



Department of Computer Science & Engineering
MATS University
Aarang, Raipur (C.G.)
Syllabus Scheme of B. Tech.



CELLULAR AND MOBILE COMPUTING (BT7245)

Course Objective:

1. To idea of various communication networks.
2. To give fundamental concepts of mobile computing.
3. To study the specifications and functionalities of various protocols/standards of mobile networks.
4. To learn development of mobile system.

UNIT – I INTRODUCTION TO MOBILE & WIRELESS DEVICES

Mobile and Wireless Devices, History, Applications, Simplified Reference Model, Wireless Transmission, Frequencies for Radio Transmission, Regulations, Signals, Antennas, Signal Propagation, Multiplexing, Modulation, Wireless LANs and Wireless WANs, Spread Spectrum, FHSS and DSSS Spread Spectrum Technology, Cellular Systems, Radio Spectrum, Cell Size and Achievable Throughput, Medium Access Control, Specialized MAC, SDMA, FDMA, TDMA, CDMA.

UNIT – II TELECOMMUNICATION & BROADCAST SYSTEMS

GSM: Services, System Architecture, Radio Interface, Protocols, Localization and Calling, Handover, Security, New Data Services, DECT, TETRA, UMTS & IMT-2000, CDPD, Data Over Analog and Digital Cellular, Paging and Two-Way Paging, Satellite Systems, Applications, GEO, LEO, MEO, Routing, Localization, Handover, Broadcast Systems, Cyclic Repetition of Data, Digital Audio Broadcasting.

UNIT – III WIRELESS NETWORKS

Wireless LAN, Hidden Nodes in Wireless Networks, Ordered MAC Techniques and Wireless Networks, Deterministic MACs for Wireless Networks, Comparison Of MAC Techniques for Wireless Networks, Infrared V/S Radio Transmission, IEEE 802.11: Architecture, Layers, Management, HIPERLAN, Bluetooth, Wireless ATM, Services, Reference Model, Functions, RAL, Handover, Location Management, Addressing, QOS, ACP.

UNIT – IV MOBILE NETWORK AND TRANSPORT LAYERS

Mobile Network Layer, Mobile IP, DHCP, ADHOC Networks, Mobile Transport Layer, Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast Transmit/Fast Recovery, Transmission/Time Out Freezing, Selective Retransmission, Transaction Oriented TCP.

UNIT –V MOBILE SYSTEM DEVELOPMENT & SUPPORT

File Systems: World Wide Web, HTTP, HTML, System Architecture, WAP & its Architecture, Wireless Datagram Protocol, Wireless Transport Layer Security, Wireless Transaction Protocol, Wireless Session Protocol, Wireless Application Environment, WML, WML script, Wireless Telephony Applications.

Text Books:

1. Mobile Communications – Schiller, Jochen; 2nd Indian Reprint, Pearson Education Asia –Addison Wesley Longman PTE. Ltd.
2. Wireless and Mobile Network Architecture, Chlamtac, John Wiley and Sons.

Reference Books:

1. Mobile Data Wireless LAN Technologies, Dayem, Rifaat A.; Prentice Hall International.
2. The Essential Guide To Wireless Communication Applications, Dornan, A.; 1st Indian Reprint, Pearson Education Asia.

Course Outcome:

After completion of the course study, students will be to

1. Describe communication networks.
2. Explain protocols, standards of mobile networks.
3. Develop a mobile system application.