

BTCS 801 (Artificial Intelligence)

UNIT – I

Scope of AI: Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems, AI techniques-search knowledge, abstraction.

Problem Solving (Blind): State space search; production systems, search space control; depth-first, breadth-first search.

Heuristic Based Search: Heuristic search, Hill climbing, best-first search, branch and bound, Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

UNIT – II

Game Playing: Game Tree, Minimax Algorithm, Alpha Beta Cutoff, Modified Minimax Algorithm, Horizon Effect, Futility Cut-off.

Knowledge Representation: Predicate Logic: Unification, Modus Ponens, Modus Tolens, Resolution in Predicate Logic, Conflict Resolution Forward Chaining, Backward Chaining, Declarative and Procedural Representation, Rule based Systems.

Structured Knowledge Representation: Semantic Nets: Slots, exceptions and default frames, conceptual dependency, scripts.

UNIT – III

Handling Uncertainty: Non-Monotonic Reasoning, Probabilistic reasoning, use of certainty factors, fuzzy logic.

Natural Language Processing: Introduction, Syntactic Processing, Semantic Processing, Pragmatic Processing.

UNIT – IV

Learning: Concept of learning, learning automation, genetic algorithm, learning by inductions, neural nets.

Expert Systems: Need and justification for expert systems, knowledge acquisition, Case Studies: MYCIN, RI.

TEXT BOOKS:

1. E. Rich and K. Knight, "Artificial Intelligence", TMH, 2nd Ed., 1992.
2. N. J. Nilsson, "Principles of AI", Narosa Publ. House, 1990.
3. M. N. Hoda, "Foundation Course in Artificial Intelligence", Vikas Pub., 2004.
4. D. W. Patterson, "Introduction to AI and Expert Systems", PHI, 1992.

REFERENCES BOOKS:

1. P. H. Winston, "Artificial Intelligence", Pearson Education, 3rd Edition, 2002.
2. R. J. Schalkoff, "Artificial Intelligence – An Engineering Approach", McGraw Hill Int. Ed. Singapore, 1992.
3. M. Sasikumar, S. Ramani, "Rule Based Expert Systems", Narosa Publishing House, 1994.
4. Tim Johns, "Artificial Intelligence, Application Programming", Wiley Dreamtech, 2005.

BTCS 802 (Software Testing)

UNIT – I

Introduction: What is software testing and why it is so hard?, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, Overview of Graph Theory.

UNIT - II

Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

Structural Testing: Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing.

UNIT - III

Reducing the number of test cases:

Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, Slice based testing

Testing Activities: Unit Testing, Levels of Testing, Integration Testing, System Testing, Debugging, Domain Testing.

UNIT - IV

Object Oriented Testing: Issues in Object Oriented Testing, Class Testing, GUI Testing, Object Oriented Integration and System Testing.

Testing Tools: Static Testing Tools, Dynamic Testing Tools, Characteristics of Modern Tools.

TEXT BOOKS:

1. William Perry, “Effective Methods for Software Testing”, John Wiley & Sons, New York, 1995.
2. Louise Tamres, “Software Testing”, Pearson Education Asia, 2002
3. Robert V. Binder, “Testing Object-Oriented Systems-Models, Patterns and Tools”, Addison Wesley, 1999.
4. K.K. Aggarwal & Yogesh Singh, “Software Engineering”, 2nd Ed., New Age International Publishers, New Delhi, 2005

REFERENCE BOOKS:

1. Cem Kaner, Jack Falk, Nguyen Quoc, “Testing Computer Software”, Second Edition, Van Nostrand Reinhold, New York, 1993.
2. Boris Beizer, “Software Testing Techniques”, Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.
3. Boris Beizer, “Black-Box Testing – Techniques for Functional Testing of Software and Systems”, John Wiley & Sons Inc., New York, 1995.

Elective
(Soft Computing)

UNIT – I

Neural Networks: History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

UNIT – II

Fuzzy Logic: Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation.

Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.

Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

UNIT – III

Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

Uncertainty based Information: Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.

UNIT – IV

Introduction of Neuro-Fuzzy Systems, Architecture of Neuro Fuzzy Networks.

Application of Fuzzy Logic: Medicine, Economics etc.

Genetic Algorithm: An Overview, GA in problem solving, Implementation of GA

TEXT BOOKS:

1. J. A. Anderson, “An Introduction to Neural Networks”, PHI, 1999.
2. Hertz J. Krogh, R.G. Palmer, “Introduction to the Theory of Neural Computation”, Addison-Wesley, California, 1991.
3. G.J. Klir & B. Yuan, “Fuzzy Sets & Fuzzy Logic”, PHI, 1995.

REFERENCE BOOKS:

1. “Neural Networks-A Comprehensive Foundations”, Prentice-Hall International, New Jersey, 1999.
2. J. A. Freeman, D.M. Skapura, “Neural Networks: Algorithms, Applications and Programming Techniques”, Addison Wesley, Reading, Mass, (1992).
3. Melanie Mitchell, “An Introduction to Genetic Algorithm”, PHI, 1998.

Elective
(Embedded System)

UNIT – I

Introduction to an embedded systems design & RTOS: Introduction to Embedded system, Processor in the System, Microcontroller, Memory Devices, Embedded System Project Management, ESD and Co-design issues in System development Process, Design cycle in the development phase for an embedded system, Use of target system or its emulator and In-circuit emulator, Use of software tools for development of an ES.

Inter-process Communication and Synchronization of Processes, Tasks and Threads, Problem of Sharing Data by Multiple Tasks, Real Time Operating Systems: OS Services, I/O Subsystems, Interrupt Routines in RTOS Environment, RTOS Task Scheduling model, Interrupt Latency and Response times of the tasks.

UNIT – II

Overview of Microcontroller: Microcontroller and Embedded Processors, Overview of 8051 Microcontroller family: Architecture, basic assembly language programming concepts, The program Counter and ROM Spaces in the 8051, Data types, 8051 Flag Bits and PSW Register, 8051 Register Banks and Stack Instruction set, Loop and Jump Instructions, Call Instructions, Time delay generations and calculations, I/O port programming Addressing Modes, accessing memory using various addressing modes, Arithmetic instructions and programs, Logical instructions, BCD and ASCII application programs, Single-bit instruction programming, Reading input pins vs. port Latch, Programming of 8051 Timers, Counter Programming

UNIT – III

Communication with 8051: Basics of Communication, Overview of RS-232, I²C Bus, UART, USB, 8051 connections to RS-232, 8051 serial communication programming, 8051 interrupts, Programming of timer interrupts, Programming of External hardware interrupts, Programming of the serial communication interrupts, Interrupt priority in the 8051

UNIT - IV

Interfacing with 8051: Interfacing an LCD to the 8051, 8051 interfacing to ADC, Sensors, Interfacing a Stepper Motor, 8051 interfacing to the keyboard, Interfacing a DAC to the 8051, 8255 Interfacing with 8031/51, 8051/31 interfacing to external memory

TEXT BOOKS:

1. Raj Kamal, “Embedded Systems”, TMH, 2004.
2. M.A. Mazidi and J. G. Mazidi, “The 8051 Microcontroller and Embedded Systems”, PHI, 2004.

REFERENCES BOOKS:

1. David E. Simon, “An Embedded Software Primer”, Pearson Education, 1999.
2. K.J. Ayala, “The 8051 Microcontroller”, Penram International, 1991.
3. Dr. Rajiv Kapadia, “8051 Microcontroller & Embedded Systems”, Jaico Press
4. Dr. Prasad, “Embedded Real Time System”, Wiley Dreamtech, 2004.

Elective
(E-Commerce & ERP)

UNIT – I

Introduction and Concepts: Networks and commercial transactions – Internet and other novelties; networks and electronic transactions today, Model for commercial transactions; Internet environment – internet advantage, worlds wide web and other internet sales venues; Online commerce solutions.

Security Technologies: Insecurity Internet; A brief introduction to Cryptography; Public key solution; Key distribution and certification; prominent cryptographic applications.

Electronic Payment Methods: Updating traditional transactions; secure online transaction models; Online commercial environments; digital currencies and payment systems; Offline secure processing; private data networks.

UNIT – II

Protocols for Public Transport of Private Information: Security protocols; secure protocols; Secure hypertext transfer protocols; Secure sockets layers; Integrating security protocols into the web; Non technical provide.

Electronic Commerce Providers: On-line Commerce options: Company profiles.

Electronic Payment Systems: Digital payment systems; First virtual internet payment system; cyber cash model.

On-line Commerce Environments: Servers and commercial environments; Netscape product line; Netscape commerce server; Microsoft internet explorer and servers; open market.

Digital Currencies: Optional process of Digicash, Ecash Trail; Using Ecash; Smart cards, Electronic Data Interchange; Its basics; EDI versus Internet and EDI over Internet.

Strategies, Techniques and Tools: Internet Strategies: Internet Techniques, Shopping techniques and online selling techniques; Internet tools.

Electronic Commerce Online Resources and Guide to the CD-ROM

UNIT – III

ERP – An Enterprise Perspective; Production Finance, Personnel disciplines and their relationship, Transiting environment, MIS Integration for disciplines, Case Study, Information / Workflow, Network Structure, Client Server Integrator System, Virtual Enterprise.

ERP – Resource Management Perspective; Functional and Process of Resource. Management, Basic Modules of ERP System-HRD, Personnel Management, Training and Development, Skill Inventory, Material Planning and Control, Inventory, Forecasting, Manufacturing, Production Planning, Production Scheduling, Production Control, Sales and Distribution, Finance, Resource Management in global scenario, dynamic data management in complex global scenario.

UNIT – IV

ERP – Information System Perspective: Evolution of Application Software Technology Management, EDP, MIS, DBMS, DSS OLAP (Online Analysis and Processing), TP, OAS, KBS, MRP, BPR, SCM, REP, CRM, Information Communication Technology, E-Business, E-Commerce, EDI

ERP-Key Managerial Issues: Concept Selling, IT Infrastructure, Implication, of ERP Systems on Business Organization, Critical success factors in ERP System, ERP Culture

Implementation Issues, Resistance to change, Public Service and Organizations (PSO) Project, ERP Selection issues, Return on Investment, Pre and Post Implementation Issues.

TEXT BOOKS:

1. Pete Loshin and P.A.Murphy, “ Electronic Commerce ” Jaico Publishing House, 1999.
2. Gary Schneider and James T. Perry, “Electronic Commerce” by Thomson learning, 2001.
3. S. Sadagopan, “Enterprise Resource Planning”, Tata McGraw Hill, 1999.
4. Alexis Leon, “Enterprise Resource Planning”, Tata McGraw Hill, 2000.
5. E-Commerce by Turban, Lee, Chung-PHI.

REFERENCE BOOKS:

1. Kalakota, “Frontiers of E-Commerce ” Addison Wesley long man Publishers, 1999.
2. Kamlesh Bajaj & Debjani Nag, “E-Commerce: The cutting edge of Business” Tata McGraw Hill, 2000.
3. Trepper, “E-Commerce strategies”, Prentice Hall of India, 2001.

Elective
(Network Security)

UNIT – I

Introduction: Codes and Ciphers – Some Classical systems – Statistical theory of cipher systems – Complexity theory of Crypto systems – Stream ciphers, Block ciphers.

Stream Ciphers: Rotor based system – shift register based systems – Design considerations for stream ciphers – Cryptanalysis of stream ciphers – Combined encryption and encoding.

Block Ciphers – DES and variant, modes of use of DES.

UNIT – II

Public Key systems – Knapsack systems – RSK – Diffie Hellman Exchange 0 Authentication and Digital signatures, Elliptic curve based systems.

System Identification and clustering

Cryptology of speech signals – narrow band and wide band systems – analogue & digital systems of speech encryption.

UNIT – III

Network Security: Hash function – Authentication:

Protocols – Digital Signature standards.

Electronics Mail Security – PGP (Pretty Good Privacy) MIME, Data Compression technique.

IP Security: Architecture, Authentication Header, Encapsulating security Payload – Key management.

Web Security: Secure Socket Layer & Transport Layer security, Secure electronic transactions.

Firewalls Design principle, established systems.

UNIT – IV

Telecommunication Network architecture, TMN management layers, Management information Model, Management servicing and functions, Structure of management information and TMN information model.

TEXT BOOKS:

1. William Stallings, “Network Security Essentials, 2nd Edition, 2002.
2. William Stallings, “Cryptography & Network Security”, 3rd Edition, 1999. Pearson education.

Elective
(Mobile Communication)

UNIT – I

Introduction to Cellular Mobile Systems: A basic cellular system, performance criteria, uniqueness of mobile radio environment, operation of cellular systems, planning a cellular system, overview of generations of cellular systems.

Elements of Cellular Radio Systems Design and Interference: General description of the problem, concept of frequency reuse channels, co-channel interference reduction factor, desired C/I from a normal case in an omni directional antenna system, cell splitting, consideration of the components of cellular systems, Introduction to co-channel interference, co-channel measurement design of antenna system, antenna parameter and their effects.

UNIT – II

Cell Coverage for Signal & Antenna Structures: General introduction, obtaining the mobile point to point mode, propagation over water or flat open area, foliage loss, propagation near in distance, long distance propagation, point to point prediction model – characteristics, cell site, antenna heights and signal coverage cells, mobile to mobile propagation, Characteristics of basic antenna structures, antenna at cell site, mobile antennas.

Frequency Management & Channel Assignment, Hand Off & Dropped Calls: Frequency Management, fixed channel assignment, non-fixed channel assignment, traffic & channel assignment, Why hand off, types of handoff and their characteristics, dropped call rates & their evaluation.

UNIT – III

Modulation methods and coding for error detection and correction: Introduction to Digital modulation techniques, modulation methods in cellular wireless systems, OFDM, Block Coding, convolution coding and Turbo coding.

Multiple access techniques: FDMA, TDMA, CDMA: Time-division multiple access (TDMA), code division multiple access (CDMA), CDMA capacity, probability of bit error considerations, CDMA compared with TDMA.

UNIT – IV

Second generation, digital, wireless systems: GSM, IS_136 (D-AMPS), IS-95, mobile management, voice signal processing and coding.

TEXT BOOKS:

1. William, C. Y. Lee, “Mobile Cellular Telecommunications”, 2nd Edition, McGraw Hill, 1990.
2. Mischa Schwartz, “Mobile Wireless Communications”, Cambridge University Press, UK, 2005.

REFERENCE BOOKS:

1. “Mobile Communication Hand Books”, 2nd Edition, IEEE Press.
2. Theodore S Rappaport, “Wireless Communication Principles and Practice”, 2nd Edition, Pearson Education, 2002.
3. Lawrence Harte, “3G Wireless Demystified”, McGraw Hill Publications, 2001.
4. Kaveh Pahlavan and Prashant Krishnamurthy”, Principles of Wireless Networks”, PHI, 2001.