

Ph.D. Course work

Pre-Ph.D. Examination Syllabus



DEPARTMENT OF ELECTRONICS & COMPUTER ENGINEERING,
KONERU LAKSHMAIAH EDUCATION FOUNDATION,
VADDESARAM - 522502, ANDHRA PRADESH, INDIA.

KL E F
Green Fields, Vaddeswaram.

List of Pre-Ph.D Courses approved by

DEPARTMENT OF ELECTRONICS & COMPUTER ENGINEERING

S.NO	PAPER – 2	Code	PAPER – 3	Code
1.	Networking of Embedded Systems	17 EM 201	Architecture Design for Advanced Embedded Processors	17 EM 301
2.	Real Time Scheduling Concepts for Embedded Systems	17 EM 202	Embedded Linux and basics of Device Drivers	17 EM 302
3.	System Design using Hardware Description Language	17 EM 203	FPGA Architectures and Applications	17 EM 303
4.	Design of VLSI Systems	17 EM 204	ASIC Design	17 EM 304
5.	Computer Networks	17 EM 205	Networks for Wireless Sensors	17 EM 305
6.	Principles of Network Security	17 EM 206	Web Security and Privacy Issues	17 EM 306
7.	Advancements in Computing	17 EM 207	Cloud Computing	17 EM 307
8.	Artificial Intelligence	17 EM 208	Machine Learning	17 EM 308
9.	Principles of Mobile Cloud	17 EM 209	Cloud Security	17 EM 309
10.	Cryptography & Network Security	17 EM 210	Mobile & ADHOC Networks	17 EM 310
11.	Wireless Technologies for IOT	17 EM 211	IoT Application Development through Python	17 EM 311
12.	Fundamentals IoT	17 EM 212	IoT Architectures and Programming	17 EM 312
13.	Fundamentals of Cyber Security	17 EM 213	Sensor Networks Programming	17 EM 313
14.	Neural Networks	17 EM 214	Fuzzy Logic	17 EM 314
15.	Sensors and Sensing Principles	17 EM 215	Pattern Recognition	17 EM 315
16	Digital Video Processing	17EM216		

NETWORKING OF EMBEDDED SYSTEMS

SYLLABUS:

UNIT-I:

Embedded Communication Protocols: Embedded Networking: Introduction-Serial/Parallel Communication – Serial communication protocols -RS232 standard –RS485 Synchronous Serial Protocols -Serial Peripheral Interface (SPI) – Inter Integrated Circuits (I2C) – PC Parallel port programming -ISA/PCI Bus protocols –Firewire.

UNIT-II:

USB BUS: Introduction- Speed identification on the bus- USB States- USB bus flow communication: Packets-Data Types-Enumeration-Descriptors-PIC 18Microcontroller USB Interface.

UNIT-III:

CAN Bus: Introduction - Frames –Bit stuffing –Types of errors –Nominal Bit Timing – PIC microcontroller CAN Interface –A simple application with CAN.

UNIT-IV:

Embedded Ethernet: Exchanging messages using UDP and TCP – Serving web pages with Dynamic Data – Serving web pages that respond to user Input – Email for Embedded Systems – Using FTP – Keeping Devices and Network secure.

UNIT-V:

Wireless Embedded Networking: Wireless sensor networks – Introduction – Applications – Network Topology – Localization –Time Synchronization - Energy efficient MAC protocols – SMAC – Energy efficient and robust routing – Data Centric routing

TEXT BOOKS

1. Frank Vahid, Givargis 'Embedded Systems Design: A Unified Hardware/Software Introduction', Wiley Publications
2. Jan Axelson, 'Parallel Port Complete', Penram publications
3. Dogan Ibrahim, 'Advanced PIC microcontroller projects in C', Elsevier2008
4. Jan Axelson 'Embedded Ethernet and Internet Complete', Penram publications
5. Bhaskar Krishnamachari, 'Networking wireless sensors', Cambridge press2005
- 6.

NETWORKING OF EMBEDDED SYSTEMS

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. a) Describe Serial Peripheral Interface (SPI) Bus?
b) Differentiate between:
c) ISA and PCI bus
d) I2C and Fire wire?
2. a) Explain parallel communication protocol with one example?
b) Explain RS232 and RS485 standards?
3. a) Discuss different types of descriptors in USB?
b) Discuss different types of data transfers in USB Bus?
4. a) Describe the message format in the CAN Bus?
b) Draw the interfacing diagram of PIC microcontroller with CAN Bus and explain about it?
5. a) How do you serve the WebPages with a dynamic data?
b) Explain how to email for Embedded Systems using FTP in Embedded Ethernet?
6. a) Define Embedded Ethernet? How do you keep devices in Embedded Ethernet?
b) Explain network secure in Embedded Ethernet?
7. a) Explain the following:
b) Energy efficient and
c) Robust routing
8. Describe the concept of Data Centric Routing?

REAL TIME SCHEDULING CONCEPTS FOR EMBEDDED SYSTEMS

SYLLABUS

UNIT I:

Introduction: Examples of Embedded Systems, Definition of Embedded Systems, Architecture of Embedded Systems, Real- Time Embedded Systems, Design Issues and Current Trends for Embedded Systems

Hard versus soft Real- Time Systems: Jobs and Processes, Release Times, Deadlines and Timing Constraints, Hard and Soft Timing Constraints, Hard Real Time Systems, Soft Real Time Systems.

UNIT II:

A Reference Model of Real – Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency, Functional Parameters- pre-emptivity of jobs, criticality of jobs, Resource Parameters of Jobs and Parameters of Resources, Scheduling Hierarchy- Scheduler and Schedules, Feasibility, Optimality and Performance Measures.

Classification of Real Time Scheduling Approaches: Clock- Driven Approach, Weighted Round- Robin Approach, Priority- Driven Approach, Dynamic versus Static Systems, Effective Release Times and Deadlines, optimality of the EDF and LST algorithms, Non optimality of the EDF and LST algorithms, Challenges in validating timing constraints in priority –driven systems Off-line versus On-line Scheduling.

UNIT III:

Clock-Driven Scheduling : Notations and Assumptions, Static, Timer -Driven Scheduler, General Structure of Cyclic Schedules, Cyclic Executives, Improving the Average Response Time of Aperiodic Jobs, Scheduling Sporadic Jobs-Acceptance test ,EDF Scheduling of accepted jobs and implementation, Pros and Cons of Clock Driven Scheduling.

UNIT IV:

Priority-Driven Scheduling of Periodic Tasks: Static Assumption, Fixed Priority v/s Dynamic Priority Algorithms, schedulability test for the EDF algorithm, a schedulability test for fixed priority tasks with short response times-time demand analysis, schedulability test for fixed priority tasks with arbitrary response times: busy intervals, general schedulability test, sufficient schedulability conditions for RM & DM algorithms: schedulable utilization of the RM algorithm for tasks with $D_i = p_i$, schedulable utilization of fixed priority tasks with arbitrary relative deadlines

Scheduling Aperiodic and Sporadic Jobs in Priority-Driven Systems: Assumptions and Approaches, Deferrable Servers- Operations of Deferrable Servers, Constant utilization server Scheduling of sporadic jobs-a simple acceptance test in deadline driven systems, a simple acceptance test in fixed- priority driven systems.

UNIT V:

Resources and Resource Access control: Assumptions on Resources and Their Usage, Effects of Resource Contention and Resource Access Control, Non-preemptive Critical Sections, Basic Priority Inheritance Protocol, Basic Priority Ceiling Protocol- Definition, computation of blocking time, controlling accesses to Multiple Unit Resources

Real-Time Operating Systems: Overview- Threads and Tasks, The Kernel, Time Services and Scheduling Mechanisms- Time Services, Scheduling Mechanisms, Other Basic Operating System Functions- Communication and Synchronization, Event Notification and Software Interrupt, Memory Management, I/O and Networking

TEXT BOOKS:

1. Real Time Systems – By Jane W.S.Liu -Low Price Edition , Pearson Education Asia
2. Real-Time Concepts for Embedded Systems - Qing Li with Caroline Yao published by CMP Books

REAL TIME SCHEDULING CONCEPTS FOR EMBEDDED SYSTEMS

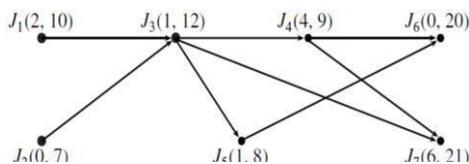
Model Question paper

Time: 3hours
Marks=100

Max.

Answer any five of the following

1. a) Define Jobs, Processes, Release Time and Deadlines.
b) Bring out the differences between Hard Real Time Systems and Soft Real Time Systems.
2. a) Define real time embedded system. Describe the design issues for real time embedded system.
b) Explain the Architecture of Embedded Systems. Discuss the current trends for embedded Systems.
3. a) Describe periodic task model for designing the real time system?
b) Explain Temporal Parameters of Real time workload
c) Explain Functional Parameters of Real time workload
4. a) A system uses the cyclic EDF algorithm to schedule the sporadic jobs. The cyclic schedule of periodic tasks in the system uses a frame size of 5, and a major cycle contains 6 frames. Suppose that the initial amounts of slack time in the frames are 1, 0.5, 0.5, 0.5, 1, and 1.
b) Suppose that a sporadic job $S_1(23, 1)$ arrives in frame 1, sporadic jobs $S_2(16, 0.8)$ and $S_3(20, 0.5)$ arrive in frame 2. In which frames are the accepted sporadic jobs scheduled?
c) Suppose that an aperiodic job with execution time 3 arrives at time 1. When will it be completed, if the system does not do slack stealing?
5. a) Discuss sufficient schedulability conditions for RM and DM algorithms
b) Find the effective release times & deadlines of the jobs in the precedence graph shown below.



6. State the implementation of priority ceiling protocol in dynamic priority systems
7. a) What are the pros and cons of clock driven scheduling
b) Describe in detail about temporal, interconnection, functional and resource characteristics of jobs
c) Differentiate between fixed priority and dynamic priority algorithms for scheduling periodic tasks.
8. a) Explain about the time services and scheduling mechanisms provided by operating systems to real time applications
b) Explain the Optimality of the EDF and LST algorithm.

SYSTEM DESIGN USING HARDWARE DESCRIPTION LANGUAGE

SYLLABUS

UNIT I:

Programmable Logic Design: ASIC, ROM, PLA, PAL, CPLD and FPGA,

VHDL Based Design: An overview of VHDL, Role of VHDL in system design, Introduction to CAD tools for system design, Introduction to Xilinx IDE software.

UNIT II:

VHDL Fundamentals: Entity and architecture declaration, Introduction to behavioral, dataflow and structural models, package and package declarations and package body.

UNIT III:

Basic Elements of VHDL: Data objects – constant, variable and signal, Data types – scalar and composite, Predefined Operators – logical, relational, shift, adding and multiplying, Overloading – literal and operator

UNIT IV:

VHDL Statements: Process, variable assignment, signal assignment, sequential statements, conditional statements, loop, if, case, next statements, assertion and report statements, signal drivers and signal assignment statements, conditional signal assignments, select and generic.

Subprograms: Application of functions and procedures. Overloading and signal assignments. Component declaration, Component instantiation.

UNIT V:

Combinational Circuit Design: VHDL Models of combinational circuits such as Adder, Multiplexer, Demultiplexer, Encoder, Decoder, Code converters, Comparators, Parity generators, Multipliers and implementation of Boolean functions etc.

Sequential Circuit Design: VHDL Models of sequential such as edge triggered D flip flop, T flip flop and J K flip flop, serial in serial out register, serial in parallel out register, parallel in parallel out register, counter, memory, ALU, etc.

TEXT BOOKS:

1. J. Bhaskar, VHDL Primer, Pearson Education Asia
2. Douglas L. Perry, VHDL Programming by Examples, Tata McGraw Hill
3. Yogesh Misra, Digital System Design Using VHDL, Dhanpat Rai & Co.

REFERENCE BOOKS:

1. Navabi, Zainalabedin, VHDL: Analysis and Modeling of Digital System, McGraw-Hill
2. Stephen Brown and Zvonko Vranesic, Fundamentals of Digital Logic with VHDL, McGraw-Hill

SYSTEM DESIGN USING HARDWARE DESCRIPTION LANGUAGE

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. A) Explain the purpose of various tools in system design using VHDL.
B) Explain the subprogram overloading and operator overloading?
2. Draw the circuit diagram of a three bit serial in parallel out register and write it's VHDL code using behavioral style of modeling.
3. Write the VHDL code of a 4-to-1 multiplexer using "if-else" and "case" statements.
4. A) Write technical note on FPGA.
B) Implement a three bit binary to gray code converter in PAL and PLA
5. A) Write and explain a function to perform addition on two four bit numbers.
B) What is the application of 'package' in VHDL?
6. A) Write the VHDL code for a JK flip flop.
B) Draw the gate level diagram of a full adder by using only two input gates and write the VHDL code of the circuit using mixed style of modeling.
7. A) In VHDL how signals are different from variables and explain how the transport delay and inertial delay models affect the transactions of signal driver.
B) Draw the circuit and write VHDL code for a three bit up counter.
8. A) Write the behavior model of the circuit given in Fig. 1 in following two ways:
 - (i) Using single '*process*'
 - (ii) Using multiple '*process*'B) Find the time at which output changes for (i) and (ii) if an event occurs on input 'A' at time 10ns.

DESIGN OF VLSI SYSTEMS

SYLLABUS

UNIT-I:

Design Methodology: Structured design techniques; Programmable logic; Gate array and sea of gates design; cell based design; full custom design; Design flow; Design Economics.

UNIT-II:

Data path Subsystems: Adders; One/zero Detectors; Comparators; Counters; Shifters; Multipliers; Power and Speed Trade-off.

UNIT-III:

Memory and Array Subsystems: SRAM, DRAM, ROM, Serial access memories; CAM, PLAs; Array yield, reliability; Power dissipation in Memories.

Special-purpose Subsystems: Packaging; power distribution; I/O pads;

UNIT-IV:

Interconnect: Interconnect parameters; Electrical wire models, capacitive parasitics; Resistive parasitics; Inductive parasitic; Crosstalk; Advanced Interconnect Techniques.

Timing Issues: Timing classification; Synchronous design; Self-timed circuit design;

UNIT-V:

Clock Synthesis and Synchronization: Synchronizers; Arbiters; Clock Synthesis; PLLs; Clock generation; Clock distribution; Synchronous Vs Asynchronous Design.

TEXT BOOKS

1. Neil H. E. Weste, David. Harris and Ayan Banerjee,, "CMOS VLSI Design" - Pearson Education, Third Edition, 2004.
2. Jan M. Rabaey, Anantha Chandrakasan, Borivoje Nikolic, "Digital Integrated Circuits" Pearson Education, Second Edition.

REFERENCES:

1. Sung-Mo Kang, Yusuf Leblebici, "CMOS Digital Integrated Circuits" TMH, Third Edition, 2003
2. Wayne Wolf, "Modern VLSI Design ", 2nd Edition, Prentice Hall, 1998.

SIMULATION BOOKS

1. Etienne Sicard, Sonia Delmas Bendhia, "Basics of CMOS Cell Design", TMH, EEE, 2005.

DESIGN OF VLSI SYSTEMS

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. Design a circuit for $X = \{1\ 3\ 5\ 11\ 13\}$ & $Y = \{1\ 2\ 10\ 12\}$ by using PLA.
2. Explain about Carry look ahead adder for 4 bits and what happens when we are using more than 4 bits explain with examples.
3. a) Justify all the four design styles by taking one example.
b) Sketch the Full adder by using transistor level by using CMOS Technology.
4. Design the Conditional sum adder for given input $A = 10110110$ & $B = 00101101$.
5. a) Design the SRAM & DRAM using Transistor.
b) Explain the Power Distribution for Subsystem design.
6. Design the multiplier for $X = 011001(25_{10})$ & $Y = 101110(-18_{10})$ using Booth multiplier.
7. a) Explain the cell-based design methodology using example.
b) Comparison of Design styles.
8. a) Illustrate the concept of clock distribution.
b) Compare synchronous and asynchronous design issues.

COMPUTER NETWORKS

SYLLABUS

UNIT I:

Introduction: OSI, TCP/IP and other networks models, Examples of Networks: Novell Networks, Arpanet, Internet, Network Topologies WAN, LAN, MAN. Physical Layer: Transmission media copper, twisted pair wireless, switching and encoding asynchronous communications; Narrow band, broad band ISDN and ATM.

UNIT-II:

Network Layer: Virtual circuit and Datagram subnets-Routing algorithm shortest path routing, Flooding, Hierarchical routing, Broad cast, Multi cast, distance vector routing.

UNIT-III:

Dynamic routing – Broadcast routing. Rotary for mobility. Congestion, Control Algorithms – General Principles – of Congestion prevention policies.

Internet working: The Network layer in the internet and in the ATM Networks.

UNIT-IV:

Transport Layer: Transport Services, Connection management, TCP and UDP protocols; ATM AAL Layer Protocol.

UNIT – V:

Application Layer – Network Security, Domain name system, SNMP, Electronic Mail; the World WEB, Multi Media.

TEXT BOOKS:

1. Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education/PHI
2. Data Communications and Networking – Behrouz A. Forouzan, Third Edition TMH.

REFERENCES:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

COMPUTER NETWORKS

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1 a) Explain with a neat sketch, the functions of the protocols used in each layer of the OSI model and illustrate how communication is taking place between two end systems.

b) Explain two types of guided media and two types of unguided media transfer in networks.

2.a) Differentiate between adaptive and non- adaptive routing algorithms.

b) How does link state routing take care of the problem of wrapping of sequence numbers, crashing of routers and corruption of sequence number?

3. Discuss briefly about different network layer protocols?

4 a) Why does UDP exist? Would it not have been enough to just let user processes send raw IP packets? Justify answer.

b) Explain briefly about all the fields in TCP segment header?

5. A TCP machine is sending windows of 65535 bytes over a 1-Gbps channel that has a 10-millisecond one-way delay. What is the maximum throughput achievable? What is the line efficiency?

6 a) Discuss in detail about Karn and Jacobson algorithm in transport layer?

b) Explain about RSA algorithm

7. Discuss in detail about Public Key Infrastructure

8. Briefly discuss about Domain name system & SNMP.

PRINCIPLES OF NETWORK SECURITY

SYLLABUS

UNIT-I:

Introduction to Network Security: Attacks, services, Security. A model of Inter network Security, Steganography, One time PADS. Basic and ESOTERIC Cryptographic Protocols: Key Exchange, Authentication, Formal Analysis of Authentication and key Exchange Protocols, Multiple & Public Key Cryptography, Secret Splitting & Sharing Secure elections, Secure multiparty, Communication, Digital Cash.

Unit II:

Crypto Graphic Algorithms (Block Cipher): RC2, GOST, CAST, BLOW FISH, SAFEER, RC5, NEWDES, CRAB, Theory of Block Cipher design. Key Management: Key lengths, Generating Keys, Transferring, Verification, Updating, Storing, Backup, Compromised, Lifetime of, Destroying Keys, Public key Management.

Unit III:

Digital Signature Algorithms: Digital Signature, DSA, DSA variants, Gost, Discrete Lagorithm, One – Schnorr – Shamir digital Signatures, Esign, Cellular Automata. Mails: Electronic Mail & IO Security good Privacy, SIMIME, IP Security Architecture, Authentication Header, Encapsulating Security, Pay load Key Management Issues.

Unit IV:

Security: Web Security Web Security requirements, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

Unit V:

Viruses and Threats: Intruders, Viruses, Worms and Firewalls Intruders, Viruses and Related Threats, Firewall Design Principles, Trusted Systems.

REFERENCE BOOKS:

1. Applied Cryptography, 7/e, Bruce SCHNEIER John Wiley & Sons Inc.
2. Cryptography and Network Security, William Stallings, PHI.
3. Introduction to cryptography with coding Theory, 7/e, Wade Trappe, C. Washington, PEA.
4. Cryptography and Information Security, V.K. Pachghare, PHI.
5. Cryptography and Network Security, Forouzan, TMH, 2007.
6. Cryptography and Network Security, 2/e, Kahate, TMH.
7. Modern Cryptography, Wenbo Mao, PEA

PRINCIPLES OF NETWORK SECURITY

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. a) What is a digital signature?
b) What is denial service attack?
c) What is ECB mode?
d) What is the procedure for key generation using RSA?
e) What is the purpose and the use of a KDC?
f) What is non-repudiation?
g) What is session key?
2. a) Describe the Diffie - Hellman key exchange algorithm and explain it with an example.

b) Alice and Bob want to establish a secret key using the Diffie – Hellman key exchange protocol using $n = 11$, $g = 5$, $x = 2$ and $y = 3$. Find the values A and B and the secret key
3. Describe the data encryption algorithm. Explain briefly about symmetric key management
4. a) What are the key requirements of message digests?
b) Describe the secure hash algorithm.
5. Discuss the message formats of Kerberos V4 in detail.
6. a) What is password based encryption? What are the problems associated with it?
b) Explain briefly about SET Protocol
7. Discuss SSL in detail?
8. Describe Pretty Good Privacy.

ADVANCEMENTS IN COMPUTING

SYLLABUS

UNIT I:

Grid Computing: Data & Computational Grids, Grid Architectures and its relations to various Distributed Technologies. Autonomic Computing, Examples of the Grid Computing Efforts (IBM)

UNIT II:

Cluster Computing 1: Cluster setup & its Administration, Performance Models & Simulations; Networking, Protocols & I/O, Lightweight Messaging systems, Active Messages

UNIT III:

Cluster Computing 2: Distributed shared memory, parallel I/O Clusters, Job and Resource management system, scheduling parallel jobs on clusters

UNIT IV:

Cluster Computing 3: Load sharing and Fault tolerance manager, parallel programming scheduling techniques, Dynamic load balancing, Example Cluster System – Beowlf, COMPaS and NanOS

UNIT V:

Pervasive Computing: Pervasive Computing concepts & Scenarios, Hardware & Software, Human - machine interface Device connectivity, Java for Pervasive devices, Application examples, Quantum Computing: Introduction to Quantum Computing, Qubits, Quantum Mechanics, Quantum gates, Applications of quantum computing.

REFERENCE BOOKS:

1. J. Joseph & C. Fellenstein, Grid Computing, PEA.
2. Raj Kumar Buyya, High performance cluster computing, PEA.
3. J.Burkhardt et .al, Pervasive computing, PEA.
4. Vishal Sahni, Quantum computing, TMH.
5. Marivesar, Approaching quantum computing, PEA.
6. Nielsen & Chung L, Quantum computing and Quantum Information, Cambridge University Press.
7. A networking approach to Grid Computing, Minoli, Wiley.

ADVANCEMENTS IN COMPUTING

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. Explain the Architecture of Grid Computing. Give Examples.
2. Explain in detail about Scheduling parallel jobs on Clusters and Parallel I/O Clusters.
3. Briefly Explain about Cluster Computing set up and Administration.
4. What is distributed shared Memory? Give an Example.
5. Discuss in detail parallel Programming Scheduling Techniques.
6. Explain about the Quantum Computing and it's Applications.
7. Discuss about the Pervasive Computing Scenarios.
8. Explain the following Terms
 - a) Parallel I/O Clusters.
 - b) Light weight Messaging systems and Active Messages.

ARTIFICIAL INTELLIGENCE

SYLLABUS

Unit-I:

Introduction to Artificial Intelligence: AI Problems, The underlying Assumption, AI Techniques, Level of the Model Problems, Problem spaces & Search: Defining the Problem as a state space search, Production System, Problem Characteristics, Production System Characteristics.

Unit-II:

Heuristic Search Techniques: Generate and Test, Hill Climbing, Best first Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis.

Unit-III:

Knowledge Representation Issues: Representation and Mapping, Approaches to Knowledge Representation, Issues in Knowledge Representation, The Frame Problem
Predicate Logic: Representing simple facts in logic, Computable Functions and Predicates, Resolution, Natural Deduction.

Unit-IV:

Representing Knowledge using rules: Procedural Versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning, Matching, Control Knowledge

Unit-V:

Common Sense: Qualitative Physics, Common Sense Ontologies, Memory Organization
Expert Systems: Representing and Using Domain Knowledge, Expert System Shells, Knowledge Acquisition

TEXT BOOK:

1. Elaine Rich & Kevin Knight, "Artificial Intelligence", 2nd Edition, (Tata McGraw Hill Edition)

REFERENCE BOOK:

1. Patrick Henry Winston, 'Artificial Intelligence', Pearson Education, 2003

ARTIFICIAL INTELLIGENCE

Model Question paper

Time: 3hours

Max. Marks: 100

Answer Any Five of the Following

1. Briefly explain the following:
 - a) State Space Representation of AI Problem?
 - b) Procedural vs Declarative Knowledge?
2. a) Explain about State Space Representation of Water Jug Problem?
 - b) Explain Problem Characteristics with examples?
3. a) Explain Best First Search Algorithm with an Example?
 - b) Apply AI Techniques D the solution of the following Cryptarithmic Problem CROSS ROADS?
4. a) Explain how a wff in predicate calculus can be converted into Clauses?
 - b) Explain with an example Unification & Resolution in Predicate Logic?
5. a) Show how semantic nets and Frames can be captured in Logic with appropriate Examples?
 - b) Write the CD Representation of the Sentence John fertilized fields with a Special Tool?
6. a) Explain The Dependency back tracking in Truth Maintenance System with an example?
 - b) What is a Certainty factor and explain how certainty factors are related to Rule Based Systems of the Sentence?
7. a) Write a neat diagram the structure of a Rule Based Expert System and Explain its Components?
 - b) Explain Syntactic Processing and Augmented Transition Nets
8. Write Short on
 - a) Natural Deduction
 - b) Forward versus Backward Reasoning
 - c) Expert System Shells

PRINCIPLES OF MOBILE CLOUD

SYLLABUS

Unit-I:

Mobile Connectivity Evolution: From Single to Multiple Air Interface Devices, Network Evolution: The Need for Advanced Architectures.

Unit-II:

Mobile Clouds: An Introduction, Cooperation and Cognition in Mobile Clouds, Mobile Cloud Classification and Associated Cooperation Approaches.

UNIT-III:

Sharing Device Resources in Mobile Clouds, Wireless Communication Technologies, Building Mobile Clouds.

UNIT-IV:

Mobile Cloud Formation and Maintenance, Cooperative Principles by Nature, Social Mobile Clouds, Green Mobile Clouds: Making Mobile Devices More Energy Efficient.

UNIT-V:

Mobile Clouds Applications, Future Developments of Mobile Clouds.

TEXT BOOK:

1. Frank H. P. Fitzek, Marcos D. Katz, Mobile Clouds: Exploiting Distributed Resources in Wireless, Mobile and Social Networks, Wiley Publications, ISBN: 978-0-470- 97389-9, Jan 2014.

REFERENCE:

1. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, and Michael Morgano, Android for Programmers: An App-Driven Approach, Prentice Hall, November 3, 2011.

PRINCIPLES OF MOBILE CLOUD

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. Discriminate the Following.
 - a). Mobile Connectivity Evolution
 - b). Network Evolution
2. a). How to share the device Resources in Mobile Clouds?
b). How to Build Mobile Clouds?
3. Define the Following Terms.
 - a). Social Mobile Clouds
 - b). Green Mobile Clouds
4. What are the Future Developments of Mobile Clouds?
5. How the Mobile Devices are making more Energy Efficient?
6. Classify the Mobile Clouds and their Cooperative approaches.
7. What are different kinds of Mobile Cloud Applications?
8. a) Explain about the Wireless Communication Technologies.
b) What is the Need for Advanced Architectures?

CRYPTOGRAPHY AND NETWORK SECURITY**SYLLABUS****UNIT –I:**

Understanding Computer Network Security: Securing the Computer Network Forms of Protection, Security Standards. **Security Threats to Computer Networks:** Sources of Security Threats, Security Threat Motives, Security Threat Management, Security Threat Correlation, Security Threat Awareness. **Computer Network Vulnerabilities:** Sources of Vulnerabilities, Vulnerability Assessment. **Cyber Crimes and Hackers:** Cyber Crimes, Hackers, Dealing with the Rising Tide of Cyber Crimes. **Hostile Scripts:** Introduction to the Common Gateway Interface (CGI), CGI Scripts in a Three-Way Handshake, Server–CGI Interface, CGI Script Security Issues, Web Script Security Issues, Dealing with the Script Security Problems, Scripting Languages. **Security Assessment, Analysis, and Assurance:** System Security Policy, Building a Security Policy, Security Requirements Specification, Threat Identification, Threat Analysis, Vulnerability Identification and Assessment, Security Certification, Security Monitoring and Auditing, Products and Services.

UNIT –II:

Disaster Management: Disaster Prevention, Disaster Response, Disaster Recovery, Make your Business Disaster Ready, Resources for Disaster Planning and Recovery. **Access Control and Authorization:** Access Rights, Access Control Systems, Authorization, Types of Authorization Systems, Authorization Principles, Authorization Granularity, Web Access and Authorization. **Authentication:** Multiple Factors and Effectiveness of Authentication, Authentication Elements, Types of Authentication, Authentication Methods, Developing an Authentication Policy.

UNIT –III:

Firewalls: Types of Firewalls, Configuration and Implementation of a Firewall, The Demilitarized Zone (DMZ), Improving Security Through the Firewall, Firewall Forensics, Firewall Services and Limitations. **System Intrusion Detection and Prevention:** Intrusion Detection, Intrusion Detection Systems (IDSs), Types of Intrusion Detection Systems, The Changing Nature of IDS Tools, Other Types of Intrusion Detection Systems, Response to System Intrusion, Challenges to Intrusion Detection Systems, Implementing an Intrusion Detection System, Intrusion Prevention Systems (IPSs), Intrusion Detection Tools.

UNIT –IV:

Computer and Network Forensics: Computer Forensics, Network Forensics, Forensics Tools. **Virus and Content Filtering:** Scanning, Filtering, and Blocking, Virus Filtering, Content Filtering, Spam. **Computer Network Security Protocols:** Application Level Security, Security in the Transport Layer, Security in the Network Layer, Security in the Link Layer and over LANS. **Security in Wireless Networks and Devices:** Cellular Wireless Communication Network Infrastructure, Wireless LAN (WLAN) or Wireless Fidelity (Wi-Fi), Standards for Wireless Networks, Security in Wireless Networks. **Security in Sensor Networks:** The Growth of Sensor Networks, Design Factors in Sensor Networks, Security in Sensor Networks, Security Mechanisms and Best Practices for Sensor, Trends in Sensor Network Security Research.

UNIT –V:

Security Beyond Computer Networks: Information Assurance: Collective Security Initiatives and Best Practices. **Network Perimeter Security:** General Framework, Packet Filters, circuit Gateways, Application Gateways, Trusted Systems and Bastion Hosts, Firewall Configurations, Network Address Translations, Setting Up Firewalls. **The Art of Anti Malicious Software:** Viruses, Worms, Virus Defence, Trojan Horses, Hoaxes, Peer-to-Peer Security, Web Security, Distributed Denial of Service Attacks. **The Art of Intrusion Detection:** Basic Ideas of Intrusion Detection, Network-Based Detections and Host-Based Detections, Signature Detections, Statistical Analysis, Behavioural Data Forensics, Honeypots.

Textbooks:

1. Computer Network Security- Theory and Practice by Jie Wang, 2009 edition, Higher Education Press, Beijing and Springer-Verlag.
2. A Guide to Computer Network Security by Joseph MiggaKizza, 2009 Edition, Springer-Verlag London Limited.

References:

1. Network Security Essentials- Applications and Standards by William Stallings, 4th edition.
2. Modern Cryptography: Theory and Practice by WenboMaoHewlett-Packard Company, 1st edition, Prentice HallPTR.
3. NetworkSecurity:PrivateCommunicationinaPublicWorldbyCharlieKaufman, Radia Perlman, MikeSpeciner, 2nd edition.
4. Cryptography and Network Security: Principles and Practice by William Stallings, 6th edition.

CRYPTOGRAPHY AND NETWORK SECURITY

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. a) Explain about substitution and transposition techniques with two examples for each.
b) What is the need for triple DES? Write the disadvantages of double DES and explain triple DES.
2. a) Explain how the elliptic curves are useful for cryptography?
b) In a public key system using RSA, you intercept the cipher text $C=10$ sent to a user whose public key is $e=5$, $n=35$. What is the plain text? Explain the above problem with an algorithm description.
3. a) Describe briefly about X.509 authentication procedures. And also list out the drawbacks of X.509 version2.
b) Write about the basic uses of MAC and list out the applications
4. a) Compare & Contrast SSL and TLS
b) Write about the basic uses of MAC and list out the applications
5. Discuss briefly about SET Protocol
6. Discuss briefly about Public Key Infrastructure
7. Discuss briefly about Malicious software, viruses and Firewalls
8. a) Describe the Diffie - Hellman key exchange algorithm and explain it with an example.
b) Alice and Bob want to establish a secret key using the Diffie – Hellman key Exchange protocol using $n = 11$, $g = 5$, $x = 2$ and $y = 3$. Find the values A and B and the secret key

WIRELESS TECHNOLOGIES FOR IOT**SYLLABUS****UNIT-I:**

RF Basics: Radio Frequency (RF) Fundamentals: Introduction to RF & Wireless Communications Systems, RF and Microwave Spectral Analysis, Communication Standards, Understanding RF & Microwave Specifications. Spectrum Analysis of RF Environment, Protocol Analysis of RF Environment, Units of RF measurements, Factors affecting network range and speed, Environment, Line-of-sight, Interference, Defining differences between physical layers- OFDM.

UNIT-II:

Cellular Standards: Cellular carriers and Frequencies, Channel allocation, Cell coverage, Cell Splitting, Microcells, Picocells, Handoff, 1st, 2nd, 3rd and 4th Generation Cellular Systems (GSM, CDMA, GPRS, EDGE,UMTS), Mobile IP, WCDMA

UNIT-III:

WLAN: Wi-Fi Organizations and Standards: IEEE, Wi-Fi Alliance, WLAN Connectivity, WLAN QoS & Power-Save, IEEE 802.11 Standards,802.11-2007,802.11a/b/g, 802.11e/h/I,802.11n

UNIT-IV:

Wi-Fi Hardware & Software: Access Points, WLAN Routers, WLAN Bridges, WLAN Repeaters, Direct-connect Aps, Distributed connect Aps, PoE Infrastructure, Endpoint, Client hardware and software, Wi-Fi Applications

UNIT-V:

WSN & WPN: Wireless Personal Area Networks, Bluetooth, Bluetooth Standards, BlueTooth Protocol Architecture, UWB, IEEE 802.15 standards, ZigBee, Sub1GHz, Sensor Networks, coexistence strategies in Sensor Networks, Routing protocols in Wireless Sensor Networks.

TEXT BOOKS:

1. Wireless Communications – Principles and Practice; by Theodore S Rappaport, Pearson Education Pte. Ltd., Delhi
2. Wireless Communications and Networking; By: Stallings, William; Pearson Education Pte. Ltd., Delhi
3. Bluetooth Revealed; By: Miller, Brent A, Bisdikian, Chatschik; Addison Wesley Longman Pte Ltd., Delhi
4. Wilson , “Sensor Technology hand book,” Elsevier publications 2005.
5. Andrea Goldsmith, “Wireless Communications,” Cambridge University Press, 2005

REFERENCES:

1. Mobile and Personal Communications Services and Systems; 1st Edition; By: Raj Pandya; PHI, New Delhi
2. Fundamentals of Wireless Communication by Tse David and Viswanath Pramod, Cambridge University press, Cambridge
3. Mobile Communications; By: Schiller, Jochen H; Addison Wesley Longman Pte Ltd., Delhi

4. 3G Networks: Architecture, protocols and procedures based on 3GPP specifications for UMTS WCDMA networks, By Kasera, Sumit, Narang, and Nishit, TATA MGH, New Delhi
5. Wireless Sensor Networks: information processing by approach, ZHAO, FENG, GUIBAS and LEONIDAS J, ELSEVIER, New Delhi
6. Holger Karl and Andreas Wiilig, "Protocols and Architectures for Wireless Sensor Networks" John Wiley & Sons Limited 2008.

WIRELESS TECHNOLOGIES FOR IOT

Model Question paper

Time: 3hours

Max. Marks: 100

Answer Any Five of the Following

1. a) Discuss in detail about spectral analysis of RF and Microwave?
b) What are the factors effecting network range and speed?
2. List out the differences between OFDM physical layers.
3. Describe the terms
 - a) Cell Coverage
 - b) Cell Splitting
 - c) Chanel allocation
 - d) Handoff
4. a) Explain in brief about first and second generation cellular systems.
b) Explain Mobile IP in detail?
5. a) Explain WLAN standard IEEE 802.11 in detail?
b) Compare IEEE 802.11 a, b,g,n.
6. Write a short note on WLAN routers, bridges and repeaters.
7. Explain in detail about Bluetooth protocol architecture?
8. Explain various routing protocols in wireless sensor networks?

FUNDAMENTALS OF IOT

SYLLABUS:

UNIT-I:

Introduction- The IOT Today & Progression to Tomorrow – Success Factors –Strategic Research & Innovation Directions.

UNIT-II:

IOT and Related Issues - IOT & Related Future Internet Technologies – Networks & Communication – Processes & Data Management - Security, Privacy & Trust - Protocol Convergence

UNIT-III:

M2M To IOT -M2M Vs IOT – A vision from M2M to IOT – Case Study.

UNIT-IV:

An Architectural Overview, Reference Model and IOT Architecture - Architecture Reference Model – IOT Reference Architecture

UNIT-V:

IOT Smart Applications, Cloud Service Management and IOT - Connecting IOT to cloud – Cloud Storage for Iot – Data Analytics for IoT – Software & Management Tools for IOT.

TEXT BOOKS:

1. Ovidiu Vermesan, Peter Friess, “Internet of Things – From Research & Innovation to Market Deployment”, River Publishers, 2014
2. Jan Holler ,VlasiosTsiatsis, Catherine Mulligan, Stamatis Karnouskos, Stefan Avesand, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, Elsevier Ltd, 2014

REFERENCE BOOKS:

1. Arshdeep Bahga, Vijay Madiseti, “Internet of Things – A hands-on approach”, Universities Press, 2015.
2. Manoel Carlos Ramon, “Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers”, Apress, 2014.
3. Marco Schwartz, “Internet of Things with the Arduino Yun”, Packt Publishing, 2014

FUNDAMENTALS OF IOT

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. What is Internet of Things (IoT)? What are the technologies that enabling IoT?
2. Discuss in brief application areas of IoT?
3. Describe the process and data management issues related to Internet of Things?
4. Write a short note on trust convergence of Internet of Things and its application to service composition?
5. What is M2M Communication? List out the differences between IoT and M2M with an example?
6. With a neat sketch explain IoT architecture in detail.
7. Explain in detail cloud service management in IoT?
8. Explain MapReduce Programming model in Apache Hadoop?

FUNDAMENTALS OF CYBER SECURITY

SYLLABUS:

UNIT-I:

Need for Cyber Security: Introduction to security- CIA triad-Case studies- security attacks-issues related to social networking – Guidelines

UNIT-II:

Methods to Secure yourself in the Cyber WORLD: Why and What of Reversible and Irreversible Cryptographic mechanisms? Applications of Digital Signature - Good password practices

UNIT-III:

E-Commerce: Secure Transactions: What is E-commerce? – Online banking security- Online shopping fraud Guidelines and Recommendations

UNIT-IV:

Everyday Security: Connecting your laptop, mobile devices, PDAs to Internet- Managing your browser-Facebook Security-E-mail security – Safe guarding from Viruses: Antiviruses– Best practices and guidelines

UNIT-V:

Cyber Security Laws and Competent Authorities: Indian IT Act, 2008 - What is Cyber Forensics? – Functions of cybercrime cell – Responding to a cyber attack

REFERENCES

1. “Information Security Awareness Handbook, ISEA, Department of Electronics and Information Technology”, Government of India, 2010.
2. deity.gov.in/sites/upload_files/dit/.../itact2000/it_amendment_act2008.pdf
3. www.schneier.com/blog/archives/2013/03/browser_securit.html
4. www.dhSES.ny.gov/ocs/awareness-training-events/news/2010-03.cfm
5. <https://www.watsonhall.com/e-commerce-security/>

FUNDAMENTALS OF CYBERSECURITY

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. What are the various security techniques used in cyber security? Explain in detail?
2. Explain Different types of security attacks and issues related to social networking?
3. a) Explain digital signature algorithm?
b) List and explain any two password management practices?
4. Define cryptography? Explain reversible and irreversible cryptography mechanisms?
5. Explain reversible cryptography mechanism? Explain any two applications in detail?
6. What is E-commerce? Explain Online banking security and Online shopping fraud Guidelines and Recommendations?
7. Explain below
 - a) How PDAs to Internet-Managing your browser?
 - b) Explain Face book Security-E-mail security?
8. What is Cyber Forensics? Explain Functions of cybercrime cell?

NEURAL NETWORKS

SYLLABUS:

UNIT-I:

Introduction to Neural Networks: Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential Applications of ANN.

UNIT-II:

Essentials Of Artificial Neural Networks: Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN –Connectivity, Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules.

UNIT-III:

Single Layer Feed Forward Networks: Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Limitations of the Perceptron Model.

UNIT-IV:

Multi- Layer Feed Forward Networks: Credit Assignment Problem, Generalized Delta Rule, Derivation of Back propagation (BP) Training, Summary of Back propagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

UNIT-V:

Associative Memories: Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory, Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function. Architecture of Hopfield Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis. Neural network applications: process identification, control, fault diagnosis.

REFERENCES

1. Laurene Fausett, "Fundamentals of Neural Networks", Pearson Education, 2004.
2. Simon Haykin, "Neural Networks- A comprehensive foundation", Pearson Education, 2003.
3. S.N.Sivanandam, S.Sumathi,S. N. Deepa "Introduction to Neural Networks using MATLAB 6.0", TATA Mc Graw Hill, 2006.
4. S. Rajasekharan and G. A. Vijayalakshmi pai, "Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications", PHI Publication, 2004.
4. Timothy J. Ross, " Fuzzy Logic With Engineering Applications", Tata McGraw- Hill Inc. 2000

NEURAL NETWORKS

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. Explain in detail how weights are adjusted in the different types of Learning Law (Both supervised and unsupervised).
2. a) What are the design steps to be followed for using ANN for your problem?
b) Write the advantages and disadvantages of Artificial Neural Networks.
3. a) Draw the model of MP(McCulloch Pitts) neuron and state its characteristics?
b) State and prove Perceptron Convergence theorem?
4. Draw the structure of biological neuron and explain in detail?
5. a) Briefly explain Back Propagation algorithm in detail?
b) Derive the Back propagation algorithm for regression?
6. Briefly explain Kolmogorov theorem in detail?
7. a) What is the purpose of using bidirectional associative memory? Explain.
b) Briefly explain the algorithm for Hopfield networks.
8. Define and explain in detail about Hebbian synapse?

SENSORS AND SENSING PRINCIPLES

SYLLABUS

UNIT-I:

Sensor Fundamentals: Basic Sensor Technology, Sensor Systems, Application Considerations, Sensor Characteristics, System Characteristics, Data Acquisition, Acceleration, Shock and Vibration Sensor: Introduction, Technology Fundamentals.

UNIT-II:

Biosensors overview: What Is a Biosensor, Applications of Biosensors, Origin of Biosensors, Flow and Level Sensors: Methods for Measuring Flow, Level Sensors.

UNIT-III:

Chemical Sensors Technology Fundamentals, Applications, Capacitive and Inductive Displacement Sensors: Introduction, capacitive Sensors, Inductive Sensors, Electromagnetism in Sensing: Introduction, Electromagnetism and Inductance.

UNIT-IV:

Force, Load and Weight Sensors: Introduction, Quartz Sensors, Strain Gage Sensors, Humidity Sensors: Humidity, Sensor Types and Technologies, Position and Motion Sensors: Contacting and Non-Contact Position Sensors Pressure Sensors, Piezo resistive Pressure Sensing, Piezoelectric.

UNIT-V:

Pressure Sensors: Strain Gages, Introduction to Strain Gages, Strain-Gage Based Measurements, Temperature Sensors: Sensor Types and Technologies, Selecting and Specifying Temperature Sensors, Nanotechnology-Enabled Sensors.

TEXT BOOK:

1. Sensor Technology Handbook –Elsevier Publishers 2005.

REFERENCE BOOKS:

1. Biosensor Principles and Applications, Edited by LoïcJ.Blum, Pierre R. Coulet Agarwal, Govind P, “fiber Optic Communication Systems”, 2nd edition, Wiley, NewYork,1997
2. Principles of Biochemistry Albert L.Lehninger, David Lee Nelson,Michael M. 2005, Fourth Edition.
3. Sensors and Transducers D. Patranabis Prentice-Hall of India Pvt.Ltd August 15, 2004
4. Jacob Fraden, “Hand Book of Modern Sensors: physics, Designs and Applications”, 3rd ed.,Springer, 2003.

SENSORS AND SENSING PRINCIPLES

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. Define and explain the performance characteristics of a sensor with an example device?
2. a) Define Accelerometer? Explain different types of accelerometers?
b) Compare different types of accelerometers?
3. What is a Bio-sensor and write its characteristics?
b) Mention the applications of Bio-sensors in detail?
4. Describe the methods for measuring flow?
5. Discuss about Capacitive and Inductive sensors?
b) How to select and specify capacitive and inductive sensors?
6. a) Explain the principle of quartz sensors?
b) Describe the structure of three common strain gage sensors?
7. Explain different types of position sensors?
8. Discuss the types of Pressure measurements?

DIGITAL VIDEO PROCESSING

SYLLABUS

UNIT-I:

REPRESENTATION OF DIGITAL VIDEO

Basics of Video: Analog Video, Digital Video, Digital Video Processing, Time Varying image formation models: 3D motion models, Geometric image formation, Photometric image formation, Photometric effects of 3D motion, Spatio temporal sampling: Sampling for analog and digital sampling, Sampling on 3D Structures, Reconstruction from samples.

UNIT-II:

2D MOTION AND ESTIMATION

Optical Flow Methods: 2D motion, 2D Motion Estimation, Methods using optical flow equation, PEL Recursive Methods: Displaced frame difference, Gradient based optimization, Steepest decent based algorithms, Wiener estimation based algorithms, Bayesian Methods: Optimization methods, Basics of MAP motion estimation, MAP motion estimation algorithms.

UNIT-III:

3D MOTION ESTIMATION AND SEGMENTATION

Methods using point correspondences: Modeling the projected displacement field, methods based on the orthographic model, methods based on the perspective model, case of 3D planar surfaces,

MOTION SEGMENTATION

Direct methods, Optical flow segmentation, Simultaneous estimation and segmentation, Stereo and motion tracking: Motion and structure from stereo, Motion tracking – 2D and 3D.

UNIT-IV:

VIDEO FILTERING MOTION COMPENSATED FILTERING

Spatio temporal Fourier Spectrum, Sub Nyquist spatio temporal sampling, filtering along motion trajectories, Applications: motion compensated noise filtering, motion compensated reconstruction filtering, Noise Filtering: Intraframe filtering, Motion adaptive filtering, Motion compensated filtering.

UNIT-V:

VIDEO COMPRESSION AND DIGITAL VIDEO SYSTEMS

The H.261 Standard, The MPEG-1 Standard, The MPEG-2 Standard, Software and Hardware Implementations, Video Conferencing, interactive video and multimedia, Digital Television, Low bitrate video and videophone.

TEXTBOOK :

1. Digital Video Processing by A M Tekalp, Prentice Hall.

DIGITAL VIDEO PROCESSING

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. Explain fully about 3D motion models
2. Discuss photometric effects of 3D motion
3. Write notes on steepest decent based algorithms
4. Illustrate MAP motion estimation algorithms
5. Write in detail about orthographic model
6. Discuss about optical flow segmentation
7. Explain various noise filtering techniques
8. Fully explain about MPEG-1&2 standards

ARCHITECTURE DESIGN FOR ADVANCED EMBEDDED PROCESSORS

SYLLABUS

UNIT I:

ARM Processor as System-on-Chip: Acorn RISC Machine – Architecture inheritance – ARM programming model. 3 and 5 stage pipeline ARM organization – ARM instruction execution and implementation – ARM Co-processor interface.

UNIT II:

ARM Assembly Language Programming: ARM instruction types – data transfer, data processing and control flow instructions – ARM instruction set – Co-processor instructions, Thumb Instruction Set.

UNIT III:

Architectural Support for System Development: Advanced Microcontroller bus architecture – ARM memory interface – ARM reference peripheral specification – Hardware system prototyping tools – ARMulator – Debug architecture.

UNIT IV:

ARM Processor Cores: ARM7TDMI, ARM8, ARM9TDMI, ARM10TDMI, the AMULET Asynchronous ARM Processors- AMULET1

UNIT V:

Embedded ARM Applications: The VLSI Ruby II Advanced Communication Processor, The VLSI ISDN Subscriber Processor, The OneC™ VWS22100 GSM chip, The Ericsson- VLSI, Bluetooth Baseband Controller, The ARM7500 and ARM7500FE.

Text Books:

1. ARM System on Chip Architecture – Steve Furber – 2nd ed., 2000, Addison Wesley Professional.
2. Design of System on a Chip: Devices and Components – Ricardo Reis, 1st ed., 2004, Springer

References:

1. Co-Verification of Hardware and Software for ARM System on Chip Design (Embedded Technology) – Jason Andrews – Newnes, BK and CDROM
2. System on Chip Verification – Methodologies and Techniques –Prakash Rashinkar, Peter Paterson and Leena Singh L, 2001, Kluwer Academic Publishers.

ADVANCED EMBEDDED PROCESSOR ARCHITECTURE

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. a) Explain the Architectural inheritance of Acorn RISC Machine based on the features accepted and rejected.
b) Describe the ARM programmer's model with neat diagrams highlighting the register and memory organization.
2. Discuss the operation of 3-stage pipeline of ARM processor, what its limitations are and how they are eliminated in ARM 5-stage pipeline.
3. a) Discuss the Data Transfer Instructions of ARM Processor.
b) Write an ALP using ARM instructions for the comparison of two null-terminated strings and store zero in R2 register if they match, -1 otherwise.
4. a) Explain the Branch Instructions of ARM Processor.
b) Explain the Co-processor interface in ARM7 processor.
5. a) Explain the Advanced Microcontroller Bus Architecture (AMBA).
b) Discuss Hardware system prototyping tools with reference to Rapid Silicon Prototyping.
6. a) Explain the following signals with reference to ARM7TDMI core.
 - i) Memory Interface
 - ii) Bus Control
 - iii) Boundary Scan Extensionb) Compare the features of ARM7, ARM9 and ARM10 cores.
7. With the Block diagram of AMULET1 processor explain the following mechanisms
 - i) Address Non-determinism
 - ii) Register Coherency
 - iii) Register Locking
8. Why ARM cores are most suitable for System on chip applications. With a block diagram explain in detail about The OneC™ VWS22100 GSM chip.

EMBEDDED LINUX & BASICS OF DEVICE DRIVERS

SYLLABUS

UNIT – I:

Introduction: History of Embedded Linux, Embedded Linux versus Desktop Linux, Embedded Linux Distributions, Architecture of Embedded Linux, Linux Kernel Architecture, Linux Start-Up Sequence, GNU Cross-Platform Tool chain.

UNIT – II:

Board Support Package: Inserting BSP in Kernel Build Procedure, Boot Loader Interface, Memory Map, Interrupt Management, PCI Subsystem, Timers, UART, and Power Management.

Embedded Storage: Flash Map, MTD—Memory Technology Device, MTD Architecture, Flash-Mapping Drivers, MTD Block and Character devices, Embedded File systems, Optimizing Storage Space.

UNIT – III:

Embedded Drivers: Linux Serial Driver, Ethernet Driver, I2C subsystem on Linux, USB Gadgets, Watchdog Timer, and Kernel Modules.

UNIT-IV:

Porting Applications: Architectural Comparison, Application Porting Road Map, Programming with Pthreads, Operating System Porting Layer (OSPL), Kernel API Driver.

Unit-V:

Real-Time Linux: Linux and Real-Time, Real-Time Programming in Linux, Hard Real-Time Linux.

TEXT BOOK:

1. Embedded Linux System Design and Development, P.Raghavan, Amol Lad, Sriram Neelakandan, 2006, Auerbach Publications

REFERENCE BOOK:

1. Embedded Linux – Hardware, Software and Interfacing

EMBEDDED LINUX & BASICS OF DEVICE DRIVERS

Model Question paper

Time: 3hours

Max. Marks: 100

Answer Any Five of the Following

1. What is Embedded Linux? With a neat sketch explain the architecture of Embedded Linux?
2. Write few differences on Embedded Linux versus Desktop Linux? Explain Linux kernel architecture?
3. Write short notes on a) Memory Map b) Interrupt Management c) PCI Subsystem, d) Timers e) UART
4. Explain MTD—Memory Technology Device and its MTD Architecture?
5. Describe a) I2C subsystem on Linux, b) USB Gadgets, c) Watchdog Timer, d) Kernel Modules.
6. Explain Operating System Porting Layer (OSPL) in detail?
7. Write brief notes on Kernel API Driver and Application Porting Road Map?
8. Explain step by step procedure of Real-Time Programming in Linux with an example?

FPGA ARCHITECTURES AND APPLICATIONS

SYLLABUS

UNIT - I:

Introduction to Programmable Logic Devices: Design metrics, merits and demerits of various IC technologies, Introduction, Simple Programmable Logic Devices – Read Only Memories, Programmable Logic Arrays, Programmable Array Logic, Programmable Logic Devices/Generic Array Logic; Complex Programmable Logic Devices – Architecture of Xilinx Cool Runner XCR3064XL CPLD Implementation of a Parallel Adder with Accumulation, various programming elements i.e mask ROM, ROM, EPROM, EEPROM.

UNIT – II:

Field Programmable Gate Arrays: Organization of FPGAs, FPGA Programming Technologies, Programmable Logic Block Architectures, Programmable Interconnects, and Programmable I/O blocks in FPGAs, Dedicated specialized Components of FPGAs, and Applications of FPGAs.

Front end design tools for FPGA and FPGA design flow.

UNIT – III:

SRAM Programmable FPGAs: Introduction, Programming Technology, Device Architecture, The Xilinx XC2000, XC3000 And XC4000 Architectures.

UNIT – IV:

Anti-Fuse Programmed FPGAs: Introduction, Programming Technology, Device Architecture, The Actel ACT1, ACT2 and ACT3 Architectures. State Transition Table, State Assignments for FPGAs and One-Hot design method.

UNIT – V:

Design Applications: General Design Issues, Counter Examples, A position Tracker for a Robot Manipulator, Designing Counters with ACT devices, Designing Adders and Accumulators with the ACT Architecture.

TEXTBOOKS:

1. Field Programmable Gate Array Technology by Stephen M. Trimberger, Springer International Edition.
2. Digital Systems Design by Charles H. Roth Jr, Lizy Kurian John, Cengage Learning.

REFERENCE BOOKS:

1. Field Programmable Gate Arrays by John V. Oldfield, Richard C. Dorf, Wiley India.
2. Digital Design Using Field Programmable Gate Arrays by Pak K. Chan/Samiha Mourad, Pearson Low Price Edition.
3. Digital Systems Design with FPGAs and CPLDs by Ian Grout, Elsevier, Newnes.
4. FPGA based System Design by Wayne Wolf, Prentice Hall Modern Semiconductor Design Series.

FPGA ARCHITECTURES AND APPLICATIONS

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. Define any three design metrics which are to be optimized by a design engineer.
2. Write the logic expression for the LUT arrangement shown in Fig. 1.

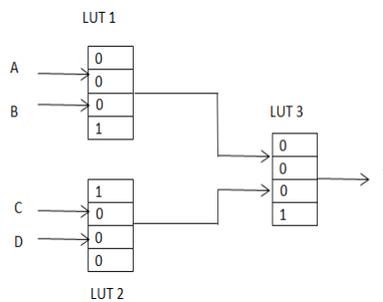


Fig. 1

3. How many flip flops are there in IO block of XC 2000 & XC 3000 FPGA?
4. Implement logic of two input NOR logic in ACTEL's ACT1 FPGA.
5. A) Explain CPLD with neat block diagram.
B) "A system has three inputs namely 'A', 'B' and 'C'. If input 'A' is '0' then the system performs the operation of XOR logic on inputs 'B' and 'C' otherwise it performs the operation of XNOR logic". Implement the logic of above statement in PLA and PAL.
6. A) Explain the operation of SRAM cell to store '1' and '0'.
B) Implement a full adder in two inputs LUT in optimized way.
7. A) With a neat sketch explain the IO Block of Xilinx XC2000 FPGA.
B) With a neat sketch explain the CLB of Xilinx XC4000 FPGA.
8. A) With the help of block diagram explain Moore machine.
B) Implement the state diagram shown in Fig. 2 by using one-hot encoding.

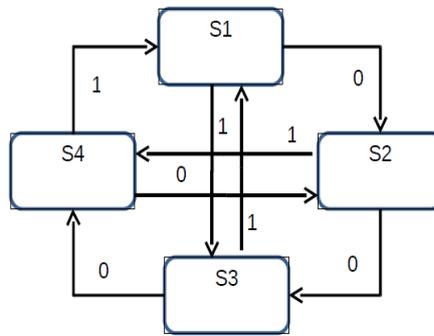


Fig. 2

Code: 17 EM 304

ASIC DESIGN

SYLLABUS

UNIT I:

Types of ASICs – Design flow – Economics of ASICs – ASIC cell libraries – CMOS logic cell data path logic cells – I/O cells – cell compilers.

UNIT II:

ASIC Library design: Transistors as resistors – parasitic capacitance – logical effort programmable ASIC design software: Design system – logic synthesis – half gate ASIC. Low level design entry: Schematic entry – low level design languages – PLA tools – EDIF – An overview of VHDL and Verilog. Logic synthesis in Verilog and VHDL simulation.

UNIT III:

CMOS System case studies: Dynamic warp processor: Introduction, the problem, the algorithm, a functional overview, detailed functional specification, structural floor plan, physical design, fabrication, pixels-planes graphic engine: introduction, raster scan graphic fundamental, pixels-planes system overview, chip electrical design, chip organization and layout, clock distribution.

UNIT IV:

Hierarchical layout and design of single chip 32 bit CPU: Introduction, design methodology, technology updatability and layout verification.

Floor planning & placement: Floor Planning Goals and Objectives, Measurement of Delay in floor planning, Floor planning tools ,I/O and Power planning, Clock planning ,Placement Algorithms.

UNIT V:

Routing: Global routing, Detailed routing, Special routing.

TEXT BOOKS

1. Application specific Integrated Circuits”, J.S. Smith, Addison Wesley.
2. Principles of CMOS VLSI Design: A System Perspective, N. Westle & K. Eshraghian ,Addison – WesleyPub.Co.1985.

REFERENCES

1. Basic VLSI Design :Systems and Circuits, Douglas A. Pucknell& Kamran Eshraghian, Prentice Hall of India Private Ltd. , New Delhi ,1989.
2. Introduction to VLSI System, C. Mead & L. Canway, Addison WesleyPub

3. Introduction to NMOS & VLSI System Design, A. Mukharjee, Prentice Hall,
4. The Design & Analysis of VLSI Circuits, L. A. Glassey & D. W. Dobbepahl, Addison Wesley Pub Co.1985.
5. Digital Integrated Circuits: A Design Perspective, Jan A. Rabey, Prentice Hall of India Pvt Ltd

ASIC DESIGN

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. a) Define ASIC and describe the various types of ASICs.
b) Explain the design approach of standard cells and cell based ASIC Design with an examples.
2. a) Compare the performance of Xilinx XC LCA families.
b) Explain in detail about PLA and PAL devices.
3. a) Briefly describe about Boundary Scan Test with suitable example.
b) Explain the various design tools available in ASIC Design.
4. a) Explain about standard cells in ASIC Design.
b) Give an overview of mixed mode and analogue ASICs.
5. a) Explain the design flow methodology used in ASIC Design.
b) Discuss in detail ASIC design approach using Xilinx based FPGA design tool.
6. a) Define simulation and synthesis. Explain in detail about various simulation techniques used in FPGA design.
b) Write in detail about automatic test pattern generation.
7. a) Explain about goals and objectives of floor planning.
b) What are the various placement algorithms in FPGA design? Explain in brief any one of them.
8. a) Explain in detail about global routing mechanism.
b) List the various partitioning methods in FPGA design. Explain in detail about Kernighan- Lin algorithm.

NETWORKS FOR WIRELESS SENSORS

SYLLABUS

UNIT I:

Introduction: Introduction to Sensor Networks, unique constraints and challenges, Advantage of Sensor Networks, Applications of Sensor Networks, Mobile Adhoc networks (MANETs) and Wireless Sensor Networks, Enabling technologies for Wireless Sensor Networks Sensor Node Hardware and Network Architecture: Single-node architecture, Hardware components & design constraints, Operating systems and execution environments, introduction to TinyOS and nesC, Network architecture, Optimization goals and figures of merit, Design principles for WSNs, Service interfaces of WSNs, Gateway concepts.

UNIT II:

Deployment and Configuration: Localization and positioning, Coverage and connectivity, Single-hop and multihop localization, self configuring localization systems, sensor management Network Protocols: Issues in designing MAC protocol for WSNs, Classification of MAC Protocols, S-MAC Protocol, B-MAC protocol, IEEE 802.15.4 standard and Zig Bee, Dissemination protocol for large sensor network.

UNIT III:

Routing protocols: Issues in designing routing protocols, Classification of routing protocols, Energy-efficient routing, Unicast, Broadcast and multicast, Geographic routing.

UNIT IV:

Data Storage and Manipulation: Data centric and content based routing, storage and retrieval in network, compression technologies for WSN, Data aggregation technique. Applications: Detecting unauthorized activity using a sensor network, WSN for Habitat Monitoring

UNIT V:

Applications Of WSN: WSN Applications - Home Control - Building Automation - Industrial Automation - Medical Applications - Reconfigurable Sensor Networks - Highway Monitoring - Military Applications - Civil and Environmental Engineering Applications - Wildfire Instrumentation - Habitat Monitoring - Nanoscopic Sensor Applications – Case Study: IEEE 802.15.4 LR-WPANs Standard - Target detection and tracking - Contour/edge detection - Field sampling.

TEXT BOOKS:

1. Holger Kerl, Andreas Willig, “Protocols and Architectures for Wireless Sensor Network”, John Wiley and Sons, 2005 (ISBN: 978-0-470-09511-9)
2. Raghavendra, Cauligi S, Sivalingam, Krishna M., Zanti Taieb, “Wireless Sensor Network”, Springer 1st Ed. 2004 (ISBN: 978-4020-7883-5).
3. Feng Zhao, Leonidas Guibas, “Wireless Sensor Network”, Elsevier, 1st Ed. 2004 (ISBN: 13-978-1-55860-914-3)
4. Kazem, Sohraby, Daniel Minoli, Taieb Zanti, “Wireless Sensor Network: Technology, Protocols and Application”, John Wiley and Sons 1st Ed., 2007 (ISBN: 978-0-471-74300-2).
5. B. Krishnamachari, “Networking Wireless Sensors”, Cambridge University Press.
6. N. P. Mahalik, “Sensor Networks and Configuration: Fundamentals, Standards, Platforms, and Applications” Springer Verlag.

NETWORKS FOR WIRELESS SENSORS

Model Question paper

Time: 3hours

Max. Marks: 100

Answer Any Five of the Following

1. Define Wireless Sensor Networks? Explain in brief about the applications of Wireless Sensor Networks?
2. a) Describe single-node architecture with appropriate diagram?
b) Discuss the security issues in MANETs?
3. a) Explain the issues in designing a MAC protocol for Adhoc wireless networks?
b) Write a short note on unicast, broadcast, multicast and geographic routing?
4. Explain the design approaches and performance of S-MAC protocol.
5. Explain any two Data-Centric routing protocols?
6. Explain any one application of Habitat monitoring in wireless sensor network?
7. Explain in detail IEEE 802.15.4 LR-WPANs Standard.
8. Briefly discuss about the applications of WSNs.

WEB SECURITY AND PRIVACY ISSUES

SYLLABUS

UNIT I:

Introduction: The Web Security Landscape, Architecture of the World Wide Web, Cryptography basics, Cryptography and the web, Understanding SSL and TLS, Digital Identification: Passwords, Biometrics and Digital Signatures.

UNIT II:

Digital Certificates, CAs and PKI, Web's war on privacy, privacy protecting techniques, privacy protecting technologies

UNIT III:

Web Server Security: Physical security for servers, Host security for servers, securing web applications.

UNIT IV:

Web Server Security: Deploying SSL server certificates, securing your web service, computer crime Security for content providers: Controlling access to web content, Client-side digital certificates, code signing and Microsoft's Authentic code .

UNIT V:

Security for content providers: Pornography, Filtering software, Censorship, privacy policies, legislation, P3P, Digital Payments, Intellectual property and actionable content.

TEXTBOOK:

1. Web Security, Privacy and Commerce, Simson Garfinkel, Gene Spafford, 2nd Edition, O'REILLY, 2002. Pvt. Ltd.

WEB SECURITY AND PRIVACY ISSUES

Model Question paper

Time: 3hours

Max. Marks: 100

Answer Any Five of the Following

1. Explain in detail about the Web Security Problem.
2. (a) Discuss about Symmetric Key Algorithms.
(b) Write a note on Message Digest Functions.
3. Discuss about the components of the World Wide Web architecture.
4. Explain about “Why Code Signing?”
- 5.(a) Discuss about Pornography Filtering.
(b) Explain about PICS and its applications.
6. Explain about the working of Cryptographic Systems and Protocols.
- 7.(a) Describe the Public Key infrastructure.
(b) Discuss about the usage of Public Keys for Identification.
8. Write Short notes on:
 - (a) LogFiles
 - (b) WebBugs.

CLOUD COMPUTING

SYLLABUS

Unit-I:

Overview of Computing Paradigm: Recent trends in Computing: Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing. Evolution of cloud computing: Business driver for adopting cloud computing.

Introduction to Cloud Computing :Cloud Computing (NIST Model): Introduction to Cloud Computing, History of Cloud Computing, Cloud service providers; Properties, Characteristics & Disadvantages: Pros and Cons of Cloud Computing, Benefits of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid computing; Role of Open Standards

Unit-II:

Cloud Computing Architecture: Cloud computing stack: Comparison with traditional computing architecture (client/server), Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web services; Service Models (XaaS): Infrastructure as a Service (IaaS), Platform as a Service(PaaS), Software as a Service (SaaS); Deployment Models: Public cloud, Private cloud, Hybrid cloud, Community cloud.

Unit-III:

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); Examples: Amazon EC2, Renting, EC2 Compute Unit, Platform and Storage, pricing, customers, Eucalyptus.

Platform as a Service (PaaS): Introduction to PaaS: What is PaaS, Service Oriented Architecture (SOA), Cloud Platform and Management, Computation, Storage, Examples, Google App Engine, Microsoft Azure, Salesforce.com's Force.com platform.

Unit-IV:

Software as a Service (PaaS): Introduction to SaaS, Web services, Web 2.0, Web OS, Case Study on SaaS.

Service Management in Cloud Computing: Service Level Agreements(SLAs), Billing & Accounting, Comparing Scaling Hardware: Traditional vs. Cloud, Economics of scaling: Benefitting enormously, Managing Data, Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large Scale Data Processing.

Unit-V:

Cloud Security: Infrastructure Security: Network level security, Host level security, Application level security, Data security and Storage: Data privacy and security Issues, Jurisdictional issues raised by Data location, Identity & Access Management, Access Control, Trust, Reputation, Risk, Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations.

REFERENCE BOOKS:

1. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010
2. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wile, 2011.

3. Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012
4. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 2010

CLOUD COMPUTING

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. Illustrate the cloud Architectures and cloud services.
2. List out the implementation of cloud in a business case.
 - a) Elaborate the cloud computing Technologies.
 - b) Write a note on cloud standards.
3. Distinguish between software as a service and Software + services with real time examples.
4. Write a case study of cloud mobile device integration.
5. a) What is virtualization? Explain different types.
 - b) Analyzing the service on migrating to the clouds.
6. Illustrate the collaborating on event management and on project management with a neat sketch diagram.
7. Analyzing the storing, sharing files and sharing digital photographs in cloud computing.
8. a) Define Cloud computing, Enlist and explain essential characteristics of cloud computing.
 - b) Explain the services provided by the Amazon infrastructure cloud from a user perspective.

MACHINE LEARNING

SYLLABUS

UNIT I:

Introduction: An illustrative learning task, and a few approaches to it. What is known from algorithms? Theory, Experiment, Biology, Psychology.

Concept Learning: Version spaces. Inductive Bias, Active queries. Mistake bound! PAC model. basic results. Overview of issues regarding data sources, success criteria.

UNIT II:

Decision Tree Learning: – Minimum Description Length Principle. Occam's razor. Learning with active queries

Neural Network Learning: Perceptions and gradient descent back propagation.

UNIT III:

Sample Complexity and Over fitting: Errors in estimating means. Cross Validation and jack knifing VC dimension.

Irrelevant features: Multiplicative rules for weight tuning.

Bayesian Approaches: The basics Expectation Maximization. Hidden Markov Models

UNIT IV:

Instance-based Techniques: Lazy vs. eager generalization. K nearest neighbor, case- based reasoning.

UNIT V:

Genetic Algorithms: Different search methods for induction – Explanation based Learning: using prior knowledge to reduce sample complexity.

TEXT BOOKS

- Tom Michel, Machine Learning, McGraw Hill, 1997
- Trevor Hastie, Robert Tibshirani & Jerome Friedman. The Elements of Statistical Learning, Springer Verlag, 2001.

REFERENCE BOOKS

- Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
- Richard O. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001.
- Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995.

MACHINE LEARNING

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. What are the important objectives of machine learning? What are the design issues and approaches to machine learning? Discuss different applications of machine learning?
2. a) What are the issues in decision tree learning? How are they overcome?
b) Explain how back propagation algorithm works for multilayer feed forward network?
3. Discuss about multiplicative rules for tuning of weight?
4. a) How is Naïve Bayes algorithm useful for learning and classifying text?
b) What are Bayesian Belief nets? What are they used? Can it solve all types of problems?
5. Discuss about
 - a) Application of machine learning algorithms.
 - b) Hidden Markov Model
6. Describe K-nearest neighbor algorithm. Why is it called instance based learning?
7. Explain in brief about Lazy and eager learning?
8. a) Explain salient features of Genetic algorithm.
b) Explain how explanation based learning is used to reduce sample complexity?

CLOUD SECURITY

SYLLABUS

Unit-I:

Security Concepts: Confidentiality, privacy, integrity, authentication, non-repudiation, availability, access control, defence in depth, least privilege, how these concepts apply in the cloud, what these concepts mean and their importance in PaaS, IaaS and SaaS. e.g. User authentication in the cloud.

Cryptographic Systems: Symmetric cryptography, stream ciphers, block ciphers, modes of operation, public-key cryptography, hashing, digital signatures, public-key infrastructures, key management, X.509 certificates, OpenSSL.

Unit-II:

Multi-tenancy Issues: Isolation of users/VMs from each other. How the cloud provider can provide this;

Virtualization System Security Issues: e.g. ESX and ESXi Security, ESX file system security, storage considerations, backup and recovery;

Unit-III:

Virtualization System Vulnerabilities: Management console vulnerabilities, management server vulnerabilities, administrative VM vulnerabilities, guest VM vulnerabilities, hypervisor vulnerabilities, hypervisor escape vulnerabilities, configuration issues, malware (botnetsetc).

Unit-IV:

Virtualization System-Specific Attacks: Guest hopping, attacks on the VM (delete the VM, attack on the control of the VM, code or file injection into the virtualized file structure), VM migration attack, hyper jacking.

Technologies for Virtualization-Based Security Enhancement: IBM security virtual server protection, virtualization-based sandboxing;

Unit-V:

Storage Security: HIDPS, log management, Data Loss Prevention. Location of the Perimeter.

Legal and Compliance Issues: Responsibility, ownership of data, right to penetration test. local law where data is held, examination of modern Security Standards (eg PCIDSS), how standards deal with cloud services and virtualization, compliance for the cloud provider vs. compliance for the customer.

Reference Books:

1. Tim Mather, SubraKumaraswamy, ShahedLatif, Cloud Security and Privacy: An Enterprise
2. Perspective on Risks and Compliance [ISBN:0596802765]
3. Ronald L. Krutz, Russell Dean Vines, Cloud Security [ISBN:0470589876]
4. John Rittinghouse, James Ransome, Cloud Computing [ISBN:1439806802]
5. J.R. ("Vic") Winkler, Securing the Cloud [ISBN:1597495921]

CLOUD SECURITY

Model Question paper

Time: 3hours

Max. Marks: 100

Answer Any Five of the Following

1. Discuss about different security concepts in cloud computing.
2. Explain about Symmetric Cryptography and public key cryptography.
3. Write a short notes on Virtualization System Vulnerabilities
4. Explain about virtualization system security issues
5. Discuss about X.509 Certificates and Open SSL.
6. Describe different Virtualization System Vulnerabilities
7. Explain different technologies for Virtualization-Based Security Enhancement
8. a) how standards deal with cloud services and virtualization
b) Explain compliance for the cloud provider vs Compliance for the customer.

MOBILE ADHOC NETWORKS

SYLLABUS

UNIT-I:

Introduction: Introduction to adhoc networks – definition, characteristics features, applications. Characteristics of Wireless channel, Adhoc Mobility Models:- Indoor and outdoor models.

UNIT-II:

Medium Access Protocols: MAC Protocols: design issues, goals and classification. Contention based protocols- with reservation, scheduling algorithms, protocols using directional antennas. IEEE standards: 802.11a, 802.11b, 802.11g, 802.15. HIPERLAN.

UNIT-III:

Network Protocols: Routing Protocols: Design issues, goals and classification. Proactive Vs reactive routing, Unicast routing algorithms, Multicast routing algorithms, hybrid routing algorithm, Energy aware routing algorithm, Hierarchical Routing, QoS aware routing.

UNIT-IV:

End-End Delivery and Security: Transport layer : Issues in designing- Transport layer classification, adhoc transport protocols. Security issues in adhoc networks: issues and challenges, network security attacks, secure routing protocols.

UNIT-V:

Cross Layer Design and Integration of Adhoc for 4G: Cross layer Design: Need for cross layer design, cross layer optimization, parameter optimization techniques, Cross layer cautionary prespective. Intergration of adhoc with Mobile IP networks.

TEXT BOOKS:

1. C.Siva Ram Murthy and B.S.Manoj, Ad hoc Wireless Networks Architectures and protocols, 2nd edition, Pearson Education. 2007
2. Charles E. Perkins, Ad hoc Networking, Addison – Wesley, 2000

REFERENCE BOOKS:

1. Stefano Basagni, Marco Conti, Silvia Giordano and Ivan stojmenovic, Mobile adhoc networking, Wiley-IEEE press, 2004.
2. Mohammad Ilyas, The handbook of adhoc wireless networks, CRC press, 2002.
3. T. Camp, J. Boleng, and V. Davies “A Survey of Mobility Models for Ad Hoc Network

MOBILE ADHOC NETWORKS

Model Question paper

Time: 3hours

Max. Marks: 100

Answer Any Five of the Following

1. a) Differentiate between cellular networks and adhoc networks.
b) Write a short note on adhoc indoor and outdoor models.
2. Explain the major issues to be considered in designing a MAC protocol for adhoc wireless networks.
3. a) What are the advantages of reservation based MAC protocols over contention based MAC protocols?
b) Compare and contrast: IEEE802.11a, IEEE 802.11b and IEEE 802.11g.
4. Explain the concepts involved in energy aware routing and Qos aware routing with suitable scenario.
5. On the basis of routing information update procedure what are the types of adhoc wireless network routing protocols?
6. a) Explain the issues in designing a transport layer protocol for adhoc wireless network.
b) Explain in brief various security attacks.
7. Write a short note on secure routing. What are the security parameters to consider over adhoc networks?
8. a) Give detailed description of Cross layer optimization.
b) Explain in detail about Integration of adhoc with mobile IP networks.

IOT APPLICATION DEVELOPMENT THROUGH PYTHON

SYLLABUS

UNIT-I:

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib. IoT Physical Devices and Endpoints.

UNIT-II:

Working with Python on Intel Galileo Gen 2 Setting up the board to work with Python as the programming language, Retrieving the board's assigned IP address ,Connecting to the board's operating system , Installing and upgrading the necessary libraries to interact with the board, Installing pip and additional libraries , Invoking the Python interpreter.

UNIT-III:

Interacting with Digital Outputs with Python Turning on and off and on board component, Prototyping with breadboards , Working with schematics to wire digital outputs , Counting from 1 to 9 with LEDs, Python code and the mraa library , Taking advantage of object-oriented code to control digital outputs , Improving our object-oriented code to provide new features Isolating the pin numbers to improve wirings , Controlling digital outputs with the wiring-x86 library.

UNIT-IV:

Working with Digital Inputs, Polling and Interrupts Understanding pushbuttons and pullup resistors , Wiring digital input pins with pushbuttons , Reading pushbutton statuses with digital inputs and the mraa library , Reading pushbutton statuses and running a RESTful API ,Reading digital inputs with the wiring-x86 library , Using interrupts to detect pressed pushbuttons.

UNIT-V:

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API. Publishing data to the cloud with dweepy , Building a web-based dashboard with Freeboard , Sending and receiving data in real-time through Internet with PubNub , Publishing messages with commands through the PubNub cloud , Working with bi-directional communications , Publishing messages to the cloud with a Python PubNub client ,Using MQTT with Mosquitto and Eclipse Paho ,Publishing messages to a Mosquitto broker with a Python client.

REFERENCE BOOKS:

1. “Internet of Things with Python” Gastón C. Hillar, Published by Packt Publishing Ltd. Livery Place 35 Livery Street Birmingham B3 2PB, UK. ISBN 978-1-78588-138-1
2. ArshdeepBahga and Vijay Madiseti, Internet of Things - A Hands-on Approach, Universities Press, 2015, ISBN: 9788173719547 .
3. Matt Richardson & Shawn Wallace, Getting Started with Raspberry Pi, O'Reilly (SPD), 2014, ISBN: 9789350239759.
4. “Learning Python”, Fifth Edition by Mark Lutz, Published by O'Reilly Media, ISBN: 978-1-449-35573-9.

IOT APPLICATION DEVELOPMENT THROUGH PYTHON

Model Question paper

Time: 3hours

Max. Marks: 100

Answer Any Five of the Following

1. Explain in brief about python data types and data structures with example program.
2. Write a short note on Exception handling Python packages?
3. Explain how to install and upgrade necessary libraries to interact with Intel Galileo Gen2 board.
4. a) Describe the process of controlling digital outputs with the wiring-x86 library.
b) Write a python program to count numbers 1 to 9 with LEDs.
5. Explain the procedure to read push button statuses with digital inputs with an example.
6. a) Explain how to detect the pressed push buttons using interrupts.
b) Describe the process to read digital inputs with wiring-x86 library.
7. a) Describe about Xively Cloud for IoT.
b) Write a Python program for sending data to Xively Cloud.
8. Give detailed description of publishing messages to a Mosquitto broker with a Python client.

IOT ARCHITECTURES AND PROGRAMMING

SYLLABUS:

UNIT I:

Introduction to IoT- Introduction, Physical Design of IOT, Logical design of IoT, IoT enabling Technologies, IoT Levels & Development Templates, Difference between IoT and M2M, SDN and NFV for IoT, Need for IoT systems management, Simple Network Management Protocol (SNMP), Network operator requirements, NETCONF, YANG, IoT systems Management with NETCONF-YANG. IoT platforms design methodology.

Unit II:

IoT Systems- Logical Design using Python- Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib.

IoT Physical Devices and Endpoints – Basic building blocks of an IoT device Exemplary Device: Raspberry Pi, about the board, Linux on Raspberry Pi, Raspberry Pi interfaces, Programming Raspberry Pi with Python.

Unit III:

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework, Designing a RESTful web API. Amazon Web services for IoT.

Unit IV:

Data analytics for IoT – Introduction, Apache Hadoop, Using Hadoop MapReduce for Batch Data Analysis, Apache Oozie, Apache Spark, Apache Storm, Using Apache Storm for Real-time Data Analysis.

Unit V:

Case Studies - Home Automation, smart cities, Smart Grid, Electric vehicle charging, Environment, Agriculture, Productivity Applications.

TEXT BOOKS:

1. Arshdeep Bahga and Vijai Madisetti : A Hands-on Approach “Internet of Things”, Universities Press 2015.
2. “Internet of Things with Python” Gastón C. Hillar, Published by Packt Publishing Ltd. Livery Place 35 Livery Street Birmingham B3 2PB, UK. ISBN 978-1-78588-138-1

REFERENCES:

1. Samuel Greengard, “ The Internet of Things”, The MIT press, 2015.
2. Adrian McEwen and Hakim Cassimally “Designing the Internet of Things “Wiley,2014.

IOT ARCHITECTURES AND PROGRAMMING

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. Explain the protocols used in the physical design of IoT?
2. Describe briefly about IoT enabling technologies?
3. Write a short note on
 - a) Simple Network Management Protocol (SNMP)
 - b) NETCONF
4. Explain File handling functions in Python with example program.
5. Briefly explain interfacing of LDR with Raspberry pi with an example program.
6. Explain in detail about designing a RESTful Web API.
7. Discriminate the workflow for real-time IoT data analysis with storm in detail?
8. Explain in detail application of Internet of Things in smart agriculture and Electric vehicle charging?

SENSOR NETWORKS PROGRAMMING

SYLLABUS

UNIT-I:

Introduction :Some Foundational Information , Next-Generation Sensor Networked Tiny Devices , Sensor Network Software Performance-Driven Network Software Programming ,Unique Characteristics of Programming Environments for Sensor Networks , Why TinyOS and NesC , Future Demands on Sensor-Based Software Wireless Sensor Networks :Sensor Network Applications ,Characteristics of Sensor Networks ,Nature of Data in Sensor Networks Sensor Technology: Sensor Level Server Level ,Client Level ,Programming Tools.

UNIT-II:

Tiny Operating System (TinyOS) Components of TinyOS, An Introduction to NesC, Event-Driven Programming. Programming in NesC. NesC Programming A Simple Program, sensor network implementation. Sensor Programming: Programming Challenges in Wireless Sensor Networks, Sensing the World Applications Using the Interface Split Control.

UNIT-III:

REAL-WORLD SCENARIOS: Sensor Deployment Abstraction: Sensor Network Abstraction Data Aggregation, Collaboration Group Abstractions, Programming Beyond Individual Nodes 205 Standards for Building Wireless Sensor Network Applications :802.XX Industry Frequency and Data Rates ZigBee Devices and Components ZigBee Application Development Dissemination and Evaluation for Real-Time Environment Motivation and Background ,Software Microframework Requirements

UNIT-IV:

Performance Analysis of Power-Aware Algorithms : Introduction Service Architecture 242 Approaches To WSN Programmability ,Simulation Capabilities ,Benchmarking Modeling Sensor Networks Through Design and Simulation :Introduction, Why a New Simulator Currently Available Simulators ,Simulation Design ,Implementation Details ,Experimental Results

UNIT-V:

MATLAB Simulation of Airport Baggage-Handling System0: Introduction, proposed Architecture

TEXT BOOKS:

1. Fundamentals of Sensor Network Programming: Applications and Technology Hardcover Dec 2010 by S. SitharamaIyengar ,Nandan Parameshwaran, Vir V. Phoha.
2. Fundamentals of Sensor Network Programming: Applications and Technology S. SitharamaIyengar, Nandan Parameshwaran, Vir V. Phoha, N. Balakrishnan, Chuka D. Okoye ISBN: 978-0-470-87614-5

REFERENCE BOOKS

1. Developing a Wireless Sensor Network Programming Language Application Guide Using Memsic Devices and LabVIEW

SENSOR NETWORKS PROGRAMMING

Model Question paper

Time: 3hours

Max. Marks: 100

Answer Any Five of the Following

1. a) Write a short note on next-generation sensor networked Tiny devices.
b) What are the characteristics of programming sensor networks?
2. Explain the nature of data in sensor networks sensor technology in detail.
3. a) Explain in detail about Tiny OS and NesC.
b) What are the challenges in programming wireless sensor networks?
4. a) Explain about the challenges faced in sensor network programming?
b) Briefly explain Collaboration Group Abstractions?
5. Discuss in detail about standards for building Wireless Sensor Network applications.
6. With a neat sketch explain service architecture 242 to program WSN.
7. Explain in brief about simulators?
8. Discuss in brief about airport baggage-handling system.

FUZZY LOGIC

SYLLABUS

UNIT I:

Introduction – crisp sets an overview – the notion of fuzzy sets – Basic concepts of fuzzy sets – classical logic an overview – Fuzzy logic.

UNIT II:

Operations: Operations on fuzzy sets - fuzzy complement – fuzzy union – fuzzy intersection – combinations of operations – general aggregation operations Crisp and fuzzy relations – binary relations – binary relations on a single set– equivalence and similarity relations.

UNIT III:

Compatibility: Compatibility or tolerance relations– orderings – Membership functions – methods of generation – defuzzification methods. General discussion – belief and plausibility measures – probability measures– possibility and necessity measures – relationship among classes of fuzzy measures.

UNIT IV:

Classical logic: An overview – fuzzy logic – fuzzy rule based systems – fuzzy decision making – fuzzy logic in database and information systems – fuzzy pattern recognition – fuzzy control systems.

UNIT V:

Applications: Washing Machine, Train braking system, Sugar mill control, Industrial applications

Text books:

1. George J Klir and Tina A Folger, “Fuzzy Sets, Uncertainty and Information”, Prentice Hall of India, 1998.
2. H.J. Zimmerman, “Fuzzy Set Theory and its Applications”, 4/e, Kluwer Academic Publishers, 2001.
3. George Klir and Bo Yuan, “Fuzzy Sets and Fuzzy Logic: Theory and Applications”, Prentice Hall of India, 1997.
4. Timothy J Ross, “Fuzzy Logic with Engineering Applications”, McGraw Hill International Editions, 1997.
5. Hung Nguyen and Elbert Walker, “A First Course in Fuzzy Logic, 2/e., Chapman and Hall/CRC, 1999.
6. Jerry M Mendel, “Uncertain Rule-based Fuzzy Logic Systems: Introduction and New Directions, PH PTR, 2000.
7. John Yen and Reza Lengari, “Fuzzy Logic: Intelligence, Control and Information”, Pearson Education, 1999.

FUZZY LOGIC

Model Question paper

Time: 3hours

Max. Marks: 100

Answer Any Five of the Following

1. Write indetail about crisp sets
2. Give full details about classical logic and fuzzy logic
3. Explain fully about various operations of fuzzy
4. Discuss indetail about different types of relations
5. What is orderings? Explain in detail about various member ship functions
6. Explain in detail about A) Fuzzy rule based system
B) Fuzzy decision making
7. Write notes on A) fuzzy pattern recognition
B) fuzzy control systems
8. Explain with necessary diagrams about Train braking system

PATTERN RECOGNITION

SYLLABUS

UNIT I:

Introduction: Basic concepts, Applications, Fundamental problems in pattern Recognition system design, Design concepts and methodologies, Examples of Automatic Pattern recognition systems, Simple pattern recognition model.

UNIT II:

Decisions and Distance Functions: Linear and generalized decision functions, Pattern space and weight space, Geometrical properties, implementations of decision functions, Minimum-distance pattern classifications.

Probability - Probability of events: Random variables, Joint distributions and densities, Movements of random variables, Estimation of parameter from samples.

STATISTICAL UNIT - III:

DECISION MAKING - Introduction, Baye's theorem, Multiple features, Conditionally independent features, Decision boundaries, Unequal cost of error, estimation of error rates, the leaving-one-out-techniques, characteristic curves, estimating the composition of populations. Baye's classifier for normal patterns.

Non Parametric Decision Making: Introduction, histogram, kernel and window estimation, nearest neighbour classification techniques. Adaptive decision boundaries, adaptive discriminant functions, Minimum squared error discriminant functions, choosing a decision making techniques.

UNIT IV:

Clustering and Partitioning: Hierarchical Clustering: Introduction, agglomerative clustering algorithm, the single-linkage, complete linkage and average-linkage algorithm. Ward's method Partition clustering-Forg's algorithm, K-means's algorithm, Isodata algorithm.

Pattern Preprocessing and Feature selection: Introduction, distance measures, clustering transformation and feature ordering, clustering in feature selection through entropy minimization, features selection through orthogonal expansion, binary feature selection.

UNIT V:

Syntactic Pattern Recognition and Application of Pattern Recognition: Concepts from formal language theory, formulation of syntactic pattern recognition problem, syntactic pattern description, recognition grammars, automata as pattern recognizers, Application of pattern recognition techniques in bio-metric, facial recognition, IRIS scon, Finger prints, etc.,

REFERENCE BOOKS:

1. Pattern recognition and Image Analysis, Gose. JohnsonbaughJost,PHI.
2. Pattern Recognition Principle, Tou. Rafael. Gonzalez,Pea.
3. Pattern Classification, Richard duda, Hart., David Strok, Wiley.

PATTERN RECOGNITION

Model Question paper

Time: 3hours

Max. Marks=100

Answer any five of the following

1. a) What are the applications and fundamental problems in pattern recognition system design?
b) Discuss the automatic pattern recognition systems with examples?
2. a) Differentiate between Linear and Generalized decision functions.
b) Compare and contrast Pattern space and weight space.
3. Explain the probability of events with examples?
4. a) List the applications of pattern recognition.
b) Discuss the importance of feature extraction for the classification of images.
5. a) What are the various types of distribution commonly employed in statistical decision making?
b) State and prove Baye's theorem as applied to pattern recognition.
6. Explain the following
 - a) Adaptive discriminate functions
 - b) Minimum squared error discriminate functions
7. Discuss the Application of pattern recognition techniques in bio-metric, facial recognition, IRIS scan, Finger prints?
8. Explain the following
 - a) Agglomerative clustering algorithm
 - b) Forg's algorithm
 - c) Isodata algorithm
 - d) K-means's algorithm