UIT-RGPV (Autonomous) Bhopal

Subject code-CS-601 **Subject: Principles of Programming Languages**

Semester: VI

For credits & marks refer your scheme

Course Objective-The purpose of this subject is to cover the underlying concepts and techniques used in Programming Languages. It provides general idea related to operating & Programming environment.

COURSE CONTENT:

UNIT-I
Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming, Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, programming environments. Issues in Language Translation: Syntax, Semantics, Stages, analysis and synthesis, Parse Tree, CFG and BNF grammar.

UNIT-II
Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization. Sequence control with Expressions, Conditional Statements, Loops, Exception handling.

UNIT-III
Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, design issues for functions overloaded operators, co routines.

UNIT-IV
Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, Static and Stack-Based Storage management. heap based storage management. Garbage Collection. object oriented programming in small talk, C++, Java, C#, PHP, Perl . Concurrency: Subprogram level concurrency, semaphores, monitors, massage passing, Java threads, C# threads.

UNIT – V
Exception handling, Exceptions, exception Propagation, Exception handler in C++ and Java. Logic Programming Language: Introduction and overview of logic programming, basic elements of prolog, application of logic programming. Functional Programming Languages: Introduction, fundamentals. Introduction to 4GL.

References:

1. Sebesta,"Concept of programming Language", Pearson Edu.
2. Louden, "Programming Languages: Principles & Practices" , Cengage Learning
3. Tucker, " Programming Languages: Principles and paradigms ", Tata McGraw –Hill
4. Terrance W Pratt, "Programming Languages: Design and Implementation" Pearson Edu.
5 Cavlo Ghezzi & Mehdi Jazayeri " Programming Languages Concepts", Willey India
6 E Horowitz, "Programming Languages", 2nd Edition, Addison Wesley

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Subject code-CS-602 **Subject: Computer Networking**

Semester: VI

For credits & marks refer your scheme

Course Objective-The purpose of this subject is to cover the underlying concepts and techniques used in Computer Networking. This syllabus provides a comprehensive introduction to computer network, network architecture and protocols.

COURSE CONTENT:

Unit –I

Computer Network: Definitions, goals, components, Architecture, Classifications & Types. Layered Architecture: Protocol hierarchy, Design Issues , Interfaces and Services, Connection Oriented & Connectionless Services, Service primitives, Design issues & its functionality. ISOOSI Reference Model: Principle, Model, Descriptions of various layers and its comparison with TCP/IP. Network standardization. Queueing Models: Little's Theorem, Queueing System: M/M/1, M/M/m, M/M/∞, M/M/m/m, M/G/1

Unit-II

Data Link Layer: Need, Services Provided, Framing , Flow Control, Error control. Data Link Layer Protocol: Elementary & Sliding Window protocol: 1-bit, Go-Back-N, Selective Repeat, Hybrid ARQ. Bit oriented protocols: SDLC, HDLC, BISYNC, LAP and LAPB. Protocol verification: Finite State Machine Models & Petri net models.

Unit-III

MAC Sublayer: MAC Addressing, Binary Exponential Back-off (BEB) Algorithm, Distributed Random Access Schemes/Contention Schemes: for Data Services (ALOHA and Slotted- ALOHA), for Local-Area Networks (CSMA, CSMA/CD, CSMA/CA), Collision Free Protocols: Basic Bit Map, BRAP, Binary Count Down, MLMA Limited Contention Protocols: Adaptive Tree Walk, URN Protocol, High Speed LAN: Fast Ethernet, Gigabit Ethernet, FDDI, Performance Measuring Metrics. IEEE Standards 802 series & their variant.

Unit-IV

Network Layer: Need, Services Provided , Design issues, Routing algorithms: Least Cost Routing algorithm, Dijkstra's algorithm, Bellman-ford algorithm, Hierarchical Routing, Broadcast Routing, Multicast Routing, Congestion Control Algorithms: General Principles of Congestion control, Prevention Policies, Congestion Control in Virtual-Circuit Subnets, Congestion Control in Datagram subnets. IP protocol, IP Addresses, Comparative study of IPv4 & IPv6, Mobile IP.

Unit-V

Transport Layer: Design Issues, UDP Header Format, Per-Segment Checksum, Carrying Unicast/Multicast Real-Time Traffic, TCP: Connection Management, Reliability of Data Transfers, TCP Flow Control, TCP Congestion Control, TCP Header Format, TCP Timer Management.Session layer: Authentication, Authorisation, Session layer protocol (PAP, SCP, H.245). Presentation layer: Data conversion, Character code translation, Compresion, Encryption and Decryption, Presentation layer protocol (LPP, Telnet, X.25 packet Assembler/Disassembler).Application Layer: WWW and HTTP, FTP, SSH, Email (SMTP, MIME, IMAP), DNS, Network Management (SNMP).

References:

1. Andrew S. Tanenbaum, David J. Wetherall, “Computer Networks” Pearson Education.
2. Dimitri Bertsekas, Robert Gallager, “Data Networks”, PHI Publication, Second Edition.
3. Kaveh Pahlavan, Prashant Krishnamurthy, “Networking Fundamentals”, Wiley Publication.
4. Uyless Black, “Computer Networks”, PHI Publication, Second Edition.
5. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, “Computer Networks: An Open Source Approach”, McGraw Hill.

List of Experiments:

1. Study of Different Type of LAN& Network Equipments.
2. Study and Verification of standard Network topologies i.e. Star, Bus, Ring etc.
3. LAN installations and Configurations.
4. Write a program to implement various types of error correcting techniques.
5. Write a program to Implement various types of framing methods.
6. Study of Tool Command Language (TCL).
7. Study and Installation of Standard Network Simulator: N.S-2, N.S-3.OpNet,QualNet etc .
8. Study & Installation of ONE (Opportunistic Network Environment) Simulator for High Mobility Networks.
9. Configure 802.11 WLAN.
10. Implement & Simulate various types of routing algorithm.
11. Study & Simulation of MAC Protocols like Aloha, CSMA, CSMA/CD and CSMA/CA using Standard Network Simulators.
12. Study of Application layer protocols- DNS, HTTP, HTTPS, FTP and TelNet.

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Subject code-CS-603 **Subject: Micro Processor and Interfacing**

Semester : VI

For credits & marks refer your scheme

Course Objective-The purpose of this subject is to cover the underlying concepts and techniques used in Micro Processor and Interfacing. In this subject we cover the unique issues associated with designing, testing, integrating, and implementing microcontroller/microprocessor-based embedded systems.

COURSE CONTENT:

Unit-I
Microprocessor and Microprocessor Development Systems: Evolution of Microprocessor, Microprocessor architecture and its operations, memory, inputs-outputs (I/Os), data transfer schemes interfacing devices, architecture advancements of microprocessors, Typical microprocessor development system.

Unit-II
8085 Mirprocessor : Architetcure of 8085 microprocessor ,Instruction set and Adressing modes of 8085 microprocessor,Assembly language programs of 8085 microprocessor, Stack, Subroutines, Time-Delay loops, Modular programming, Macro .

Unit-III
8086 Microprocessor : Architecture , Registers ,Memory Segmentation ,8086 Memory Addressing ,Memory Read and Write Bus Cycle of 8086,Demultiplexing of the system Bus in 8086 and 8088 microprocessors, Instruction set and Addressing modes of 8086 microprocessor ,Assembly language programs of 8086 miroprocessor.

Unit-IV
I/O and Memory Interfacing Using 8085/8086: memory interfacing, Interrupts of 8085/8086 Microprocessors, 8259A Programmable Interrupt Controller, Programmable peripheral Interface, 8253 Programmable Counter/Interval Timer. Communication and Bus Interfacing with 8085/8086 Microprocessor :Serial Communication Interface, DMA Controller 8257, 8279-Programmable Keyboard and Display I/O Interface, Bus Interface,8089 I/O processor

Unit-V
8051 Microcontroller: Architecture of 8051 microcontroller, Memory organization, Timers/Counters, Interrupts, Addressing modes, 8051 Instruction set, Assembly language Programs, Applications of microcontrollers.

References:
1. Douglas V Hall, “Microprocessors and interfacing – Programming & Hardware” TMH
2. Gaonkar, “Microprocessor Architecture, Programming & Applications with 8085”, TMH
Grading System 2013 - 14
3. Rafiquzzaman, “Microprocessors-Theory & Applications”, PHI
4. Savaliya, “8086 Programming & Advance Processor Architecture”, Wiley India
5. Ray, Bhurchandi, “Advanced Microprocessor and peripherals” TMH Pub
6. Soumitra Kumar Mandal, “Microprocessors and Microcontroller” TMH Pub

List of Experiments
1. To study 8085 based microprocessor system
2. To study 8086 based microprocessor system
3. To develop and run a program for finding out the largest/smallest number from a given set of numbers.
4. To develop and run a program for arranging in ascending/descending order of a set of numbers
5. To perform multiplication/division of given numbers

6. To perform conversion of temperature from 0F to 0C and vice-versa
7. To perform computation of square root of a given number
8. To perform floating point mathematical operations (Addition, Subtraction, Multiplication and Division)
9. To obtain interfacing of RAM chip to 8085/8086 based system
10. To obtain interfacing of keyboard controller
11. To obtain interfacing of DMA controller
12. To obtain interfacing of PPI
13. To perform microprocessor based temperature control of hot water Grading System 2013 - 14

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Subject code-CS-604 **Subject: Advance Computer Architecture**

Semester: VI

For credits & marks refer your scheme

Course Objective-The purpose of this subject is to cover the underlying concepts and techniques used in Advance Computer Architecture. The Syllabus discusses principles of parallel algorithms design and different parallel programming models

COURSE CONTENT:

Unit-I
Flynn's Classification, System Attributes to Performance, Parallel computer models - Multiprocessors and multicomputer, Multifactor and SIMD Computers. Data and resource dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain size and latency, Control flow, data flow and Demand driven mechanisms. Static interconnection networks, Dynamic interconnection Networks: Bus Systems, Crossbar Switch, Multiport Memory, Multistage and Combining Networks

Unit- II
Instruction set architecture, CISC Scalar Processors , RISC Scalar Processors, VLIW architecture, Memory Hierarchy, Inclusion, Coherence and Locality, Memory capacity planning. Interleaved memory organization-memory interleaving, pipelined memory access, Bandwidth and Fault Tolerance. Backplane Bus System :Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt.

Unit-III
Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, pipeline hazards, Dynamic instruction scheduling – score boarding and Tomosulo's algorithm, Branch handling techniques, Arithmetic Pipeline Design, Static arithmetic pipeline, Multifunctional arithmetic pipelines. Superscalar pipeline design, Super pipeline processor design.

Unit-IV
Cache coherence, Snoopy protocols, Directory based protocols. Message routing schemes in multicomputer network, deadlock and virtual channel. Vector Processing Principles, Vector instruction types, Vector-access memory schemes. Vector supercomputer architecture, SIMD organization: distributed memory model and shared memory model. Principles of Multithreading: Multithreading Issues and Solutions, Multiple-Context Processors

Unit-V
Parallel Programming Models, Shared-Variable Model, Message-Passing Model, Data-Parallel Model, Object-Oriented Model, Functional and Logic Models, Parallel Languages and Compilers, Language Features for Parallelism, Parallel Programming Environment, Software Tools and Environments.

References:

1. Kai Hwang, "Advanced computer architecture", TMH. Grading System 2013 - 14
2. J.P.Hayes, "computer Architecture and organization"; MGH.
3. V.Rajaranam & C.S.R.Murthy, "Parallel computer"; PHI Learning.
4. Kain,"Advance Computer Architecture: - A System Design Approach", PHI Learning
5. M.J Flynn, "Computer Architecture, Pipelined and Parallel Processor Design"; Narosa Publishing.
6. Hwang and Briggs, "Computer Architecture and Parallel Processing"; MGH.
7. David E. Callav & Jaswinder Pal Singh Marge Kaufmann"Advance Computer Architecture", EIS India.
8. Sajjan G. Shiva, Taylar & Francis, "Advance Computer Architecture

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Subject code-CS-605(D) **Subject: Mobile Application Development**

Semester : VI

For credits & marks refer your scheme

Course Objective- Students will be able to describe various issues in mobile communication and those aspects of mobile programming that make it unique from programming for other platforms.

COURSE CONTENT:

Unit-I
Mobile Communication Fundamentals
Introduction, issues in mobile communications, Wireless telephony: cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, handoffs, channel allocation in cellular systems, CDMA, GPRS, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, Mobile IP, WAP: Architecture, protocol stack, applications.

Unit-II
Mobile Applications Development Frameworks and Tools
Introduction of Mobile Applications, Types and Benefits of a Mobile App, Mobile Platforms, deployment on Apple iOS with versions, Android, Windows phone application using development platforms: worklight, kendo, Appcon, Xcode, Xpage, Architecture of Mobile Software Applications, N-Tier Client–Server Frameworks and Tools, Java, BREW, Windows CE, WAP, Symbian EPOC, Publishing Frameworks, Mobile User Interface Design, Building Generic User Interfaces, mobile apps in the cloud.

Unit-III
Mobile Agents and Peer-to-Peer Architectures for Mobile Applications
Mobile Agents for Mobile Computing, Applications of Mobile Agents to Mobile Applications and Implementation Tools, Techniques for Agent-Based Software, Peer-to-Peer Applications for Mobile Computing, security and fault tolerance.

Unit-IV
Synchronization and Replication of Mobile Data
Taxonomy of Replication and Synchronization, Data Replication and Synchronization for Mobile Applications, SyncML, WebDAV, Mobile Agents, Replication, and Synchronization, Location Information Modeling, Problems with Building Location-Based Applications, Utilizing Location-Based Services with Mobile Applications, UML-Based Development Cycle for Mobile Applications, Architectural Patterns for Mobile Applications.

Unit-V
Testing Mobile Applications, Validating the Mobile Use Cases before Development, The Effect of the Dimensions of Mobility on Software Testing, Stress Testing and Scalability Issues, Testing Location-Based Functionality, Android as your mobile platform, installation, Configuring of Eclipse and the Android SDK, Additional SDK Components, application layout and Android app development, Android user interface elements, Android Virtual Device, Connection to Google play.

References :

1. Reza b'far, Mobile computing Principles Designing and developing Mobile applications with Uml and xml, Cambridge university press.
2. Jeff Mcwherter, Scott Gowell, Professional Mobile application development, Wrox, John Wiley & Sons, Inc..
3. Richard Rodger, Beginning mobile application Development in the cloud, John Wiley & Sons, Inc.
4. J. Schiller, Mobile Communication, Addison Wesley.