VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

BACHUPALLY, (VIA) KUKATPALLY, HYDERABAD – 500 072

ACADEMIC PLAN FOR THE YEAR 2011

IV - B.TECH I - SEMESTER

1. MOBILE COMPUTING

2. ADVANCED COMPUTER ARCHITECTURE

3. NETWORK PROGRAMMING

4. WEB TECHNOLOGIES

5. SOFTWARE PROJECT MANAGEMENT

6. DATA WAREHOUSING AND DATA MININIG

MOBILE COMPUTING

UNIT-I

I Syllabus

Introduction to Mobile Communications and Computing: Introduction to MC, novel applications, limitations, and architecture.

GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

II Learning Objectives

At the end of unit student must be able to

- Learn about Mobile Computing and its applications.
- Learn about Mobile Computing limitations.
- Understand Mobile Computing architecture.
- Learn Mobile Services.
- Define System Architecture.
- Explain the radio interface and protocols for localization and calling.
- Define the security feature and new data services.

III Lecture Plan

Description of Topic	**No. of classes required: 10**
• Learn about Mobile Computing and its applications.	2 (1^{st}, 2^{nd})
• Understand Mobile Computing limitations.	1 (3^{rd})
• Defining the architecture of Mobile Computing and mobile services.	2 ($4^{th, 5th}$)
• Defining the system architecture.	2 ($6^{th, 7th}$)
• Explaining the radio interface and its protocols.	2 ($8^{th, 9th}$)
• Defining the new data services.	1 (10^{th})

IV Assignment:

1. Explain the applications of mobile computing
2. Name the main elements of the GSM system architecture and describe their functions. What are the advantages of specifying not only the radio interface but also all internal interfaces of the GSM system.
3. With the help of a neat diagram, explain the reference model of wireless and mobile networks.
4. Explain the different generations of mobile telecommunications systems.

UNIT-II

I Syllabus

(Wireless) Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

II Learning Objectives

At the end of unit student must be able to

- Become familiar with MAC.

- Understand the hidden and exposed terminals.
- Learn Near and far terminals.
- Explain SDMA.
- Explain FDMA.
- Explain TDMA.
- Explain CDMA.

III Lecture Plan

Description of Topic	**No. of classes required: 08**
• Understanding the Medium Access Control.	1 (11th)
• Defining hidden terminals.	1 (12th)
• Defining exposed terminals.	1 (13th)
• Defining near terminals.	1 (14th)
• Defining far terminals.	1 (15th)
• Explain about SDMA.	1 (16th)
• Explain about FDMA.	1 (17th)
• Explain about TDMA.	1 (18th)
• Explain about CDMA.	

IV Assignment

1. Explain how priority based multiple access schemes can be implemented.
2. What are the benefits of reservation schemas? How are collisions avoided during data transmission? Why the probability of collisions is lower compared to classical Aloha?
3. What is hidden and exposed terminals problem. What are the advantages and disadvantages of FDMA and TDMa
4. Explain polling and inhibit sense multiple access.
5. Compare SDMA, FDMA, TDMA and CDMA.

UNIT-III

I Syllabus

Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations) Dynamic Host Configuration Protocol (DHCP).

II Learning Objectives

At the end of unit student must be able to

- Define the goals of Mobile IP.
- Define IP Packet Delivery.
- Learn how to register the agents.
- Understand the concepts of encapsulations and optimizations.
- Describe DHCP.

III Lecture Plan

Description of Topic	**No. of classes required: 12**
• Basics of Mobile IP.	2 (19th, 20th)
• Goals and Assumptions, Entities and Terminology.	2 (21st, 22nd)

- IP Packet Delivery. 2 (23rd, 24th)
- Agent Advertisement and discovery and Registration. 2 (25th, 26th)
- Tunneling and encapsulation. 2 (27th, 28th)
- DHCP. 2 (29th, 30th)

IV Assignment:

1. What is the use of binding cache in mobile IP? What are the limitations of minimal-encapsulation in mobile IP?
2. The goal of mobile IP is supporting end system mobility while maintaining scalability, efficiency, and compatibility in all respects with existing applications and internet protocols. Explain.
3. What are the requirements for a mobile IP? Explain them.
4. Explain DHCP in brief.

UNIT-IV

I Syllabus

Mobile Transport Layer: Traditional TCP ,Indirect TCP ,Snooping TCP ,Mobile TCP, Fast retransmit/fast recovery ,Transmission /time-out freezing ,Selective retransmission, Transaction oriented TCP..

II Learning Objectives

At the end of unit student must be able to

- Compare & Contrast Traditional and mobile TCP.
- Discuss about Indirect TCP & Snooping TCP.
- Explain about Fast retransmit/fast recovery.
- Define Selective retransmission.
- Explain about Transaction oriented TCP.

III Lecture Plan

Description of Topic **No. of classes required: 07**

- Concepts of TCP, differences between traditional and mobile. 1(31st)
- Indirect TCP. 1(32nd)
- Snooping TCP. 1(33rd)
- Fast retransmit/fast recovery. 1(34th)
- Transmission/time-out freezing. 1(35th)
- Selective retransmission. 1(36th)
- Transaction oriented TCP. 1(37th)

IV Assignment:

1. Explain mobile-TCP and also write its advantages and disadvantages.
2. Explain selective Retransmission and Transaction oriented TCP techniques
3. Write brief notes on congestion control in traditional TCP.
4. Compare several enhancements to TCP for mobility.
5. Compare the error rate in wired networks and mobile networks.

UNIT-V

I Syllabus

Database issues: Hoarding techniques, caching invalidation mechanisms. client server computing with adapt ion , power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues.

II Learning Objectives

At the end of unit student must be able to

- Understand the concepts of issues related to databases.
- Become familiar with hoarding techniques.
- Use invalidation mechanisms.
- Know Client Server computing.
- Understand Power aware Computing.
- Understand context-aware Computing.
- Understand the transactional model.
- Define query processing.
- Know recovery of data.
- Understand the quality issues.

III Lecture Plan

Description of Topic	No. of classes required: 13
• Concepts of issues related to databases.	1(38th)
• Hoarding techniques.	2(39th, 40th)
• Invalidation Mechanisms.	2(41st, 42nd)
• Client Server Computing.	2(43rd, 44th)
• Power aware Computing.	2(45th, 46th)
• Context aware Computing.	1(47th)
• Transactional Model.	1(48th)
• Query processing.	1(49th)
• Recovery and quality issues.	1(50th)

IV Assignment

1. Write about the client server computing with adaptation
2. Explain the following concepts in mobile environment.
   (i) Data cache maintenance
   (ii) Web cache maintenance
3. Explain about power aware computing.
4. Explain the data recovery processing in detail.
5. Explain in detail the transactional model of database.

UNIT-VI

I Syllabus

Data Dissemination: Communications asymmetry, classification of new data delivery mechanisms, push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

II Learning Objectives

At the end of unit student must be able to

- Understand the concepts of data dissemination.
- Become familiar with communication asymmetry.
- New data delivery mechanisms.
- Push –based mechanisms.
- Pull-based mechanisms.
- Hybrid mechanisms.
- Selective Tuning or indexing techniques.

III Lecture Plan

Description of Topic	**No. of classes required: 07**
• Concepts of Data Dissemination.	1(51st)
• Communication Asymmetry.	1(52nd)
• New Data Delivery Mec	1(53rd)
• Push – Based Mechanisms.	1(54th)
• Pull --Based Mechanisms.	1(55th)
• Hybrid Mechanisms.	1(56th)
• Selective Tuning or Indexing Techniques.	1(57th)

IV Assignment

1. What is balanced push-pull mechanism? In detail explain about IPP.
2. The push based broad cast are not suitable for large data size, justify.
3. Explain about on demand data scheduling.
4. Explain the following selective tuning techniques:
   (i) Temporal Addressing
   (ii) Broadcast Addressing
   (iii) Index based method
   (iv) Distributed index based method

UNIT-VII

I Syllabus

Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET, applications, routing and various routing algorithms, security in MANET's.

II Learning Objectives

At the end of unit student must be able to

- Understand the concepts of Mobile Ad hoc Networks.
- Learn the properties of a MANET.
- Know the spectrum of MANET.
- Understand the applications of MANET.
- Understand different routing algorithms.
- Security issues in MANET.

III Lecture Plan

Description of Topic	No. of classes required: 10
▪ Concepts of Mobile Ad hoc Networks.	2(58th, 59th)
▪ Properties of a MANET	1(60th)
▪ Spectrum of	2(61st, 62nd)
▪ Application of MANET.	2(63rd, 64th)
▪ Routing Algorithms.	2(65th, 66th)
▪ Security issues in MANET.	1(67th)

IV Assignment

1. Explain the applications of mobile Ad-hoc networks
2. Explain Dynamic source routing in MANETs?
3. Compare the reactive and proactive routing protocols.
4. Why is routing in multi-hop ad-hoc networks complicated? What are the special challenges?

UNIT-VIII

I Syllabus

Protocols and Tools: Wireless Application Protocol-WAP (Introduction. Protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

II Learning Objectives

At the end of unit student must be able to

- Understand the WAP.
- Know the WAP architecture.
- WAP in network layer.
- WAP in transport layer.
- WAP in application layer.
- Bluetooth usage in physical layer.
- Bluetooth in MAC layer.
- Bluetooth in network layer.
- Link management in transport layer.
- J2ME.

III Lecture Plan

Description of Topic	No. of classes required: 10
• Concepts of WAP.	2(68th, 69th)
• Architecture of	1(70th)
• WAP in network layer.	1(71st)
• WAP in transport layer.	1(72nd)
• Bluetooth in physical layer.	1(73rd)
• Bluetooth in MAC layer.	1(74th)
• Bluetooth in network layer.	1(75th)
• Link Management.	1(76th)
• J2ME.	1 (77th)

IV Assignment

1. With a neat diagram explain the WAP architecture.
2. Discuss briefly the user scenarios of Bluetooth.
3. Discuss the configuration and profile of J2ME in detail.
4. What is WAE? Discuss about its logical model.
5. Name mechanisms to improve web access for handheld devices. What is their common problem and what led finally to the development of WAP?

Advanced Computer Architecture

UNIT I

1.1 SYLLABUS

Fundamentals of Computer design- Technology trends- cost- measuring and reporting performance quantitative principles of computer design.

1.2 OBJECTIVES

At the end of this unit students will be able to

- Understand the fundaments of computer architecture
- Describe the various steps involved in measuring the performance of a computer
- Identify the functionalities of components in the computer architecture

1.3 LECTURE PLAN

TOTAL CLASSES : 8

Sno	Topic	Number of hours
1.	Introduction to Computer Architecture	1
2.	Trends in computer architecture	2
3.	Cost measuring and performance	2
4.	Problems on cost measuring and performance	3

1.4 ASSIGNMENT

1. Explain the quantitative principles of computer design?

2. Explain the Amdahl's law ?

3. Three enhancements with the following speedups are proposed
   for a new architecture:
   Speedup1 = 30
   Speedup2 =20
   Speedup3 = 10
   Only one enhancement is usable at a time.
   If enhancements 1 and 2 are each usable for 30% of the time, what fraction
   of the time must enhancement 3 be used to achieve an overall speedup of 10?

UNIT II

2.1 SYLLABUS

Instruction set principles and examples- classifying instruction set- memory addressing- type and size of operands- addressing modes for signal processing-operations in the instruction set- instructions for control flow- encoding an instruction set.-the role of compiler

2.2 OBJECTIVES

At the end of this unit students will be able to

- Understand the fundaments of Instruction set principles.
- Understand the memory addressing and type of an aoperand
- Identify the signal processing operations in the instruction set- instructions for control flow
- Classify Instruction Set Architectures

2.3 LECTURE PLAN

TOTAL CLASSES : 9

Sno	Topic	Number of hours
5.	Classifying Instruction Set Architectures	2
6.	Memory Addressing	2
7.	addressing modes for signal processing-operations	3
8.	The Structure of Recent Compilers	2

2.4 ASSIGNMENT

1 Classify Instruction Set Architectures ?

2. List out the addressing modes of an instruction set of a computer?
3. Explain briefly the Addressing Modes for Signal Processing?
4. Here are three simple16-bit patterns:
   0100 0000 0000 0000
   0000 1000 0000 0000
   0100 1000 0000 1000
   What values do they represent if they are two's complement integers?
   Fixedpoint numbers?

4. What are the operations to be performed on Operations for Media and Signal Processing
5. What are the control flow instructions of a computer?

UNIT III

3.1 SYLLABUS

Instruction level parallelism (ILP)- over coming data hazards- reducing branch costs –high performance instruction delivery- hardware based speculation- limitation of ILP

3.2 OBJECTIVES

At the end of this unit students will be able to

- Understand the ILP.
- Understand the data hazards
- Understand the Tomasulo's Algorithm:

3.3 LECTURE PLAN

TOTAL CLASSES : 9

Sno	Topic	Number of hours
1.	Instruction level parallelism (ILP)	2
2.	Overcoming Data Hazards with Dynamic Scheduling	2
3.	Dynamic Scheduling: Examples and the Algorithm	3
4.	Reducing Branch Costs with Dynamic Hardware Prediction	2

3.4 ASSIGNMENT

1 How many branch-selected entries are in a (2,2) predictor that has a total of 8K bits in the prediction buffer?

2. Determine the total branch penalty for a branch-target buffer assuming the penalty cycles for individual mispredictions from Figure 3.21.(text book). Make the following assumptions about the prediction accuracy and hit rate:
n prediction accuracy is 90% (for instructions in the buffer)
n hit rate in the buffer is 90% (for branches predicted taken)
Assume that 60% of the branches are taken.

3. How close could a real dynamically scheduled, speculative processor come to

the ideal processor?

4. Show what the information tables look like for the following code sequence when only the first load has completed and written its result:
1. L.D F6,34(R2)
2. L.D F2,45(R3)
3. MUL.D F0,F2,F4
4. SUB.D F8,F2,F6
5. DIV.D F10,F0,F6
6. ADD.D F6,F8,F2

5. Consider a loop branch whose behavior is taken nine times in a row, then not taken once. What is the prediction accuracy for this branch, assuming the prediction bit for this branch remains in the prediction buffer?

UNIT IV

4.1 SYLLABUS

ILP software approach- compiler techniques- static branch protection - VLIW approach - H.W support for more ILP at compile time- H.W verses S.W Solutions

4.2 OBJECTIVES

At the end of this unit students will be able to

- Understand Basic Compiler Techniques for Exposing ILP
- Know the Static Branch Prediction
- Work on The Basic VLIW Approach
- Understand Hardware Support for Exposing More Parallelism at Compile-Time

4.3 LECTURE PLAN

TOTAL CLASSES : 10

Sno	Topic	Number of hours
1.	Basic Compiler Techniques for Exposing ILP	2
2.	static Multiple Issue: the VLIW Approach	2
3	Hardware Support for Exposing More Parallelism at Compile-Time	3

4. Hardware versus Software Speculation Mechanisms 1

5. Putting It All Together: The Intel IA-64 Architecture and Itanium Processor 2

4.4 ASSIGNMENT

1. Show how the loop would look on MIPS, both scheduled and unscheduled, including any stalls or idle clock cycles. Schedule for both delays from floating-point operations and from the delayed branch.

2. Suppose we have a VLIW that could issue two memory references, two FP operations, and one integer operation or branch in every clock cycle. Show an unrolled version of the loop x[i] = x[i] +s (see page 223 for the MIPS ode) for such a processor. Unroll as many times as necessary to eliminate any stalls. Ignore the branch-delay slot.

3. Consider a loop like this one:

```
for (i=1; i<=100; i=i+1) {
A[i+1] = A[i] + C[i]; /* S1 */
B[i+1] = B[i] + A[i+1]; /* S2 */
}
```

Assume that A, B, and C are distinct, nonoverlapping arrays. (In practice, the arrays may sometimes be the same or may overlap. Because the arrays may be passed as parameters to a procedure, which includes this loop, determining whether arrays overlap or are identical often requires sophisticated, interprocedural analysis of the program.) What are the data dependences among the statements S1 and S2 in the loop?

4.

Use the GCD test to determine whether dependences exist in the following loop:

```
for (i=1; i<=100; i=i+1) {
X[2*i+3] = X[2*i] * 5.0;
}
```

5.

Show a software-pipelined version of this loop, which increments all the elements of an array whose starting address is in R1 by the contents of F2:

```
Loop: L.D F0,0(R1)
ADD.D F4,F0,F2
S.D F4,0(R1)
DADDUI R1,R1,#-8
BNE R1,R2,Loop
```

You may omit the start-up and clean-up code.

UNIT V

5.1 SYLLABUS

Memory hierarchy design- cache performance- reducing cache misses penalty and miss rate – virtual memory- protection and examples of VM.

5.2 OBJECTIVES

At the end of this unit students will be able to

- Understand the Memory hierarchy in computer architecture.
- Notify the cache performance .
- Analyze **Average memory access time and Processor Performance**
- Understand **DRAM technology**

5.3 LECTURE PLAN

TOTAL CLASSES : 10

Sno	Topic	Number of hours
1.	Review of the ABCs of Caches	2
2.	Cache performance	2
3.	Reducing Cache Miss Penalty or Miss Rate via Parallelism	2
4.	Memory Technology	2
5.	Virtual Memory	2

5.4ASSIGNMENT

1. Assume we have a computer where the clocks per instruction (CPI) is 1.0 when all memory accesses hit in the cache. The only data accesses are loads and stores, and these total 50% of the instructions. If the miss penalty is 25 clock cycles and the miss rate is 2%, how much faster would the computer be if all instructions were cache hits?

2.
Which has the lower miss rate: a 16-KB instruction cache with a 16-KB data cache or a 32-KB unified cache? Use the miss rates in Figure 5.7 to help calculate the correct answer assuming 47% of the instructions are data transfer instructions. Assume a hit takes 1 clock cycle and the miss penalty is 100 clock cycles. A load or store hit takes 1 extra clock cycle on a unified cache if there is only one cache port to satisfy two simultaneous requests. Using the pipelining terminology of the previous chapter, the unified cache leads to a structural hazard. What is the average memory access time in each case? Assume write-through caches with a write buffer and ignore stalls due to the write buffer.

3.Let's use an in-order execution computer for the first example, such as the UltraSPARC III (see section 5.15). Assume the cache miss penalty is 100 clock cycles, and all instructions normally take 1.0 clock cycles (ignoring memory stalls). Assume the average miss rate is 2%, there is an average of 1.5 memory references per instruction, and that the average number of cache misses per 1000 instructions is 30. What is the impact on performance when behavior of the cache is included? Calculate the impact using both misses per instruction and miss rate.

4. Let's redo the example above, but this time assuming the processor with the longer clock cycle time supports out-of-order execution yet still has a direct mapped cache. Assume 30% of the 75 ns miss penalty can be overlapped; that is, the average CPU memory stall time is now 52.5 ns.

UNIT IV

6.1 SYLLABUS

Multiprocessors and thread level parallelism- symmetric shared memory architectures- distributed shared memory- Synchronization- multi threading.

6.2 OBJECTIVES

At the end of this unit students will be able to

- Understand the Multiprocessors and thread level parallelism
- Design the symmetric shared memory architectures
- Know distributed shared memory
-

6.3 LECTURE PLAN
TOTAL CLASSES : 10

Sno	Topic	Number of hours
1.	Characteristics of Application Domains	1
2.	Symmetric Shared-Memory Architectures	3
3.	Performance of Symmetric Shared-Memory Multiprocessors	2
4.	Distributed Shared-Memory Architectures	2
5.	Synchronization	2

6.4 ASSIGNMENT

1. Suppose there are 10 processors on a bus that each try to lock a variable simultaneously. Assume that each bus transaction (read miss or write miss) is 100 clock cycles long. You can ignore the time of the actual read or write of a lock held in the cache, as well as the time the lock is held (they won't matter much!). Determine the number of bus transactions required for all 10 processors to acquire the lock, assuming they are all spinning when the lock is released at time 0. About how long will it take to process the 10 requests? Assume that the bus is totally fair so that every pending request is serviced before a new request and that the processors are equally fast.

2. Suppose we know that for a given multiprocessor the Ocean application spends 20% of its execution time waiting for communication when run on four processors. Assume that the cost of each communication event is independent on processor count, which is not true in general, since communication costs rise with processor count. How much faster might we expect Ocean to run on a 32-processor machine with the same problem size? What fraction of the execution time is spent on communication in this case? How much larger a problem should we run if we want the fraction of time spent communicating to be the same?

3.

Assume a 64-processor multiprocessor with 1GHz processors that sustain one memory reference per processor clock. For a 64-byte block size, the remote miss rate is 0.7%. Find the per-node and estimated bisection bandwidth for FFT. Assume that the processor does not stall for remote memory requests; this might be true if, for example, all remote data were prefetched. How do these bandwidth requirements compare to various interconnection technologies?

4. Assume that L2 has a block size four times that of L1. Show how a miss for an address that causes a replacement in L1 and L2 can lead to violation of the inclusion property.

5. Suppose we have a problem whose execution time for a problem of size *n* is proportional to *n*3. Suppose the actual running time on a 10-processor multiprocessor is 1 hour. Under the time-constrained and memory-constrained scaling models, find the size of the problem to run

UNIT VII

7.1 SYLLABUS

Storage systems- Types – Buses - RAID- errors and failures- bench marking a storage device- designing a I/O system

7.2 OBJECTIVES

At the end of this unit students will be able to

- Classify the storage devices
- Understand the **Buses—Connecting I/O Devices to CPU/Memory**
- Understand **Errors and Failures in Real Systems**
- **Describe I/O Performance Measures**

7.3 LECTURE PLAN

TOTAL CLASSES : 10

Sno	Topic	Number of hours
1.	Types of Storage Devices	2
2.	Buses—Connecting I/O Devices to CPU/Memory	2
3.	RAID: Redundant Arrays of Inexpensive Disks	2
4.	Errors and Failures in Real Systems	2
5.	Benchmarks of Storage Performance and Availability	**2**

7.4 ASSIGNMENT

1 What is the average time to read or write a 512-byte sector for a disk? The advertised average seek time is 5 ms, the transfer rate is 40 MB/second, it rotates at 10000 RPM, and the controller overhead is 0.1 ms. Assume the disk is idle so that there is no queuing delay. In addition, calculate the time assuming the advertised seek time is three times longer than the measured seek time.

2 .Compare the time to read and write a 64-KB block to Flash memory, and magnetic disk. For Flash, assume it takes 65 nanoseconds to read one byte, 1.5 microseconds to write one byte, and 5 milliseconds to erase 4 KB. For disk, use the parameters of the Microdrive in Figure 7.2 on page 490. Assume the measured seek time is one-third of the calculated average, the controller overhead is 0.1 ms, and the data is stored in the outer tracks giving it the fastest transfer rate.

3. Assume a disk subsystem with the following components and MTTF:
n 10 disks, each rated at 1,000,000 hour MTTF;
n 1 SCSI controller, 500,000 hour MTTF
n 1 power supply, 200,000 hour MTTF
n 1 fan, 200,000 hour MTTF
n 1 SCSI cable, 1,000,000 hour MTTF
Using the simplifying assumption that the components lifetimes are exponentially distributed–which means that the age of the component is not important in probability of failure–and that failures are independent, compute the MTTF of the system as a whole.

4 .Suppose an I/O system with a single disk gets on average 50 I/O requests per second. Assume the average time for a disk to service an I/O request is10 ms. What is the utilization of the I/O system?

5.Using the definitions and formulas above, derive the average time waiting in the queue (Timequeue) in terms of the average service time (Timeserver) and server utilization.

UNIT VIII

8.1 SYLLABUS

Inter connection networks and clusters- interconnection network media – practical issues in interconnecting networks- examples – clusters- designing a cluster

8.2 OBJECTIVES

At the end of this unit students will be able to

- Understand the ILP.
- Understand the data hazards
- Understand the Tomasulo's Algorithm:

8.3 LECTURE PLAN
TOTAL CLASSES : 9

Sno	Topic	Number of hours
5.	Instruction level parallelism (ILP)	2
6.	Overcoming Data Hazards with Dynamic Scheduling	2
7.	Dynamic Scheduling: Examples and the Algorithm	3
8.	Reducing Branch Costs with Dynamic Hardware Prediction	2

8.4 ASSIGNMENT

1 How many branch-selected entries are in a (2,2) predictor that has a total of 8K bits in the prediction buffer?

2. Determine the total branch penalty for a branch-target buffer assuming the penalty cycles for individual mispredictions from Figure 3.21.(text book). Make the following assumptions about the prediction accuracy and hit rate:
n prediction accuracy is 90% (for instructions in the buffer)
n hit rate in the buffer is 90% (for branches predicted taken)
Assume that 60% of the branches are taken.

3. How close could a real dynamically scheduled, speculative processor come to the ideal processor?

4. Show what the information tables look like for the following code sequence when only the first load has completed and written its result:
1. L.D F6,34(R2)
2. L.D F2,45(R3)
3. MUL.D F0,F2,F4
4. SUB.D F8,F2,F6
5. DIV.D F10,F0,F6
6. ADD.D F6,F8,F2

5. Consider a loop branch whose behavior is taken nine times in a row, then not taken once. What is the prediction accuracy for this branch, assuming the prediction bit for this branch remains in the prediction buffer?

NETWORK PROGRAMMING

UNIT-I

Introduction to Network Programming: OSI model, UNIX standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

Learning Objectives: At the end of this unit the student will be able to

1. Learn about OSI Model.
2. Know various UNIX standards
3. Become familiar with TCP and UDP
4. Know various standard internet services.

Lecture plan:

S.no	Topic	No. of classes
1	OSI Model	01
2	UNIX Standards	01
3	TCP and UDP	03
4	Buffer sizes and limitations	01
5	Standard internet services and Protocol usage	02
		08

Assignment:

1. Explain OSI model.
2. Write short notes on TCP connection establishment and Format
3. Write the differences between UDP and TCP
4. Explain various standard internet services provided by TCP/IP
5. Explain IPv4 header. What is the value of the protocol filed in IPv4 header for the OSPF datagram's?

UNIT-II

Sockets: Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.

Learning Objectives: At the end of this unit the student will be able to

1. Describe the Sockets API.
2. Know various Byte ordering functions
3. Become familiar with elementary TCP sockets.
4. Know various socket functions.

Lecture plan:

S.no	Topic	No. of classes
1	Socket Address structures	02
2	Value – result arguments, Byte ordering	01
3	Byte manipulation functions	03
4	Socket, connect, bind, listen, accept functions	02
5	Fork and exec function	01
6	Concurrent servers. Close and related functions.	01
		10

Assignment:

1. Explain IPv4 and IPv6 socket address structure. Compare them.
2. Write short notes on value result arguments.
3. Explain the following functions
   i) inet-aton ii) inet_addr iii) inet_ntoa
4. What is the problem with inet_ntop? How can you resolve it?
5. Write short notes on fork and exec functions.
6. Explain Concurrent servers.
7. What are descriptor reference counts?

UNIT-III

TCP client server: Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host.

Learning Objectives: At the end of this unit the student will be able to

1. Become familiar with TCP client server.
2. Understand Posix signal handling.
3. Become familiar with server process termination.
4. Know Crashing and Rebooting of server host.

Lecture plan:

S.no	Topic	No. of classes
1	TCP Echo server functions	02
2	Signal handling	03
3	Server process termination	02
4	Crashing and Rebooting of server host	01
		08

Assignment:

1. What happens with our echo client –server if we run the client and redirect standard input to a binary file?
2. Explain TCP Echo server functions.
3. Explain POSIX signal handling.
4. Explain how to handle interrupted system calls.
5. Differentiate wait and waitpid functions.
6. What happens if the client ignores the error return from readline and writes more data to the server?
7. Explain the format of the data exchanged between the client and server.

UNIT-IV

I/O Multiplexing and socket options: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, getsockopt and setsockopt functions. Socket states, Generic socket option IPV6 socket option ICMPV6 socket option IPV6 socket option and TCP socket options.

Learning Objectives: At the end of this unit the student will be able to

1. Become familiar with I/O models.
2. Understand select, shutdown and poll functions.
3. Become familiar with getsockopt and setsockopt functions.
4. Know IPV6 socket option and ICMPV6 socket option

Lecture plan:

S.no	Topic	No. of classes
1	I/O Models	02
2	Select function, Batch input	03
3	Shutdown function, poll function	02
4	Socket options	04
		11

Assignment:

1. Explain various I/O models.
2. Differentiate synchronous and asynchronous I/O.
3. Write short notes on batch input.
4. Write short notes on shutdown function.
5. Explain pselect function.
6. Write short notes on socket states.

UNIT-V

Elementary UDP sockets: Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP.

Learning Objectives: At the end of this unit the student will be able to

1. Become familiar with UDP client server.
2. Understand no flow control with UDP.
3. Become familiar with UDP.
4. Know IPV6 socket option and ICMPV6 socket option

Lecture plan:

S.no	Topic	No. of classes
1	UDP Echo server function	02
2	Lost datagram's	02
3	UDP Example	02
4	Lack of flow control with UDP	02
		08

Assignment:

1. Explain socket functions for UDP client - server.
2. Write short notes on lost datagram's.
3. Write short notes on connect function with UDP.

UNIT-VI

Elementary name and Address conversions: DNS, gethostbyName function, Resolver option, Function and IPV6 support, uname function, other networking information.

Learning Objectives: At the end of this unit the student will be able to

1. Become familiar with Domain Name System(DNS)
2. Understand gethostbyName function
3. Understand uname function

Lecture plan:

S.no	Topic	No. of classes
1	DNS	02
2	gethostbyName function	02
3	Resolver option	02
4	uname function	02
		08

Assignment:

1. Explain DNS.
2. Write short notes on uname function.
3. Explain various types of network related information.

UNIT-VII

IPC: Introduction, File and record locking, Pipes, FIFOs streams and messages, Name spaces, system IPC, Message queues, Semaphores.

Learning Objectives: At the end of this unit the student will be able to

1. Know Inter Process communication (IPC)
2. Become familiar with Pipes and FIFO
3. Understand various record locking mechanisms
4. Understand name spaces.
5. Become familiar with semaphores, message queues.

Lecture plan:

S.no	Topic	No. of classes
1	IPC	01
2	File and record locking	02
3	Pipes, Fifos	02
4	Name spaces, system IPC	02
5	Message queues, Semaphores	03
		10

Assignment:

1. Explain various record locking mechanisms.
2. Write short notes on pipes and fifos.
3. Explain name space.
4. Define semaphore and explain its purpose.
5. Write short notes on Message queues

UNIT-VIII

Remote Login: Terminal line disciplines, Pseudo-Terminals, Terminal modes, Control Terminals, rlogin Overview, RPC Transparency Issues.

Learning Objectives: At the end of this unit the student will be able to

1. Know Remote login
2. Become familiar pseudo –terminals
3. Understand various terminal modes
4. Understand various RPC transparency issues.

Lecture plan:

S.no	Topic	No. of classes
1	Terminal line disciplines	01
2	Pseudo-Terminals	01
3	Terminal modes	02
4	Control Terminals, rlogin Overview	02
5	RPC Transparency Issues	02
		08

Assignment:

1. Explain Pseudo-Terminals.
2. Write short notes on Terminal modes
3. Briefly explain RPC Transparency Issues

TEXT BOOKS:

1. UNIX Network Programming, Vol. I, Sockets API, 2nd Edition. – W.Richard Stevens, Pearson Edn. Asia. **(UNIT-I to UNIT-VI)**
2. UNIX Network Programming, 1st Edition,–W.Richard Stevens.PHI**. (UNIT-VII & VIII)**

REFERENCES:

1. UNIX Systems Programming using C++ T CHAN, PHI.
2. UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education
3. Advanced UNIX Programming 2nd Edition M. J. ROCHKIND, Pearson Education

WEB TECHNOLOGIES

Syllabus : HTML Common tags :

List, Tables, images, forms, Frames: Cascading Style sheets.

Learning Objectives: At the end of this unit the student will be able to

5. Learn about HTML History.
6. Understand the Frames.
7. Write Scripts using List ,Image, Table tag.
8. Become familiar with designing HTML web pages
9. Become familiar with HTML tags.
10. Become familiar with Cascading Style Sheets.
8. Write, Run HTML Scripts.
9. Design static web pages with hyperlinks

Lecture plan:

s.no	Topic	no.of classes
1	List	01
2	Tables	01
3	images, Forms	01
4	Frames	01
5	Cascading Style Sheets	02
		06

Assignment:

1. What is CascadingStylesheet ? What are the benefits of using styles compared with placing formatting directly into the text of the Web page?
2. Describe the different ways that styles can be added to a page.
3. Create a simple HTML page which demonstrates the use of the various types of lists. Try adding a definition list which uses an unordered list to define terms.
4. Create a HTML document that has your image and your friend's image with a specific height and width. Also when clicked on the images it should navigate to their respective profiles.
5. Create a HTML webpage which illustrates Hyperlink.
6. Create a HTML webpage which illustrates frames.
7. Create a HTML webpage which displays student information (student id, student name,address,phonenumber) in Tabular format.
8. Write a program to develop static web pages illustrating the college infrastructure using list, Table , image, Form tag.

UNIT – II

Syllabus : Java Script

Introduction to Java Scripts. Objects in Java Script. Dynamic HTML with Java Script

Learning Objectives: At the end of this unit the student will be able to

1. Learn about Java Script History.
2. Understand the Objects in Java Scripts.
3. Become familiar with writing Java Scripts.
4. Become familiar with writing Validations in Java Script.
5. Use Java Script Objects

6. Write & run Java Script programs.

Lecture plan:

s.no	Topic	no.of classes
1	Introduction to Java Scripts	01
2	data types in java script	01
3	java script objects	01
4	Control Statements	01
5	java script functions	01
6	regular expressions	01
7	exceptions	01
8	events in java script	01
9	java script forms	01
		09

Assignment:

1. What is a function ? explain how parameters are passed to functions in Java Script.
2. Write a java script that reads six integers and displays the largest and smallest integers from the given integers.
3. Describe the primitive data types that javascript uses.
4. Write a script that reads an integer and determines and displays whether it is an odd or even number.
5. Create a simple form with user name , age fields and submit button , write a script which will validate username & password .(i.e username should consists of characters from a to z, password should allows digits only).
6. Write a Script to develop Tic-Tac-Toe game

UNIT – III

Syllabus : XML

Document type definition. XML Schémas. Document ObjectModel. Presenting XML using XML Parsers: DOM and SAX

Learning Objectives: At the end of this unit the student will be able to

1. Write XML documents.
2. write Document type definition
3. Write XML Schemas
4. Write Document Object model
5. Write SAX
6. understand extensible stylesheet language.

Lecture plan:

s.no	Topic	no.of classes
1	Document Type Definition	01
2	XML Schema	02
3	Extensible Style Sheet Language	01
4	DOM	01
5	SAX	01
		06

Assignment:

1. Define an XML Schema. Show how an XML schema can be created.
2. What is a namespace? Describe how a namespace is created with a relevant example.
3. Explain the purpose of XML processors.
4. Explain the various types of XML schema data types used.
5. a. write an XML document for storing the student details(i.e studentid, studentname,age,address).
   b. write Document type definition for the above XML document.
   c. write XML schema for the above XML document.
   d. display the above XML document information in a formatted way using extensible style sheet language.

UNIT – IV

Syllabus : Java Beans

Introduction to java Beans Advantages of Java Beans. BDK Introspection Using Bound prosperities. Bean info Interface. Constrained properties. Persistence., Customizes ,Java Beans API Introduction to EJB's.

Learning Objectives: At the end of this unit the student will be able to

1. identify the advantages of javabeans.
2. become familiar with javabean API.
3. become familiar with bean properties.
4. become familiar with EJB API.
5. compare and contrast Bean vs EJB.
6. write bean classes.

Lecture plan:

s.no	Topic	no.of classes
1	Introduction to java Beans & Advantages of Java Beans	01
2	BDK Introspection Using Bound prosperities	01
3	Bean info Interface	01
4	Constrained properties	01
5	Persistence	01
6	API Introduction to EJB's	01
		06

Assignment:

1. What is a bean development kit?
2. explain the design patterns for the bean events.
3. What is a Java Bean? " Java bean is a reusable platform- neutral software component" justify this statement.
4. explain the features of javabean.
5. explain the significance of the bound property in java beans with an example.
6. explain the design patterns for writing the java bean with an example.

UNIT – V

Syllabus : Web Servers

Introduction to Servelets: Lifecycle of a Servelet. JSDK. The Servelet API. The javax servelet Package. Reading Servelet Parameters. Reading Initialization parameters. The javax servelet HTTP package Handling Http Request & Responses. Using Cookies Session Tracking Security issues

Learning Objectives: At the end of this unit the student will be able to

1. understand the life cycle of a servlet.
2. understand JSDK.
3. understand API.
4. learn how to develop servlets and deploy in JSDK.
5. write servlets , having servlet parameters and initialization parameters.
6. understand and implement Servlet package.
7. implement the servers and develop a project to accept client request and server response

Lecture plan:

s.no	Topic	no.of classes
1	Introduction to Servelets,Lifecycle of a Servelet, JSDK	01
2	The Servelet API, The javax servelet Package.	01
3	Reading Servelet Parameters, Reading Initialization parameters	01
4	The javax servelet HTTP package Handling Http Request & Responses.	02
5	Using Cookies Session Tracking Security issues	02
		07

Assignment:

1. Explain the functionality of javax.servlet.http package by discussing about the methods and interfaces of this package.
2. What is a servlet? Explain lifecycle of a servlet. Illustrate with an example program.
3. Discuss how servlets can be used to extend a web server's functionality.
4. Write a program to demonstrate URL redirecting.
5. Explain session tracking using Http Session.
6. write a HTTPservlet which will display Login form.
7. Write a Genericservlet which will display Student application form.

UNIT – VI

Syllabus : Introduction to JSP

the problem with Servelet. The anatomy of a JSP page JSP Processing JSP Application Design with MVC Setting Up and JSP Environment installing the java software Development Kit. Tomcat Sever & Testing Tomcat

Learning Objectives: At the end of this unit the student will be able to

1. identify drawback of servlet.
2. identify the anatomy of jsp page & jsp page processing.
3. familiar with MVC architecture.
4. develop jsp application using MVC architecture.
5. develop jsp application in Java software Development Kit Environment.
6. understand Tomcat Server.

7. develop the jsp application in Tomcat Server Environment.

Lecture plan:

s.no	Topic	no.of classes
1	problem with Servelet,The anatomy of a JSP page, JSP Processing JSP	01
2	MVC architecture	02
3	installing Tomcat Server	01
4	simple jsp application	01
		05

Assignment:

1. what are the limitations of servlets? How jsp overcomes these problems.
2. Discuss about Tomcat Server.
3. Write about the jsp processing.
4. Explain the components of jsp.
5. Describe Model – View – Controller setup.
6. Write about javax.servlet.jsp package.

UNIT – VII

Syllabus **: JSP Application Development**

Generation Dynamic Content. Using scripting Elements Implicit JSP Objects Conditional Processing-Displaying values using an Expression to set an Attribute. Declaring variables and Methods Error Handling and Debugging Sharing Data between JSP pages requests and users Passing Control and Date between pages – sharing session and Application Data Memory usage Considerations.

Learning Objectives: At the end of this unit the student will be able to

1. develop jsp application which will generate dynamic content.
2. know jsp scripting elements.
3. become familiar with jsp tags.
4. become familiar with sessions.
5. become familiar with sharing the data between pages.
6. use implicit jsp objects.
7. become familiar with understanding the errors.

Lecture plan:

s.no	Topic	no.of classes
1	Generation Dynamic Content, scripting Elements	01
2	Implicit JSP Objects , Conditional Processing	01
3	Expressions,scriptlet	01
4	Declaring variables, Methods	01
5	Error Handling	01
6	sharing the data between jsp pages	01
7	jsp tags,scopes	02
		08

Assignment:

1. What is a scriptlet ? write about scriptlet elements.
2. Discuss about dynamic content. List the methods in Request object.
3. discuss the various jsp tags(Declaration tag,Expression Tag,Directive Tag,Scriptlet Tag,Action Tag) with an examples.
4. Develop a jsp with a Bean in application Scope.
5. Write a jsp which will handle request dispatching.

UNIT – VIII

Syllabus : Database Access

Database Programming using JDBC, studying javax.sql package accessing a Database from a JSP Page Application – Specific Database Actions. Deploying JAVA Beans in a JSP Page introduction to struts framework.

Learning Objectives: At the end of this unit the student will be able to

1. Understand JDBC.
2. become familiar with javax.sql package.
3. become familiar with Struts framework.
4. Understand how to deploy java Bean in jsp page.
5. Write jsp which will manage the data in a database.

Lecture plan:

s.no	Topic	no.of classes
1	introduction to JDBC	01
2	javax.sql package	01
3	Statement Object	01
4	ResultSet Object	01
5	PreparedStatemt object	01
6	developing JDBC programs	02
		07

Assignment:

Write a jsp which will update the salary 10,000/Rs. For an employee whose name starts With 'A'.

1. Write a jsp which will insert the tuples into "Employee" table using PreparedStatement. And retrieve the results accordingly
2. Discuss about javax.sql Package.
3. Discuss about Struts framework.
4. Discuss about Resultset, Statement and PreparedStatement Objects.
5. Prepare a website that implements all the features discussed above

Text Books:

1. Web Programming building internet applications. Chris Bales 2 edition, WILEY Dreamtech (UNITs 1,2,3)
2. The complete Reference java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH (Chapters: 19, 20, 21, 22, 25, 27) (UNIT 4)

REFERENCES:

1. Internet and World Wide Web-How to program by Dietel and Nieto PHI/Pearson Education Asia.
2. Jakarta Struts Cookbook. Bill Siggelkow, S P D O reilly for chap 8.
3. Murach's beginning JAVA JDK 5. Murach, SPD
4. An Introduction to web Design and Programming-Wang-Thomson
5. Web Applications Technologies Concepts-Knuckles, John Wiley
6. Programming World Wide Web-Sebesta. Pearson
7. Building Web Applications-NIIT, PHI
8. Web Warrior Guide to Web Programming Bai/Ekedaw-Thomas
9. Beginning Web Programming Jon Duckett WROX.

SOFTWARE PROJECT MANAGEMENT

UNIT-I :- SYLLABUS

Conventional Software Management: The waterfall model, conventional software management performance.

Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

LEARNING OBJECTIVES:-

At the end of Unit-I student must be able to

- Explain waterfall model
- Learn conventional software management performance
- Learn software economics and cost estimation

LECTURE PLAN:

UNIT-I: 4 hours

1st hr : waterfall model
2nd hr: conventional software management performance
3rd hr: software economics
4th hr: pragmatic software cost estimation

ASSIGNMENT – I:-

1. What are the five components of software cost models?
2. What are the components of a good cost estimate, in practice?
3. What are the criteria's involved in the performance of conventional process model. How can we improve the criteria's?
4. Compare Waterfall model with the modern models and give the literature survey?

UNIT-II: - SYLLABUS

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

LEARNING OBJECTIVES:-

At the end of Unit-II student must be able to

- Explain manual process in software
- Explain Automated process in software.

LECTURE PLAN:-

UNIT-II: 7 hours

1st hr: Reducing Software product size.
2nd hr: improving S/w process
3rd hr: improving team effectiveness, improving automation
4th hr: Achieving required quality, peer inspections.
5th hr: The principles of conventional software Engineering.
6th hr: principles of modern software management
7th hr: transitioning to an iterative process.

ASSIGNMENT-II :-

1. Why does software not give as much returns on investment as other industries?
2. What are the ways of achieving better economics in Software?
3. Describe the process for the Formal meeting?
4. List out the characteristics of manual process and automated process in software?

UNIT-III: - SYLLABUS

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

LEARNING OBJECTIVES:-

At the end of Unit-III student must be able to

- Explain Life cycle phases
- Explain transition phases
- Explain Artifacts of the process

LECTURE PLAN:-

UNIT-III: 8 hours

1st hr: Engineering and production stages
2nd hr: inception, elaboration
3rd hr: construction
4th hr: transition phases
5th hr: The artifact sets
6th hr: management artifacts
7th hr: Engineering artifacts
8th hr: programmatic artifacts.

ASSIGNMENT-III:-

1. What are the essential activities in construction and transition phases?
2. How do you evaluate the completion of each of the four phases in SW lifecycle?
3. Explain about life cycle phases

4. Explain about Artifacts of the process.

UNIT-IV :- SYLLABUS

Model based software architectures: A Management perspective and technical perspective.
Work Flows of the process: software process workflows, iteration workflows.

LEARNING OBJECTIVES:-

At the end of Unit-IV student must be able to

- Explain Model based software architectures
- Learn work flows of the process
- Explain Iterative Process Planning

LECTURE PLAN:-

UNIT-IV: 3 hours

1st hr: model based software architectures
2nd hr: software process workflows
3rd hr: Iteration workflows

ASSIGNMENT-IV:-

1. What does each of the views (design, process, component, deployment) address in the software architecture? Explain with an example.
2. Explain about iteration workflow.
3. Take an example system, and draw different UML diagrams.

UNIT-V: - SYLLABUS

Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments.
Iterative Process Planning: work breakdown structures, planning guidelines, cost and schedule estimating, iteration planning process, pragmatic planning.

LEARNING OBJECTIVES:-

At the end of Unit-V student must be able to

- Explain Major and Minor mile stones
- Learn work breakdown structures
- Learn cost and schedule estimating
- Learn Iteration and Pragmatic planning process

LECTURE PLAN:-

UNIT-V: 8 hours

1st hr: Major mile stones
2th hr: Minor milestones
3th hr: periodic status assessments
4th hr: work breakdown structures
5th hr: planning guidelines
6th hr: cost and schedule estimating
7th hr: Iteration planning process
8th hr: Pragmatic planning.

ASSIGNMENT-V:-

1. What are the disadvantages of traditional work break down structures?
2. How should the evolutionary WBS be structured?
3. Explain about "Status Assessment Report"
4. Explain work break bown structure any real time project.

UNIT-VI: - SYLLABUS

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.
Process Automation: Automation Building blocks, the project environment.

LEARNING OBJECTIVES:-

At the end of Unit-VI student must be able to

- Explain Line-of-Business Organizations
- Explain Project Organizations
- Learn Process Automation.

LECTURE PLAN:-

UNIT-VI: 5 hours

1st hr : Line-of-Business Organizations
2nd hr: Project Organizations
3rd hr: evolution of Organizations
4th hr: Automation Building blocks
5th hr: the project environment

ASSIGNMENT-VI:-

1. What are the sources of change? Why should change be made in a controlled way?
2. Define a configuration baseline.
3. Explain about project organizations and responsibilities

4. Write and Explain about Process Automation steps.

UNIT-VII: - SYLLABUS

Project control and process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic software metrics, metrics automation.
Tailoring the Process: Process discriminants.

LEARNING OBJECTIVES:-

At the end of Unit-VII student must be able to

- Explain seven core Metrics
- Explain Management and Quality indicators
- Explain about pragmatic software metrics
- Explain metrics automation and Process discriminants

LECTURE PLAN:-

UNIT-VII: 7 hours

1st hr: seven core Metrics
2nd hr: Management indicators
3rd hr: Quality indicators
4th hr: life cycle expectations
5th hr: pragmatic software metrics
6th hr: metrics automation
7th hr: Process discriminants

-

ASSIGNMENT-VII:-

1. What is the need for metrics? What do you mean by indicators?
2. List the seven core metrics, their purpose and perspectives.
3. Briefly explain about tailoring the process.

UNIT-VIII: - SYLLABUS

Future Software Project Management: modern project profiles, next generation, software economics, modern process transitions.

Case Study: The command Center Processing and Display system-Replacement (CCPDS-R)

LEARNING OBJECTIVES:-

At the end of Unit-VIII student must be able to

- Explain modern project profiles
- Explain future software project management software economics

- Explain about modern process transitions
- Learn command center processing and display system- replacement

LECTURE PLAN:-

UNIT-VIII: 6 hours

1st hr: modern project profiles
2nd hr: next generation
3rd hr: software economics
4th hr: modern process transitions
5th hr: command center processing and display system
6th hr: the command center processing and display system – replacement.

ASSIGNMENT-VIII:-

1. What were metrics collected in CCPDS-R? What is the purpose of each metric?
2. Briefly explain about software economics of future software project management
3. Explain about the command center processing and display system.
4. How can we increase the efficiency of Modern software process.

TEXT BOOK:

1. Software project Management, Walker Royce: Person Education,2005.

REFERENCES:

1. Software project Management, Bob Hughes
2. Software project Management, Joel Henry, Pearson Education.
3. Software project Management in practice, Pankaj Jalote Pearson Education

DATA WAREHOUSING AND DATA MININIG

UNIT-I

Introduction : Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining.

Data Preprocessing : Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

LEARNING OBJECTIVES:- At the end of unit-I students must be able to

- Understand What is Data Mining?
- Briefly explain the Data Mining's importance?
- Explain What kind of data used in data mining?
- Define the Data Mining Functionalities and what kinds of patterns can be mined?
- Explain the Classification of Data Mining systems
- Explain the Major issues in Data Mining
- Explain the necessity of Preprocessing the Data
- Define Data cleaning
- Define Data Integration and Transformation
- Define Data Reduction
- Explain the concept of Discretization and Concept Hierarchy Generation.

LECTURE PLAN:-

UNIT –I : 15 hours

1st hr : Fundamentals of data mining
2nd hr: Data Mining Functionalities
3rd hr: Classification of Data Mining systems
4th hr: Major issues in Data Mining
5th hr: Needs Preprocessing the Data
6th hr: Data Cleaning
7th hr: Data Integration and Transformation
8th hr: Data Reduction
9th hr: Data Reduction
10th hr: Discretization and Concept Hierarchy Generation.
11th hr: Discretization and Concept Hierarchy Generation.
12th hr: Data Warehouse and OLAP Technology for Data Mining Data Warehouse
13th hr: Multidimensional Data Model
14th hr: Data Warehouse Architecture
15th hr: Data Warehouse implementation

ASSIGNMENT –I:-

1) How is a data warehouse different from a data base? How are they similar?
2) Describe two challenges to data mining regarding performance issues.
3) What is the difference between discrimination and classification?
4) What are the differences between the three main types of data warehouse usage?

5) Discuss the motivation behind OLAP mining.
6) In real world data, tuples with missing values for some attributes are a common occurrence. Describe various methods for handling this problem.
7) Discuss issues to consider during data integration.
8) Use a flow-chart to summarize the following procedures for attributes subset selection:
    a. Stepwise forward selection
    b. Stepwise backward elimination
9) Discretization and Concept Hierarchy Generation

UNIT-II

Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining.

LEARNING OBJECTIVES:-

At the end of unit-II student must be able to

- Explain what is a Data warehouse
- Explain the multidimensional data model
- Explain the Data Warehouse Architecture
- Describe the implementation of a datawarehouse
- Explain the Data Cube technology

LECTURE PLAN:-

UNIT –II : 7 hours

1st hr: Data Warehouse and OLAP Technology for Data Mining Data Warehouse
2nd hr: Multidimensional Data Model
3rd hr: Data Warehouse Architecture
4th hr: Data Warehouse implementation
5th hr & 6th hr: Further Development of Data Cube Technology,
7^{th} hr : From Data Warehousing to Data Mining.

ASSIGNMENT –II:-

1) What are the differences between the three main types of data warehouse usage?
2) Discuss the motivation behind OLAP mining.

UNIT-III

Data Mining Primitives, Languages, and System Architectures: Data Mining Primitives, Data Mining Query Languages, Designing Graphical User Interfaces Based on a Data Mining Query Language Architectures of Data Mining Systems.

LEARNING OBJECTIVES:-

At the end of unit-III student must be able to

- Define a Data Mining Task
- Explain the Data Mining Primitives
- Explain the Data Mining Query Languages
- Design a Graphical User Interfaces Based on a DMQL.
- Explain the Data Mining Query Language Architectures.

LECTURE PLAN:-

UNIT –III : 7 hours

1st hr : Data Mining Primitives
2nd hr: Data Mining Primitives
3rd hr: Data Mining Primitives
4th hr: Data Mining Query Languages
5th hr: Data Mining Query Languages
6th hr: Data Mining Query Languages
7th hr: Designing Graphical User Interfaces Based on a Data Mining Query Language Architectures of Data Mining Systems

ASSIGNMENT –III:-

1) List and describe the five primitives for specifying a data mining task.
2) Describe why concept hierarchies are useful in data mining.
3) Describe the differences between the following architectures.
    a. no coupling
    b. loose coupling
    c. semi tight coupling
    d. tight coupling
4) Explain the Data Mining Query Languages
5) Design a Graphical User Interfaces Based on a DMQL

UNIT-IV

Concepts Description: Characterization and comparison: Data Generalization and Summarization- Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.

LEARNING OBJECTIVES:-

At the end of unit-IV student must be able to

- Explain concept description
- Explain Data Generalization and Summarization
- Explain the Analysis of Attribute Relevance
- Explain the Discrimination between Different Classes
- Describe the Mining Descriptive Statistical Measures in Large Databases

LECTURE PLAN:-

UNIT –IV : 8 hours

1st hr : Data Generalization and Summarization- Based Characterization,.
2nd hr: Data Generalization and Summarization- Based Characterization,
3rd hr: Analytical Characterization: Analysis of Attribute Relevance
4th hr: Mining Class Comparisons: Discriminating between Different Classes
5th hr: Mining Class Comparisons: Discriminating between Different Classes
6th hr: Mining Descriptive Statistical Measures in Large Databases
7th hr: Mining Descriptive Statistical Measures in Large Databases
8th hr: Mining Descriptive Statistical Measures in Large Databases

ASSIGNMENT –IV:-

1. Discuss why analytical characterization is needed and how it can be performed.
2. Compare the result of two induction methods: (1) with relevance analysis and (2) without relevance analysis.
3. Give three additional commonly used statistical measures for the characterization of data dispersion.
4. Outline a data cube-based incremental algorithm for mining analytical class comparisons.
5. Outline a method for (1) parallel and (2) distributed mining of statistical measures of data dispersion in a data cube environment.

UNIT-V

Mining Association Rules in Large Databases: Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transactional Databases, Mining Multilevel Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

LEARNING OBJECTIVES:-

At the end of unit-V student must be able to

- Define Association Rule Mining
- Explain Single-Dimensional Boolean Association Rules from Transactional Databases
- Explain Multi-Dimensional Boolean Association Rules from Transactional Databases
- Explain Multi-level Association Rules from Relational Databases
- Explain the Association Mining to Correlation Analysis
- Analyze the Constraint-Based Association Mining

LECTURE PLAN:-

UNIT –V : 8 hours

1st hr : Association Rule Mining
2nd hr: Mining Single-Dimensional Boolean Association Rules from Transactional Databases
3rd hr: Mining Single-Dimensional Boolean Association Rules from Transactional Databases
4th hr: Mining Multilevel Association Rules from Transactional Databases
5th hr: Mining Multilevel Association Rules from Transactional Databases
6th hr: Mining Multilevel Association Rules from Relational Databases and Data Warehouses

7th hr: Association Mining to Correlation Analysis
8th hr: Constraint-Based Association Mining

ASSIGNMENT –V:-

1) The Apriori algorithm makes use of prior knowledge of subset support properties.
    a) Prove that all nonempty subsets of a frequent item set must also be frequent.
    b) Prove that the support of any nonempty subset s' of item set s must be as great as the support of s.
2) Propose a method for mining hybrid-dimension association rules.
3) Give a short example to show that items in a strong association rule may actually be negatively correlated.

UNIT-VI

Classification and Prediction: Issues Regarding Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on concepts from Association Rule Mining, Other Classification Methods, Prediction, Classifier Accuracy.

LEARNING OBJECTIVES:-

At the end of unit-VI student must be able to

- What is Classification?
- What is Prediction?
- What are the Issues Regarding Classification and Prediction
- Decision Tree Induction
- Bayesian Classification method
- Classification by Back propagation
- Association Rule Mining
- Other Classification Methods
- Classifier Accuracy

LECTURE PLAN:-

UNIT –VI : 11 hours

1st hr : What is Classification? What is Prediction?
2nd hr: Issues Regarding Classification and Prediction
3rd hr: Classification by Decision Tree Induction
4th hr: Classification by Decision Tree Induction
5th hr: Bayesian Classification
6th hr: Classification by Back propagation
7th hr: Classification Based on concepts from Association Rule Mining
8th hr: Other Classification Methods
9th hr: Other Classification Methods
10th hr: Prediction
11th hr: Classifier Accuracy

ASSIGNMENT –VI:-

1) Why is tree pruning useful in decision tree induction? What is a drawback of using a separate set of samples to evaluate pruning?
2) Why naïve Bayesian classification is called "naïve"? Briefly outline the major ideas of naïve Bayesian classification.
3) Compare the advantages and disadvantages of eager classification versus lazy classification.
4) Write an algorithm for k-nearest neighbor classification given k and n, the number of attributes describing each example.
5) What is boosting? State why it may improve the accuracy of decision tree induction.

UNIT-VII :- SYLLABUS

Cluster Analysis Introduction: Types of Data in cluster analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

LEARNING OBJECTIVES:-

At the end of unit-VII student must be able to

- What is Cluster Analysis?
- What are the Types of Data in cluster analysis?
- Define various clustering methods.
- Explain the partitioning methods.
- Explain the Density-Based Methods
- Explain the Grid-Based Methods
- Explain the two approaches of Model-Based Clustering Methods
- Explain the various outlier detections.

LECTURE PLAN:-

UNIT –VII : 10 hours

1st hr : What is Cluster Analysis?
2nd hr: Types of Data in cluster analysis
3rd hr: Types of Data in cluster analysis
4th hr: A Categorization of Major Clustering Methods
5th hr: Partitioning Methods
6th hr: Density-Based Methods
7th hr: Grid-Based Methods
8th hr: Model-Based Clustering Methods
9th hr: Model-Based Clustering Methods
10th hr: Outlier Analysis

ASSIGNMENT –VII:-

1) Given the following measurements for the variable age:
18,22,25,42,28,43,33,35,56,28
Standardize the variable by the following:
a) Compute the mean absolute deviation of age.
b) Compute the z-score for the first four measurements.

2) Give an example of how specific clustering methods may be integrated, for example, where one clustering algorithm is used as a preprocessing step for another.
3) Why is outlier mining important?
4) Briefly describe the different approaches behind statistical-based outlier detection, distance based outlier detection, and deviation based outlier detection

UNIT-VIII

Mining Complex Types of Data: Multidimensional Analysis and Descriptive Mining of Complex Data objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Time-Series and Sequence Data, Mining Text Databases, Mining the World Wide Web.

LEARNING OBJECTIVES:-

- At the end of unit-VIII student must be able to
- What is generalization of structured data?
- What is aggregation and approximation?
- What are the analyses in mining spatial databases?
- What is mining multimedia databases?
- What are the analyses in Mining Time-Series and Sequence Data?
- Explain about the Mining Text Databases
- Describe the World Wide Web Mining.

LECTURE PLAN:-

UNIT –VIII : 9 hours

1st hr : Multidimensional Analysis and Descriptive Mining of Complex Data
2nd hr: Multidimensional Analysis and Descriptive Mining of Complex data
3rd hr: Mining Spatial Databases
4th hr: Mining Spatial Databases
5th hr: Mining Multimedia Databases
6th hr: Mining Time-Series and Sequence Data
7th hr: Mining Time-Series and Sequence Data
8th hr: Mining Text Databases
9th hr: Mining the World Wide Web.

ASSIGNMENT –VIII:-

1) Discuss how to process a descriptive mining query in such a system using a generalization-based approach.
2) Discuss how to handle set-oriented data in an object cube.
3) Each scientific or engineering discipline has its own subject index classification standard that is often used
   for classifying documents in its discipline.
   a) Design a Web document classification method that can be taking such a subject index to classify a set of web documents automatically.
   b) Discuss how to use Web linkage information to improve the quality of such classification.
   c) Discuss how to use Web usage information to improve the quality of such classification.