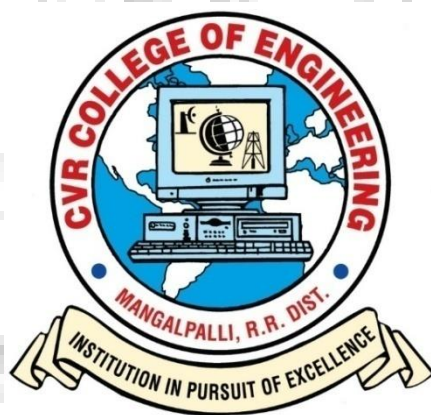


COURSE FILE
for
B.Tech. IV Year I Semester
DEPARTMENT OF INFORMATION TECHNOLOGY

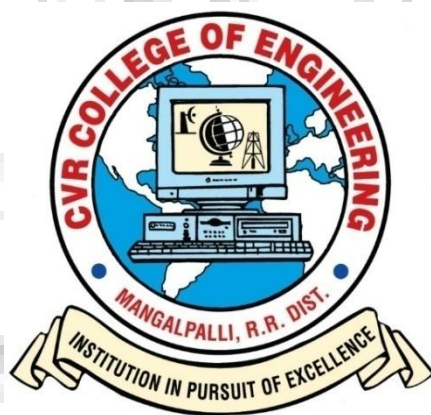


2021-2022

CVR COLLEGE OF ENGINEERING

(An Autonomous Institution)
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R.R. District. Pin: 501510
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COURSE FILE
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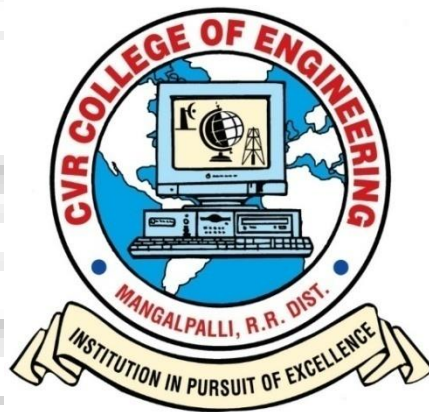


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COURSE FILE
For
B.Tech. IV Year I Semester
INTRODUCTION TO LINUX PROGRAMMING
DEPARTMENT OF INFORMATION TECHNOLOGY



2021-2022

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Course Objectives:

1. To enable the student in exploring open source development tools.
2. To make the student appreciate the command implementation in Linux.
3. To make the student familiar with inter command interaction with inter process communication standards.
4. To make the student realize network protocols are implementation as software.



INTRODUCTION TO LINUX PROGRAMMING

Instruction	: 3 Periods / week	Continuous Internal Evaluation	: 30 Marks
		Semester End Examination	: 70 Marks
Credits	: 3	Semester End Exam Duration	: 3 Hours

Prerequisites:

1. Problem Solving through C
2. Operating Systems
3. Computer Organization
4. Computer Networks.

Unit I

Introduction to Linux:

Linux Architecture, Kernel features, System calls vs Library functions. Basic Commands **echo**, **passwd**, **uname**, **date**, **cal**, **man**.

Simple Filters: Filters and Pipes, **cat**, **grep**. **awk** as command and writing **awk** scripts.

GNU Development Tools: Handling Multisource C Applications using make utility. Building Static and Shared Libraries.

Unit II

Introduction to File system:

Basics of File system Implementation, i-nodes, File permissions, File attributes and types of files, changing the file attributes using **chmod**, **umask**. Hierarchical structure of file system. Hard links and symbolic links.

File Handling using System calls: File descriptors, open, read, write, close, dup, dup2, fcntl, stat.

Directory API: Directory structure, directory access with **opendir ()** and **readdir ()**.

Unit III

Processes and Signals:

Process: – Process concept, Kernel support for process, process attributes, process control process creation with **fork ()**, **vfork ()**, **exec ()** family system calls. Waiting for a process, process termination, zombie process, orphan process. **Exit ()** and **atexit ()** functions.

Signals – Introduction to signals, Signal generation and handling with signal, sigaction, kill, raise, alarm, pause, abort, sleep functions.

Unit IV

Inter Process Communication-1:

Pipes: Unnamed pipes and named pipe APIs. Sample programs.

System V IPC: Common Data Structures and system calls of System V IPC.

Message Queues: Message Queue system calls. Sender receiver, Client Server examples.

Unit V

Inter Process Communication-2:

System V Shared Memory and Semaphores: System V APIs for shared memory and semaphores. Sample applications with shared memory and semaphores.

Multi-Threading using PThreads: Differences between threads and processes. POSIX Thread APIs, Creating Threads. Thread Synchronization with POSIX semaphores, Mutexes and Condition variables. Example programs.

Socket Programming: Socket API. Simple TCP and UDP Client Server programs

Course outcomes: At the end of the course, the student will be able to

- CO 1 : Apply the concepts of basic commands, filters and write simple scripts to automate application building.
- CO 2 : Appreciate File abstraction and understand the implementation of basic commands on files and directories using system calls and library functions.
- CO 3 : Demonstrate process abstraction and event handling through signal dispositions.
- CO 4 : Implement concurrent applications using Processes and Thread API.
- CO 5 : Demonstrate process communication semantics using SVR4 IPC objects and sockets.

Text Books:

1. Graham Glass, Kigables, Unix for programmers and users, 3rd Edition, Pearson Education, 2003.
2. W. R. Stevens, Advanced Programming in the Unix environment, 3rd Edition, Pearson Education, 2013.
3. WR Stevens, Unix Network Programming, 1st Edition, PHI, 1990.

References:

1. Richard Stones, Mathew Neil, Beginning Linux Programming, 4th Edition, Wrox publication.
2. T. Chan, Unix System Programming using C++, PHI.
3. Unix Internals, UreshVahalia, Pearson Education.

Lecture Schedule for Introduction to Linux Programming

SNO	TOPIC	Periods
	Unit I: Introduction to Linux	
1	Linux Architecture, Kernel Features	1
2	System calls vs Library functions	1
3	Linux directory structure, file commands	1
4	Commands echo, passwd, uname, date, cal, man	2
5	Filters and Pipes: cat, grep, awk scripts	4
5	GNU Development Tools: multi-source C applications, make	2
6	Static and Shared Libraries	2
	UNIT – I Total Number of classes	13
	Unit II: Introduction to File System	
1	Basics of file system implementation, i-nodes	1
2	File Attributes, File types chmod, umask	1
3	Hierarchical structure of file system	1
4	File Handling system calls: open, close, read, write	3
5	File control system calls dup, dup2, fcntl, stat	2
6	Directory API: opendir() and readdir()	2
	UNIT II Total Number of Classes	10
	UNIT III: Process and Signals	
7	Process concept and Kernel support for process	1
8	Process attributes, process control and process creation fork() vfork()	2
9	Exit(), atexit(), wait() calls and zombie processes	2
10	Introduction to signals	1
11	Signal generation and handling	1
12	Kernel support for signal, Signal function, unreliable signal, reliable sig	1
13	kill, raise, alarm, pause, abort, sleep functions	1
	UNIT III Total Number of Classes	9
	UNIT IV: Inter Process Communication-1	
14	Introduction to IPC.	1
15	Pipes, FIFOs.	4
16	Introduction to three types of IPC.	1
17	System V Message queues.	3
	UNIT IV Total Number of Classes	9
	UNIT V: Inter Process Communication-2	
18	System V Shared Memory API	1
19	System V Semaphores and Sample programs	2
20	Differences between threads and processes	1
21	POSIX Thread APIs , Thread creation	1

22	Thread Synchronization with semaphores & mutexes	1
23	Condition variables	1
24	Introduction to Sockets	1
25	TCP Sockets and client-server interaction programs	2
26	UDP Sockets and client-server interaction programs	2
		12
Total No. of Classes		62

Subject vs. PO'S Mapping Course to PO, PSO Mapping

COURSE	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3	PS O4
Introduction to Linux Programming	3	-	2	-	3	-	-	-	-	-	-	3	3	2	1	2

Course Outcome to PO, PSO Mapping

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3	PS O4
CO 1	3	-	2	-	3	-	-	-	-	-	-	2	3	2	1	2
CO 2	2	-	2	-	2	-	-	-	-	-	-	2	2	2	2	3
CO 3	-	-	2	-	2	-	-	-	-	-	-	3	2	2	2	3
CO 4	2	-	2	-	3	-	-	-	-	-	-	3	2	2	2	3
CO 5	2	-	-	-	2	-	-	-	-	-	-	3	1	2	3	3

Subject vs. PEO'S Mapping

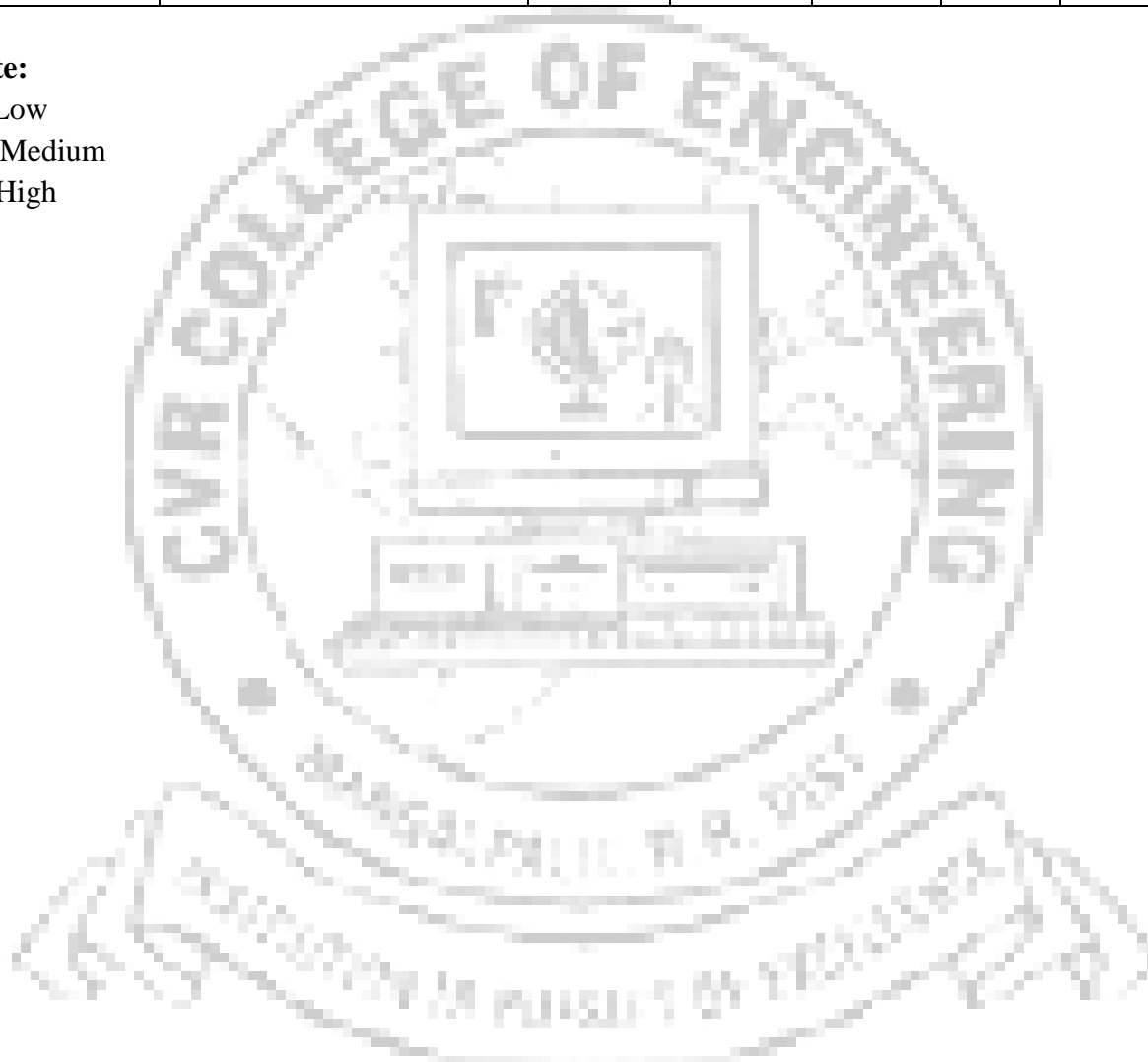
Course Code	Course Name	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5
67401	Introduction to Linux Programming	H	M	-	L	-

Note:

L: Low

M: Medium

H: High



UNIT – I

Short Questions

1. What is the difference between monolithic and micro kernel architectures?
2. How can you say that Linux kernel is modular
3. What is the difference between system call and a library function?
4. What do you mean by a filter?
5. Draw the flow chart how **grep** utility works?
6. A file contains **sales** details of years 2018, 2019, 2020 and 2021 in different columns with tab separated fields. Write an **awk** script to calculate the total sales in each year and average sales of all years.
7. Describe various options of **uname** command

Essay Questions

1. Draw the Linux kernel structure with its modular architecture and explain various features of it.
2. An executable project implemented in C programming language has the files **module1.h, module2.h, module3.h, main.c, module1.c, module2.c and module3.c**. Write a Make file to generate the executable for the project.
3. What is the difference between static and dynamic libraries in Linux.
4. A C library project has the files **module1.h, module2.h, module3.h, module1.c, module2.c and module3.c**. Write the commands to generate static library and dynamic libraries for this project.

UNIT – II

Short Questions

1. List File types in LINUX.
2. Explain about the standard I/O and formatted I/O in C.
3. Explain file descriptors in Linux.
4. What is the advantage of **dup2()** system call
5. Differentiate hard link and symbolic links to a file.
6. Write the usage of various flags in open () system call
7. What are the contents of an i-node?
8. Write the prototypes and usage of **stat** system calls.

Essay Questions

1. Discuss in detail about File System Implementation Structure of Linux.
2. Explain about kernel support for files in Linux with example.

3. Explain about System calls in Linux with example.
4. Explain File access related system calls in Linux?
5. Write a program to copy contents of one file into to other file using system calls and command line arguments
6. What is file record locking?
7. Explain file and directory management in Linux
8. Write about Directory file APIs in Linux? Write a program to list the directory contents similar to **ls -l** command using directory API.

UNIT – III

Short Questions

1. Explain process and process attributes.
2. What is a Zombie process and how to avoid such process?
3. Explain Orphan process.
4. Write the prototype of **wait ()** system calls and the macros to know the exit status of a process.
5. Write the prototype of **signal()** system call in Linux.

Essay Questions

1. Explain Process creation and states of process in Linux with neat diagram.
2. Explain Signal generation and handling in Linux.
3. What is a process? Explain with example functions related to process creation, process control and process termination.
4. a) Differentiate between fork and vfork system calls.
b) Explain with the help of diagram how files are shared between processes.
5. a) What does wait and waitpid functions do?
b) What is a race condition? Write program to indicate race conditions.
6. Compare and contrast functions with examples.
7. a) What is system function? In what way it helps the programmer.
b) How process accounting is done? What times are measures? Explain.
8. a) What is a signal in Unix context? Classify signals.
b) Give the prototype of signal function. Explain its semantics. Use the same in an example program and explain its working.
9. a) Differentiate between SIGCLD and SIGCHLD.
b) What are signals sets? Discuss their functionality.
10. Discuss kill and raise functions in the context of signals giving an example program.

UNIT-IV

Short Questions

1. Write the proto-type to create a pipe? Explain how both ends of pipe are used in IPC?
Explain Pipes with example.
2. What are the differences between pipe and FIFOs? How do you create them? What are the limitations of pipe and FIFO
3. Write the prototypes of System V message queue functions
a) msgget b) msgsnd c)msgctl
4. Write the prototypes of System V shared memory functions
a) shmget b) shmctl c) shmat d) shmdt
5. How does kernel support System V shared memory?
6. What is the significance of type field in message queue?
7. When receiver get blocked increase of msg queue?
8. What is the significance of IPC_NOWAIT flag?

Essay Questions

1. a) Compare and contrast pipes and stream pipes.
b) Write a C program to send data from parent to child over a pipe.
2. a) What are FIFOs? What are its limitations?
b) What are the uses of FIFOs? Explain their usage with an example each.
3. a) What data structures are associated with IPC? Discuss their advantages and disadvantages.
4. What system calls are associated with message queues? Discuss their prototypes.
5. a) How semaphores are different from other mechanisms of IPC? Explain.
b) Explain with examples the data structures and system calls associated with semaphores.
6. In what way shared memory mechanism is different with other types of IPC? Give your reasons.
7. Enumerate system calls associated with shared memory. Explain their usage with an example program.
8. Write a program that does the following. Execute a loop five times creates a message queue, print the queue identifier, delete the message queue. Then execute the next loop five times, create message queue with a key of IPC-PRIVATE, and plan a message on the queue. After the program terminates look at the message using rpcs(1) Explain what is happening with queue identifiers.
9. Describe how to build a linked list of data objects in shared memory segment. What would you store as the last pointers?

UNIT V

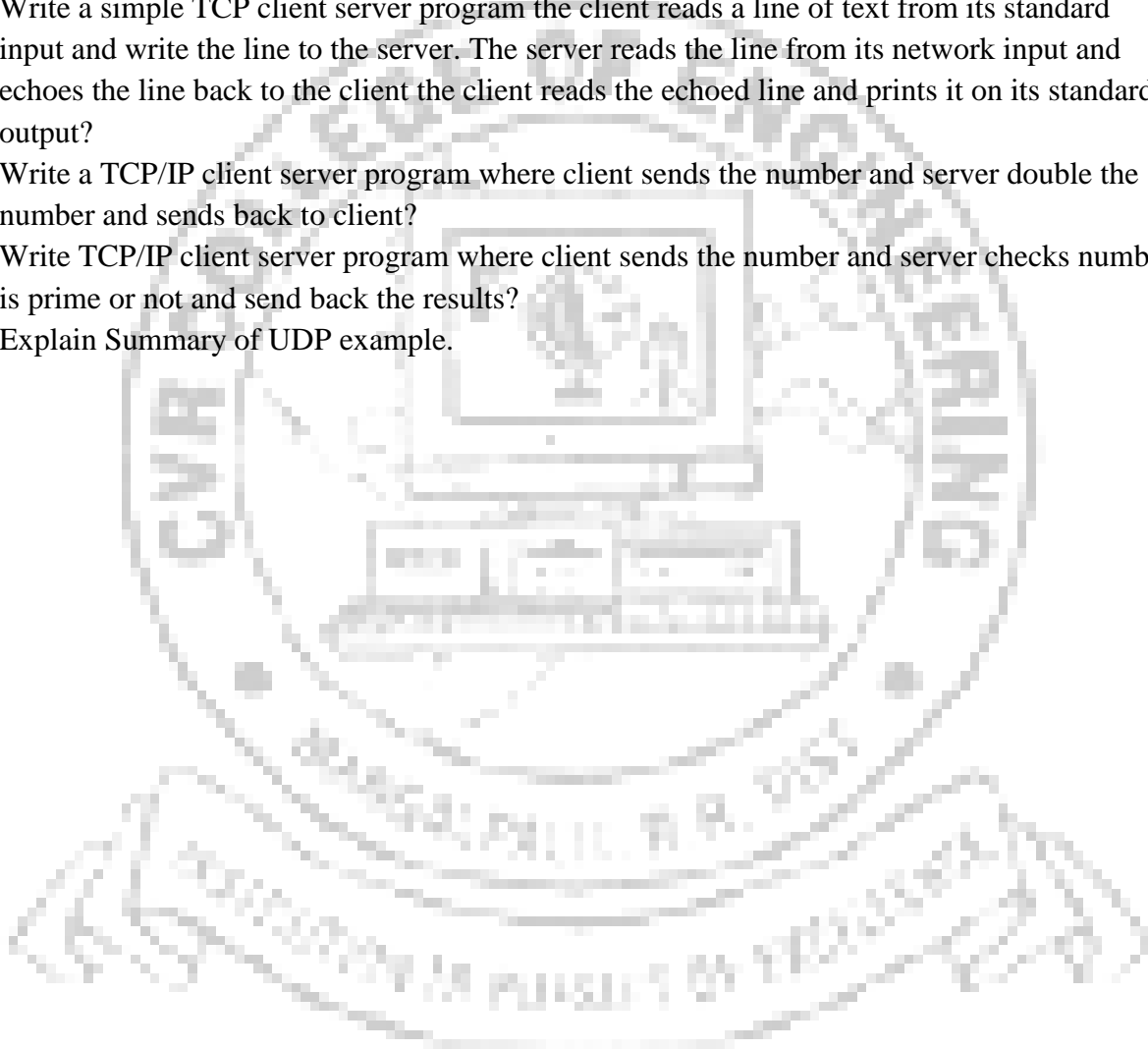
Short Questions

1. Explain about semaphores.
2. Explain about shared memory.
3. Explain with example semaphores.
4. Explain with example shared memory.
5. Explain the concept of shared memory with example.
6. Write down the differences between threads and process
7. Explain uses of Threads.
8. What is light weight Process.
9. Write about Thread attributes.
10. Explain Mutex in Linux.
11. Write short notes on IPV4 and IPV6 Socket address structures.
12. Explain all socket system calls with syntax.
13. Give the syntax of a socket function.
14. Give the syntax of a bind() function .
15. Write all socket system calls used at client side.
16. Write all socket system calls used at server side.
17. Give the syntax of a close () function.
18. Explain UDP Echo server function.
19. What is lost datagram and explain it with neat diagram.
20. What is Remote login and briefly explain about it.

Essay Questions

1. Explain Unix system V APIs for shared memory.
2. How semaphores are different from other mechanisms of IPC? Explain.
3. Explain with examples the data structures and system calls associated with semaphores.
4. In what way shared memory mechanism is different with other types of IPC? Give your reasons.
5. Enumerate system calls associated with shared memory. Explain their usage with an example program.
6. What is a thread in Linux environment? Why to use threads?
7. Explain the thread structure?
8. What is multithreading?
9. Differentiate between multi threaded and multi process programming?
10. Explain in detail the differences between threads and process?

11. How a thread is created and destroyed?
12. What is a condition variable?
13. In how many ways threads can be synchronized? Explain how threads can be synchronized with mutex and semaphores?
14. What synchronization primitives do you know? write down differences between them
15. Explain the groups and sub routines that comprise the pthreads API?
16. Compare the following Socket address .IPV4, IPV6, in Unix Data link.
17. Draw the neat diagram of socket functions for elementary TCP client/server.
18. Write a simple TCP client server program the client reads a line of text from its standard input and write the line to the server. The server reads the line from its network input and echoes the line back to the client the client reads the echoed line and prints it on its standard output?
19. Write a TCP/IP client server program where client sends the number and server double the number and sends back to client?
20. Write TCP/IP client server program where client sends the number and server checks number is prime or not and send back the results?
21. Explain Summary of UDP example.





CVR COLLEGE OF ENGINEERING
UGC Autonomous Institution - Affiliated to JNTUH
B.Tech. IV Year 1st Sem. – I Mid Exam, Model Paper

Subject: Linux Programming

Branch: IT

Date:

Time: 2 hours

Max. Marks: 40

Answer **all questions** of Part – A and any **three** questions of Part – B.

Part – A

2x5 = 10 marks

1. Draw the flow chart to illustrate the functionality of **grep**. CO1
2. How can you add *holes* in a text file? CO2
3. What are the signals which we can't override the default functionality? CO3
4. If a C program invokes 5 consecutive calls to *fork()*, how many processes are created as a result? CO3
5. What is the importance of *O_CLOEXEC* flag? How do you use it? CO1

Part – B

10x3 = 30 marks

6. a) Take an example project containing files file1.c, file2.c, file3.c and main.c. Write a make file to build the project? 5M CO1

b) Write a C function to copy the content of one file into a new destination file. 5M

(OR)

7. a) What is the use of *dup()* and *dup2()* functions? 5M CO2

b) Write a program in which parent process handles *SIGCHLD* signal. 5M

10. Write a C program to implement *ls -l* command. 10M CO2

(OR)

11. Write a C program to create parent and child processes sharing global variable. 10M CO2

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CVR COLLEGE OF ENGINEERING

An UGC Autonomous Institution - Affiliated to JNTUH

B.Tech. IV Year I Sem. II MID Examinations – Model Paper

Subject: **Linux Programming**

Branch: IT

Date:

Time: 2 hours

Max. Marks: **40**

PART – A

Answer **ALL** questions

5x2 = 10 M

1. What is the difference between pipe and FIFO. CO4
2. Explain the usage of *mkfifo*. CO4
3. What is the difference between mutex and semaphore? CO5
4. Write the proto type of pthread condition variable functions. CO5
5. Why do you use byte order changing functions in socket programming? CO5

PART – B

Answer **ALL** questions

3x10= 30M

6. Write a program to illustrate Message Queue communication between client and server. 10M
(OR) CO4

7. Implement shell pipe using pipes. 10M

8. a) What are the differences between thread and a process 4M CO4

b) Write a C program to create two threads where one thread prints odd numbers up to *limit* and other thread prints even numbers up to *limit* where *limit* is passed as parameter to thread.

6M CO4

(OR)

9. a) Describe the kernel support for shared memory 4M CO5

b) Write the sequence diagram of socket API calls TCP Client Server communication.

10. Implement UDP Echo server and client programs 10M CO5

(OR)

11. Implement Reader-Writer problem using System V semaphores. 10M CO5



CVR COLLEGE OF ENGINEERING

An UGC Autonomous Institution - Affiliated to JNTUH

B.Tech. IV Year I Sem. Main Examinations Model Paper

Subject: Linux Programming

Branch: IT

Date:

Time: 3 hours

Max. Marks: 70

PART – A

Answer **ALL** questions

5x2 = 10 M

- Write an awk script to find the total sales in a file containing fields Year, Sales?
- Describe various fields of an i-node?
- What is a zombie process?
- What are the signals that can not be overridden?
- Write the command to create a named pipe?
- What is the advantage of shared memory communication?
- What is the difference between a process and a thread?
- Why do we use byte ordering functions in socket programming?
- Write an example socket call to create IPv6 TCP socket.
- Write the prototype of *stat* system call?

PART – B

Answer ALL questions

3x10= 30M

- A) Write a shell script to count different users having /root as home directorie taking the file /etc/passwd as input file **5M**
- Write an example make file to create static library from the files file1.c file2.c file3.c **(OR)**

- A) Explain the functionality of **grep** using a flowchart. **4M**
- Explain various components of Linux kernel **6M**
- a) What is the difference between hard link and symbolic link? **4M**
- Write a C program to read the contents of a file using system calls **6M**

(OR)

- a) Explain the standard directory API **4M**
- Write a C program to read the contents of a directory. **6M**
15. a) What is the difference between fork () and vfork () **4M**
- Write a program to create child process and parent displays the exit status of child. **6M**

(OR)

16. a) What is the difference between reliable and unreliable signals **4M**

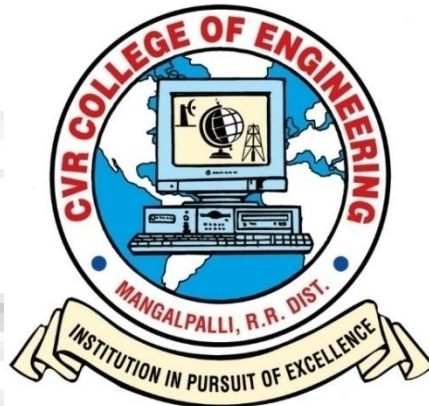
- b) Write a C program to handle SIGCHLD 6M
17. Write a C program to illustrate the functionality of command line pipe 10M
(OR)
18. Write a C program to illustrate message queue communication 10M
19. a) What is the difference between TCP and UDP sockets 4M
- b) Write the generic structure of TCP Server program. 6M
(OR)
20. Write a program for UDP Client Server communication 10M



COURSE FILE
For
B.Tech. IV Year I Semester

CRYPTOGRAPHY AND NETWORK SECURITY

DEPARTMENT OF INFORMATION TECHNOLOGY



2021-2022

CVR COLLEGE OF ENGINEERING

(An Autonomous Institution)

Vastunagar, Mangalpalli (V), Ibrahimpatan (M),
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Web: <http://cvr.ac.in>

Course Objectives:

1. Understand security concepts, Ethics in Network Security.
2. Understand security threats, and the security services and mechanisms to counter them.
3. Comprehend and apply relevant cryptographic techniques.
4. Comprehend security services and mechanisms in the network protocol stack.
5. Comprehend and apply authentication services and mechanisms.
6. Comprehend and apply email and web security services and mechanisms.
7. Comprehend computer and network access control.



CRYPTOGRAPHY AND NETWORK SECURITY

Instruction: 3 Periods / week
Marks

Continuous Internal Evaluation: 30

Credits: 3

Semester End Examination: 70 Marks

Semester End Exam Duration : 3 Hours

Prerequisites:

1. Mathematical Foundations of Computer Science
2. Computer Networks

Unit I

Security Attacks (Interruption, Interception, Modification and Fabrication), Passive and Active Attacks, Security Services (Confidentiality Authentication, Integrity, Non-repudiation, Access Control and Availability) and Mechanisms, A Model for Internetwork Security, Steganography, Internet Standards and RFCs

Unit II

Symmetric Encryption Principles, Symmetric Block Encryption Algorithms, Cipher Block Modes of Operation, Location of Encryption Devices, Key Distribution, Approaches of Message Authentication, Secure Hash Functions and HMAC.

Public-Key Cryptography Principles, Public-Key Cryptography Algorithms, Digital Signatures, Key Management.

Unit III

Kerberos, X.509 Directory Authentication Services, Public-Key Infrastructure. Electronic Mail Security: Pretty Good Privacy (PGP) and S/MIME.

Unit IV

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations, Key Management. Web Security Considerations, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

Unit V

Basics Concepts of SNMP, SNMPv1 Community facility and SNMPV3, Intruders, Viruses and Related Threats.

Firewall Design Principles, Trusted Systems, Intruder Detection Systems, Common Criteria for Information Technology Security Evaluation.

Course outcomes: At the end of the course, the student will be able to

CO 1: Understand the theory of fundamental cryptography, encryption and decryption algorithm.

CO 2: Build a secure authentication system.

CO 3: Understand the key management principles and implement the digital signature.

CO 4: Develop the secured IP and the secured Web for electronic transactions.

CO 5: Familiarize with the classification of intruders, viruses and study the mechanisms to counter them and be familiar with the concepts of Firewalls, Trusted systems and IDS.

Text Books:

1. William Stallings, Network Security Essentials: Applications and Standards, 4th Edition Pearson Education.
2. B.A. Forouzan and D. Mukhopadhyay, Cryptography and Network Security, TMH, 2nd Edition, TMH. 2010.

References:

1. William Stallings, Cryptography and Network Security, 3rd Edition, PHI/Pearson.
2. Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn IdoDubrawsky, Steve W. Manzuik, Ryan Permech, Wiley Dreamtech, Hack Proofing your Network, 2nd Edition, Wiley Dreamtech.
3. Robert Bragg, Mark Rhodes, Network Security: The Complete Reference, TMH.

COURSE OUTCOMES

At the end of the course, the student will be able to

CO 1: Students will be able to understand the theory of fundamental cryptography, encryption, and decryption algorithm.

CO 2: Students will be able to build a secure authentication system.

CO 3: Students will be able to understand the key management principles and implement the digital signature.

CO 4: Students will be able to develop the secured IP and the secured Web for electronic transactions.

CO 5: Students will be familiar with the classification of intruders, viruses and study the mechanisms to counter them and be familiar with the concepts of Firewalls, Trusted systems and IDS.

Course to PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
	2	2	2	2	-	2	-	-	-	-	-	2	2	2	2	2

Course Outcome to PO Mapping

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO 1	2	2	2	-	-	-	-	-	-	-	-	-	2	-	-	-
CO 2	2	2	2	-	-	-	-	-	-	-	-	2	-	2	2	-
CO 3	2	-	2	-	-	-	-	-	-	-	-	2	-	2	2	-
CO 4	-	-	2	2	-	-	-	-	-	-	-	2	-	-	-	2
CO 5	2	2	2	2	-	2	-	-	-	-	-	2	-	-	-	1

1 Low 2 Moderate 3 High

LECTURE SCHEDULE

UNIT-I: Introduction		
S. No.	Topic	No. of periods
1	Security Attacks	1
2	Security Services	1
3	Mechanisms	1
4	A Model for Network Security	1
5	Steganography	1
6	Internet Standards and RFCs	2
Total Number of Classes		07
UNIT-II:		
7	Symmetric Encryption Principles	1
8	Symmetric Block Encryption Algorithms	4
9	Cipher Block Modes of Operation	1
10	Location of Encryption Devices	1
11	Key Distribution	1
12	Approaches of Message Authentication	1
13	Secure Hash Functions and HMAC	2
14	Public Key Cryptography Principles	1
15	Public Key Cryptography Algorithms	2
16	Digital Signatures	1
17	Key Management	1
Total Number of Classes		16
UNIT-III		
18	Kerberos	3
19	X.509 Directory Authentication Service	2
20	Public-Key Infrastructure	1
21	Email Privacy (Pretty Good Privacy PGP)	3
22	S/MIME	3
Total Number of Classes		12
UNIT-IV:		
23	IP Security Overview	1
24	IP Security Architecture	1
25	Authentication Header	1
26	Encapsulating Security Payload	2
27	Combining Security Associations and Key Management	2
28	Web Security Requirements	1
29	Secure Socket Layer and Transport Layer Security (TLS)	3
30	Secure Electronic Transaction (SET)	3
Unit IV Total Number of Classes		14
UNIT-V:		
31	Basic Concepts of SNMP	2

32	SNMPv1 Community Facility and SNMPv3	3
33	Intruders	2
34	Viruses and related Threats	2
35	Firewall Design Principles	1
36	Trusted Systems	2
37	Common criteria for Information Technology Security Evaluation.	2
Unit V Total Number of Classes		14
TOTAL NUMBER OF CLASSES		63



UNIT-I

Short Questions

1. What is network security?
2. What is a Security Attack?
3. What are security services?
4. Define the terms confidentiality and authentication.
5. Differentiate between active attack and passive attack.
6. What is non-repudiation?
7. What is Denial of Service?
8. What is steganography?
9. What is RFC? Briefly explain.

Essay Questions

1. Briefly discuss the model for network security.
2. Explain in detail about the security attacks and security services.
3. Write about various security mechanisms.
4. Explain the internet standards and RFCs in detail.
5. Write short notes on Steganography.

UNIT-II

Short Questions

1. What is cryptography?
2. What are the dimensions used for classifying cryptographic algorithms?
3. What is the difference between a block cipher and a stream cipher?
4. What are the essential ingredients of symmetric cipher?
5. What are the design parameters of Feistel cipher network?
6. How many rounds are there in DES algorithm?
7. What are the strengths of DES?
8. What are block cipher modes of operation?
9. What are the advantages and disadvantages of Electronic Code Book mode?
10. What are the different approaches for attacking a cipher?
11. What is digital signature?
12. What is the difference between link and end-to-end encryption?
13. Define weak collision property of a hash function.
14. Differentiate between MAC and hash function.
15. What is the basic idea behind HMAC?
16. What is Key Distribution Center?
17. What is MD5?
18. What are the differences between Symmetric and Asymmetric cryptography?

19. What are the keys involved in public-key cryptography?
20. Which key is used for digital signature?
21. Who provides digital certificates?
22. What are the applications of public-key cryptography?

Essay Questions

1. Describe in detail about different block cipher modes of operation.
2. Explain in detail about the conventional encryption principles.
3. Narrate the strength of DES algorithm with its vital steps and an illustration.
4. Explain in detail about AES Algorithm.
5. Explain SHA-1 algorithm in detail.
6. Explain in brief Secure Hash Functions and HMAC.
7. Briefly discuss the public-key cryptography principles.
8. Explain in detail about the public-key cryptography algorithms.
9. Explain in detail about RSA algorithm with an example.
10. Explain Diffie-Hellman key exchange algorithm in detail.
11. What is Meet-in-the-Middle attack?
12. Write the Key Management issues in detail.

UNIT-III

Short Questions

1. What is Kerberos?
2. What is IDC in Kerberos?
3. Who issues the tickets to users who have been authenticated to AS?
4. Should a Kerberos have UID and Passwords? Justify your answer.
5. What are the requirements of Kerberos protocol?
6. What is X.509 service?
7. Define forward certificates.
8. Define reverse certificates.
9. What is one-way authentication?
10. What is two-way authentication?
11. What is three-way authentication?
12. What is policy mapping?
13. What are the services provided by PGP?
14. What are the notations in PGP, K_s , KR_a , KU_a , EC, DC?
15. What is authentication in PGP?
16. What is confidentiality in PGP?
17. How digital signature is generated?
18. What is compression?

19. What is email compatibility in PGP?
20. Define segmentation in PGP.
21. Define reassembly in PGP.
22. What are key rings?
23. What is time stamp?
24. What is message digest?
25. What is private key ring?
26. What is public key ring?
27. What is multipart type?
28. What is message/partial subtype?
29. What is enveloped data?
30. What is signed data?
31. What is registration in S/MIME?
32. What is secure mailing list?

Essay Questions

1. Briefly explain about the Kerberos version 4 and its motivation.
2. Narrate shortly regarding X.509 authentication services.
3. Explain the differences between public key encryption and symmetric key encryption.
4. What is PGP? Briefly discuss its operational descriptions.
5. Explain in detail about the cryptographic key and key rings in PGP.
6. Explain the public key management in PGP.
7. Briefly narrate the MIME overview, content types, transfer coding and a multipart example.
8. Briefly summarize the S/MIME functionality.

UNIT-IV

Short Questions

1. Write two applications of IP Security.
2. Write two benefits of IP Security.
3. What are the IP security services?
4. What is SPI?
5. What is anti replay window?
6. What are SA selectors?
7. What is transport mode?
8. What is tunnel mode?
9. What is replay attack?
10. What is integrity check value?
11. What is padding?
12. What are the fields in ESP format?

13. What is virtual private network?
14. What is security association bundle?
15. What is transport tunnel bundle?
16. Write the two types of key management.
17. Define cookie exchange.
18. What is proposal payload?
19. What is transform payload?
20. What is certificate payload?
21. What is hash payload?
22. What is nonce payload?
23. What are the web security threats?
24. What is SSL?
25. What is master secret?
26. What is sequence number?
27. What is message integrity?
28. Write the difference between fragmentation and compression.
29. What is alert protocol?
30. What is handshake protocol?
31. What is pseudo random function?
32. What is record overflow?
33. What is no renegotiation?
34. What is padding?
35. What is merchant authentication?
36. What is integrity of data in SET?
37. What is the purpose of dual signature in SET protocol?
38. What is payment gateway?
39. What is dual signature?
40. What is initial response?
41. What is capture reversal?
42. What is card holder certificate?

Essay Questions

1. What is IP Security? Briefly discuss its applications.
2. Explain in detail about the IP Security Architecture.
3. Write the Authentication Header in IP Security.
4. Briefly narrate the Encapsulating Security Payload.
5. Briefly explain the concept of combining Security Associations.
6. Explain the Key Management in IP Security.
7. Explain in detail about the SSL architecture and SSL record protocol.
8. Write in detail the handshake protocol.
9. Briefly narrate the cryptographic computations and transport layer security.

10. What are the differences between SSL and TSL?
11. Explain the Secure Electronic Transaction in detail.
12. Explain the payment processing and payment authorization in SET.

UNIT-V

Short Questions

1. What is Management system?
2. What are the components of SNMP?
3. What is Management Agent?
4. What is Management Information Base?
5. What is SNMP?
6. What are proxies?
7. What is SNMP community?
8. What is access policy?
9. What is SNMP community profile?
10. What is proxy service?
11. What is traditional SNMP manager?
12. What is traditional SNMP agent?
13. Which application makes use of the send PDU and process Response PDU dispatcher primitives?
14. What is command responder application?
15. What is notification receiver application?
16. What is masquerade?
17. What is disclosure?
18. What is denial of service?
19. What is SNMP engine boots?
20. What is MIB context?
21. What is misfeasor?
22. What is one-way encryption?
23. What is proactive password checker?
24. What is intrusion detection?
25. What is rule based detection?
26. What is trap door and logic bomb?
27. What is Trojan horse?
28. What is macro virus?
29. What is virus signature scanner?
30. What are various anti-virus techniques?
31. What is a firewall?
32. What is packet filtering router?
33. What is IP address spoofing?

34. What is source routing attack?
35. What is application-level gateway?
36. What is circuit level gateway?
37. What is screened subnet firewall?
38. What is access matrix?
39. What is multilevel security?
40. What is simple security property?
41. What is trusted system?
42. What is Trojan horse defense?
43. What is IDS?
44. Name few IDS techniques.
45. What is verifiability?
46. What is complete mediation?
47. What are capability tickets?
48. What are tiny fragment attacks?
49. What is bastion host?
50. What is the difference between Host based IDS and Network based IDS?
51. What are the advanced persistent Threats?

Essay Questions

1. What are the basic concepts of SNMP?
2. Discuss briefly about the SNMPV1 community facility.
3. Write the SNMP architecture and its terminology.
4. What is message processing and the user security modes in SNMPV3?
5. Discuss briefly about the intruders.
6. Explain the concepts of viruses and its types.
7. Explain the design principles of firewall.
8. Discuss briefly about the types of firewalls and its application.
9. Discuss briefly about the trusted systems.
10. Explain in detail about the different IDS techniques.
11. Write short notes on Host based IDS, Network based IDS, Anomaly based IDS, Statistical based IDS.
12. Write short notes on Advanced Persistent Threats.



CVR COLLEGE OF ENGINEERING
UGC Autonomous Institution - Affiliated to JNTUH
B.Tech. IV Year 1st Sem. – I Mid Exam, Model Paper

Subject: **Cryptography and Network Security**

Branch: IT

Date:

Time: 2 hours

Max. Marks: 40

Answer **all questions** of Part – A and any **three** questions of Part – B.

Part – A

2x5 = 10 marks

- | | | |
|----|---|-----|
| 1. | Define the terms confidentiality and authentication. | CO1 |
| 2. | Differentiate between active attack and passive attack. | CO1 |
| 3. | List out the importance of one-time pad | CO2 |
| 4. | List out any three principles of public-key cryptography. | CO2 |
| 5. | Give the role of TGS in Kerberos Version-4. | CO3 |

Part – B

10x3 = 30 marks

- | | | | |
|-----|---|-----|-----|
| 6. | Explain in detail about different security attacks with suitable examples. | 10M | CO1 |
| | (OR) | | |
| 7. | Draw the network security model and explain each of its components. | 10M | CO1 |
| 8. | Elaborate different block chaining modes of operations with its merits. | 10M | CO2 |
| | (OR) | | |
| 9. | How is Diffie Hellman key exchange algorithm works? Explain with an example. | 10M | CO2 |
| 10. | Describe in detail about Kerberos Version 4 with its importance. | 10M | CO3 |
| | (OR) | | |
| 11. | Narrate the significance of Public Key Infrastructure with a schematic diagram. | 10M | CO3 |
-



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B.Tech. III Year II Sem. II MID Examinations – Model Paper

Subject: Cryptography and Network Security

Branch: IT

Date:

Time: 2 hours

Max. Marks: **40**

PART – A

Answer **ALL** questions

5x2 = 10 M

- | | |
|--|-----|
| 9. Define segmentation and reassembly in PGP | CO3 |
| 10. List out the importance of security association bundle? | CO4 |
| 11. Give the significance of transport tunnel bundle? | CO4 |
| 12. What is the indispensable role of virus signature scanner? | CO5 |
| 13. What are the components of SNMP? | CO5 |

PART – B

Answer **ALL** questions

3x10= 30M

- | | |
|--|-----|
| 14. Explain the public key management in PGP. | CO3 |
| (OR) | |
| 15. Briefly narrate the MIME overview, content types, transfer coding and a multipart example. | CO3 |
| 16. Explain in detail about the IP Security Architecture. | CO4 |
| (OR) | |
| 17. Explain in detail about the SSL architecture and SSL record protocol. | CO4 |
| 18. Enumerate in detail about the types of firewalls with its application. | CO5 |
| (OR) | |
| 19. Write short notes on Host based IDS and Network based IDS with an example. | CO5 |



CVR COLLEGE OF ENGINEERING

An UGC Autonomous Institution - Affiliated to JNTUH

B.Tech. IV Year I Sem. Main Examinations Model Paper

Subject: Cryptography and Network Security

Branch: IT

Date:

Time: 3 hours

Max. Marks: 70

PART – A

Answer **ALL** questions

5x2 = 10 M

1. Define Denial of Service attack? CO1
2. List out the need for enforcing steganography. CO1
3. What is the difference between a block cipher and a stream cipher? CO2
4. What are the essential ingredients of symmetric cipher? CO2
5. Should a Kerberos have UID and Passwords? Justify your answer. CO3
6. What is the importance of segmentation and reassembly in PGP? CO3
7. What are the fields in ESP format? CO4
8. Specify the purpose of dual signature in SET protocol? CO4
9. What is the difference between Host based IDS and Network based IDS? CO5
10. What are the advanced persistent Threats? CO5

PART – B

Answer **ALL** questions

3x10= 30M

11. Write about various security mechanisms. CO1
(OR)
12. Explain the internet standards and RFCs in detail. CO1
13. Explain in detail about the conventional encryption principles. CO2
(OR)
14. Write the DES algorithm in detail and discuss its strengths. CO2
15. Briefly explain about the Kerberos version 4 and its motivation. CO3
(OR)

16. Narrate shortly regarding X.509 authentication services. CO3
17. Elaborate the differences between SSL and TLS? CO4
(OR)
18. Explain the Secure Electronic Transaction in detail. CO4
19. What is message processing and the user security modes in SNMPV3? Explain. CO5
(OR)
20. Discuss in detail about the potentiality of SNMPV1 community facility. CO5



COURSE FILE
FOR
FOR B.TECH IV YEAR II SEMESTER
CLOUD COMPUTING
DEPARTMENT OF INFORMATION TECHNOLOGY



2021-22

CVR COLLEGE OF ENGINEERING

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CLOUD COMPUTING

(Professional Elective – II)

Instruction :3 Periods / week

Credits :3

End Exam Duration : 3 Hours

Sessional Marks : 30

End Examination Marks : 70

Prerequisite:

1. Computer Organization
2. Operating Systems
3. Computer Networks.

Course Objectives:

1. Able to differentiate the architectures of distributed systems and parallel computing and the role of virtualization in cloud
2. Overview of cloud computing and identify various cloud services.
3. Importance of scheduling in cloud architecture and standards to be followed
4. Specify security threat exposure within a cloud computing infrastructure.
5. Contrast the risks and benefits of implementing cloud computing

Unit I - Introductory Concepts and Virtualization

Distributed systems – Parallel computing architectures: Vector processing, Symmetric multiprocessing and Massively parallel processing systems -High performance Cluster computing –Grid computing – Service Oriented Architecture overview-concept of virtualization-hypervisor types xen and vmware

Unit II - Cloud Computing Overview

The evolution of cloud computing-Meaning of the terms cloud and cloud computing – Key characteristics of cloud computing -Cloud computing Architecture-cloud based service offerings– Infrastructure as a service – Platform-as-a-service- Software-as-a-service. Grid computing Vs Cloud computing –Benefits of cloud model – limitations – legal issues - – Challenges for the cloud.

Unit III - Scheduling in Cloud and Common Standards in Cloud Computing

Scheduling in cloud: static scheduling vs. dynamic scheduling, dynamic scheduling algorithms, virtual machine scheduling and task scheduling in cloud.

Common standards in cloud computing: The open cloud consortium – The distributed management task force – standards for application developers – standards for messaging - standards for security.

Unit IV - Federation Presence, Identity and Privacy in the Cloud

Federation in the cloud – Presence in the cloud – Privacy and its relation to cloud based information system-SLA Management in Cloud Computing, cloud security-data security in cloud, security controls at infrastructure.

Unit V - Cloud Computing Case Studies, End User Access to Cloud Computing

Cloud computing case studies: Manjrasoft Aneka-Amaon EC2- Google App Engine – Microsoft Azure Services platform-developing cloud based applications.

End user access to cloud computing: YouTube – zimbra – Facebook – Zoho-DimDim Collaboration

Text Books:

1. Cloud Computing Implementation Management and Security, John W. Rittinghouse, and James F.Ransome, CRC Press, Taylor & Francis Group, 2010.
2. Cloud Computing: A Practical Approach, Anthony T.Velte, Toby J.Velte and Robert Elsenpeter, Tata McGraw-Hill, 2010.
3. Cloud Computing: Implementation, Management and Security, John W. Rittinghouse and James F Ransome. CRC Press, rp2012.

References:

1. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, Oreilly Publishers.

Course Outcomes: At the end of the course, the student will be able to

CO 1: Learn about Cloud Provider, User and Services provided by Cloud.

CO 2: Explore the Cloud Architecture, SOA

CO 3: Realize the importance of Virtualization, How it is useful to Cloud Computing.

CO 4: Learn federation presence, identity and privacy in the cloud, common standards in cloud computing

CO 5: Know about end user access to cloud computing and also mobile platform virtualization.

CO 6: Explore case studies like Amazon S3, Amazon cloud front and Amazon SQS, Google App Engine, Microsoft Dynamic CRM

Course to PO, PSO Mapping

Cours	PO	P	P	P	P	P	P	P	P	PO	PO	PO	PS	PS	PS	PSO
37353	-	2	3	2	3	-	2	-	1	-	-	2	2	2	3	3

Course Outcome to PO, PSO Mapping

Cours ne	P	P	P	P	P	P	P	P	P	PO	PO	PO	PS	PS	PS	PSO4
CO 1	-	-	3	2	3	-	-	-	-	-	-	-	2	1	-	-
CO 2	-	2	3	-	3	-	-	-	-	-	-	-	-	3	-	-
CO 3	-	-	-	2	2	-	2	-	1	-	-	-	-	2	2	-
CO 4	-	-	2	2	-	-	-	-	-	-	-	2	-	3	-	-
CO 5	-	-	-	-	-	-	2	-	-	-	-	2	-	-	3	3
CO 6	-	-	2	-	2	-	-	-	-	-	-	2	2	-	-	3

Note: 1-Slight 2- Moderate 3 -Substantial

S.No	Topic	Number of Periods
UNIT – I		
1	Distributed systems	1
2	Parallel computing architectures	1
3	Vector processing	1
4	Symmetric multi processing and Massively parallel processing systems	1
5	High performance Cluster computing	1
6	Grid computing	1
7	Service Oriented Architecture overview	1
8	Virtualization	2
9	Hypervisor Types-Xen,VMWare	3
UNIT – I : Total Number of Classes		12
UNIT - II		
10	Evaluation of Cloud Computing	1
11	Meaning of the terms cloud and cloud computing	1
12	Cloud Computing Architecture	1
13	Cloud based service offerings	1
14	Infrastructure as a service, Platform-as-a-service, Software-as-a-service	4
15	Key characteristics of cloud computing	1
16	Challenges for the cloud	1
UNIT – II: Total Number of Classes		10
UNIT - III		
17	Scheduling in cloud, static scheduling vs. dynamic scheduling	2
18	Dynamic scheduling algorithms	3
19	Virtual machine scheduling and Task scheduling in cloud.	2
20	The open cloud consortium	1
21	The distributed management task force.	1
22	Standards for application developers	1
23	Standards for messaging	1
24	Standards for security	1
UNIT – III: Total Number of Classes		12
UNIT - IV		
25	Federation in the cloud	2
26	Presence in the cloud	1

27	Privacy and its relation to cloud based information system	2
28	SLA Management in Cloud Computing	1
29	Cloud security and its challenges	2
30	Data security in cloud	2
31	Security controls at infrastructure	2
	UNIT – IV : Total Number of Classes	12
UNIT - V		
32	Cloud computing case studies-Manjrasoft Aneka	2
33	Amazon EC2	2
34	Google App Engine	2
35	Microsoft Azure Services platform-developing cloud based applications	2
36	Youtube – zimbra	2
37	Facebook	1
38	Zoho-DimDim Collaboration	1
	UNIT – V: Total Number of Classes	12
	Total Number of Classes	58

UNIT – I

Short Questions

- 1) Define Distributed System.
- 2) What are the characteristics of a Distributed System?
- 3) What are the goals of a Distributed System?
- 4) What is Vector Processing?
- 5) What is Grid Computing?
- 6) What is a Service?
- 7) What is SOA?
- 8) What are the characteristics of a Service?
- 9) What are the key Components of SOA?
- 10) What are the benefits of Virtualization?
- 11) What is full Virtualization?
- 12) What is para-virtualization?
- 13) What is Super Scalar Processor?
- 14) What is meant by Shared Memory Multiprocessor System?
- 15) Describe Message Passing Multi-Computer.
- 16) What is the difference between Uniform Memory Access and Non-Uniform Memory Access?
- 17) What is Symmetric Multiprocessing?
- 18) Compare Xen with Vmware

Essay Questions

- 1) What is Distributed System? What are its goals? Explain.
- 2) What is Cluster Computing? Explain using example.
- 3) What is Vector Processing? Explain how does it work?
- 4) What are the characteristics of Massively Parallel Processing Systems? Explain.
- 5) What are the characteristics of Symmetric Multi-Processing System? Explain.
- 6) What is Grid Computing? Explain a Layered architecture for Grid Computing.
- 7) Explain SOA as a step toward Cloud Computing.
- 8) Give the Classification of Parallel Computers. Explain Briefly.
- 9) Briefly explain the following.
a) Parallel Processing b) Vector Processing
- 10) Explain the Concept of Virtualization.
- 11) Explain the architecture of hypervisor

UNIT – II

Short Questions

1. What is Cloud?
2. What is Cloud Computing?
3. Enumerate Cloud-based service offerings.
4. What are the benefits of using Cloud Model?
5. Mention the Key characteristics of Cloud Computing.
6. What are the Challenges for the Cloud Provider Companies?
7. What is meant by Virtualization?
8. Define Platform Virtualization.
9. What is the difference between IPv4 and IPv6?
10. What is SaaS?
11. What is PaaS?
12. What is IaaS?
13. Name any four Cloud Service Providers?
14. What is Public Cloud?
15. What is Private Cloud?
16. What is Community Cloud?
17. What is Hybrid Cloud?

Essay Questions

1. a) What is Cloud? Describe the emergence of Cloud Computing.
b) Discuss the global nature of the Cloud.
2. Explain different Cloud Service Offerings.
3. a) What are legal issues when using Cloud Models?
b) Describe the Seven principles provided by United States – European Union Safe Harbor Act.
4. a) Describe the key characteristics of Cloud Computing
b) Discuss challenges that are faced by Cloud Providers.
5. Describe Hardware Evolution
6. Describe Software Evolution
7. Discuss Server Virtualization
8. What are the different types of Clouds? Explain them.
9. Discuss PaaS and its Characteristics.
10. Explain SaaS and its key Characteristics.

UNIT – III

Short Questions

1. What is scheduling?
2. Define static scheduling
3. What is dynamic scheduling?
4. List the dynamic scheduling algorithms
5. What is VM scheduling?
6. What is Task Scheduling?
7. What is SLA?
8. Define the standards for messaging
9. List the security standards in cloud
10. What is distributed management task force?
11. What is open cloud consortium ?
12. What does “Open Virtualization Format” do?
13. What is working group? What are its characteristics

Essay Questions

1. Explain the scheduling procedure in cloud
2. a) Describe CaaS and its advantages.
b) What are the Unified Communication features that are part of a Standard CaaS Deployment?
3. What is MaaS? Describe the services provided by MaaS Vendors.
4. Explain VM scheduling in cloud using any scheduling algorithm
5. Apply any dynamic scheduling algorithm in cloud and discuss results
6. Explain Task scheduling with an example.
7. Compare the static scheduling with dynamic scheduling in cloud with an example
8. What is Open Cloud Consortium? How it is Organized? Explain.
9. Discuss the contribution and scope of the Distributed Management Task Force (DMTF).
10. Discuss the application standards for transferring data, sending messages, and securing data in Internet Browsers.
11. Explain the following Protocols for Messages.
a) Simple Message Transfer Protocol
b) Post Office Protocol
c) Internet Messaging Access Protocol
12. Describe the Standards for Security in the Cloud Environment

UNIT – IV

Short Questions

1. Define Federation in the Cloud.
2. What is Jabber XCP?
3. How encrypted federation differs from trusted federation?
4. What is meant by Presence in the Cloud?
5. What is Service Discovery?
6. What is digital Identity?
7. What is Identity as a Service?
8. What is Compliance as a Service?
9. What is Privacy?
10. What are the key financial benefits of moving to an ITaaS model?
11. Enumerate the evolution of Cloud Services.
12. What does network forensics include?
13. What are the key components of data center physical security?

Essay Questions

1. Discuss the XMPP protocol for Federation in the Cloud.
2. Describe four basic types of federation.
3. Explain the concept of presence in the Cloud.
4. What is Privacy? Describe its relation to Cloud-based information systems.
5. Discuss the Future of Federation, Presence, Identity, and Privacy in the Cloud.
6. a) Describe Cloud Security Challenges.
b) What are the Seven Security Issues that are to be discussed with a Cloud-Computing Vendor?
7. Enumerate the baseline security practices for SaaS Environment.
8. a) Describe SDLC Phases.
b) Explain a Security Architecture Framework.
9. Explain the following with respect to Security in SaaS Environment.
a) Data Privacy
b) Data Governance
c) Data Security

UNIT – V

Short Questions

1. Give the overview of YouTube. API.
2. Explain Zimbra and its Collaboration Suite.
3. Discuss about Facebook.

4. Describe Zoho and its Cloud SQL.
5. What is the purpose of DimDim Collaboration? Describe its services.
6. What is Amazon EC2?
7. What is Amazon SimpleDB?
8. What is Amazon Simple Queue Service?
9. What is Amazon CloudFront?
10. What is Google App Engine?
11. What is the purpose of Google Web Toolkit?
12. What is Windows Azure?
13. Enumerate the Components of Windows Azure Services Platform.
14. What is Aneka thread model?
15. What is Aneka Task Model?

Essay Questions

1. Describe steps to add a Guest Operating System to Virtual Box.
 2. Explain briefly the Amazon EC2 Service characteristics.
 3. Discuss Elastic IP Addressing in detail.
 4. Describe how Amazon SimpleDB offers database Services?
 5. Explain how AmazonS3 provides a Storage solution for Internet?
 6. How content delivery is provided by Amazon Cloud Front? Discuss.
 7. Explain Amazon SQS.
 8. a) What is Windows Azure Services Platform? What does it offer?
b) Describe the Azure Services Platform Components
 9. How can you upload a web application in google app engine? Explain.
 10. Explain Aneka task model with an example.
 11. Illustrate thread model in Aneka.
-



CVR COLLEGE OF ENGINEERING

An UGC Autonomous Institution - Affiliated to JNTUH

B.Tech. III Year II Sem. I Mid Examinations, Jan./Feb., - 2019

Subject: Cloud Computing

Branch: IT

Date: 29-01-2019(AN)

Time: 2 hours

Max. Marks: 40 M

PART – A

Answer ALL questions

5x2 = 10 M

1. List characteristics of Distributed Systems. CO1
2. Define Vector processing. CO1
3. Write key components of Service Oriented Architecture. CO2
4. Define Cloud Computing. CO2
5. State functions of Kernel in Operating system. CO3

PART – B

Answer ALL questions

3x10= 30 M

6. Define parallel Processing. Compare Parallel Computing with Distributed Computing. CO1
- (OR)
7. Write peer-to-peer Systems with appropriate diagram. Write applications of Peer to peer Systems. CO1
 8. Explain Different Cloud Service offerings with unified diagram indicating all services. CO2
- (OR)
9. Describe Server Virtualization. Explain with suitable diagram how virtualization enables cloud functionality. CO2
 10. Explain how context switching occurs in operating System. CO3
- (OR)
11. What is VM Scheduling. Write briefly about different cloud scheduling algorithms. CO3



CVR COLLEGE OF ENGINEERING
An UGC Autonomous Institution - Affiliated to JNTUH
B.Tech. III Year II Sem. II Mid Examinations, March - 2019
Subject: Cloud Computing

Date: 26-03-2019(AN)

Branch: IT
Time: 2 hours

Max. Marks: 40 M

PART – A

Answer ALL questions

5x2 = 10 M

1. State the characteristics of Working Group. CO2
2. Define SLA in cloud. CO3
3. State federation in cloud. CO4
4. State the different services provided by Aneka with one line explanation for each. CO6
5. List the advantages of Zimbra. CO6

PART – B

Answer ALL questions

3x10 = 30 M

6. a) Explain the role of Open Cloud consortium in evolving Cloud standards.
b) Explain Vman Initiative.
(OR) CO2
7. a) Discuss in detail about Distributed Management Task Force. CO2
b) Explain about Cloud Test Bed with suitable diagram. CO3
8. Describe different Federations in cloud highlighting limitations and advantages of each.
(OR) CO4
9. Describe Cloud security challenges in detail. CO3
10. a) Describe Amazon Machine Image with suitable diagram. CO6
b) Describe Amazon EBS in detail.
(OR) CO6
11. Describe any following end access mechanisms of Cloud. CO5
 - a) You-Tube API
 - b) Zoho email services
 - c) Dim-Dim Collaboration



CVR COLLEGE OF ENGINEERING
An UGC Autonomous Institution - Affiliated to JNTUH
B.Tech. III Year II Sem. Substitute Examinations, April - 2019
Subject: Cloud Computing

Date: 09-04-2019(AN)

Branch: IT
Time: 2 hours

Max. Marks: 40 M

PART – A

Answer ALL questions

5x2 = 10 M

1. State the Goals of distributed systems.
2. List the service models of Cloud.
3. Define grid computing.
4. Define Massively parallel processing.
5. Write important design principles of Dynamic Cloud scheduling.

PART – B

Answer ALL questions

3x10= 30 M

6. a) Discuss Standards for security for implementing security process.
b) Explain Task scheduling with an example.

(OR)

7. Explain the following protocols
 - a) Post Office Protocol
 - b) IMAP protocol
 - c) SMTP protocol

8. Discuss future of Presence, Identity and privacy in Cloud.

(OR)

9. Describe the Security Architecture Framework.
10. Explain Features of Google's APP engine.

(OR)

11. Explain different End user access mechanisms in Cloud computing.



B Tech III Year II Sem. Main & Suppl. Exams April - 2019 (2016 & 15 Batches)

Subject: Cloud Computing
Branch: Information Technology

Time: 3 hours

Max. Marks: 70

PART – A
(Answer ALL Questions)

(10x2= 20 Marks)

- | | |
|--|-----|
| 1. Define Parallel Computing. | CO1 |
| 2. Write the function of hypervisor. | CO1 |
| 3. Classify the Cloud Based Services. | CO2 |
| 4. Identify the 2 limitations of a Cloud Model. | CO2 |
| 5. List the advantages of Dynamic Cloud scheduling. | CO2 |
| 6. Write functions of Distributed Management Task Force. | CO3 |
| 7. Define Privacy in Cloud. | CO4 |
| 8. State the importance of Cloud Based Information System. | CO4 |
| 9. Write services offered by Google App Engine. | CO5 |
| 10. Outline the functions of Dim Dim. | CO5 |

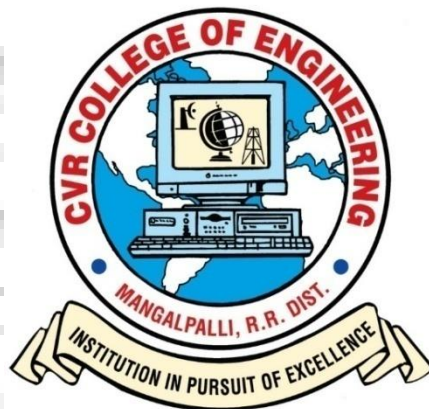
PART – B
(Answer ALL Questions)

(5x10 = 50 Marks)

- | | | |
|--|-----|-------|
| 11. a) Explain in detail about Massively Parallel processing. | CO1 | |
| b) Discuss the need of High performance Computing. | | [6+4] |
| [OR] | | |
| 12. a) Explain the importance of Virtualization. | CO1 | |
| b) Explain SOA interoperability. | | [5+5] |
| 13. a) Discuss in detail the Characteristics of a Cloud. | CO2 | |
| b) Compare and contrast IaaS and PaaS. | | [4+6] |
| [OR] | | |
| 14. a) Explain in detail about the Cloud Computing Architecture. | CO2 | |
| b) Discuss in briefly the Challenges for the Cloud. | | [6+4] |
| 15. a) Distinguish Static Scheduling Vs Dynamic Scheduling. | CO3 | |
| b) Discuss in brief about the design standards for Application Developers. | | [6+4] |
| [OR] | | |
| 16. a) Explain in brief about Task Scheduling. | CO3 | |
| b) Design the various Standards used in Security. | | [5+5] |
| 17. Discuss the mechanism used for SLA management in Cloud computing. | CO4 | [10] |
| [OR] | | |
| 18. Write about security challenges in cloud. | CO4 | [10] |
| 19. a) Explain different Microsoft Azure Services. | CO5 | |
| b) Explain the role of face book for end user access. | | [7+3] |
| [OR] | | |
| 20. Explain in detail the mechanism of Zimbra and Zoho. | CO5 | [10] |

COURSE FILE
For
B.Tech. IV Year I Semester
Applied Machine Learning

DEPARTMENT OF INFORMATION TECHNOLOGY



2021-2022

CVR COLLEGE OF ENGINEERING

(An Autonomous Institution)
Vastunagar, Mangalpalli (V), Ibrahimpatan (M),
R.R. District. Pin: 501510
email: info@cvr.ac.in
Web: <http://cvr.ac.in>

Course Objectives:

1. To understand the need for machine learning for various problem solving.
2. To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning.
3. To learn the new approaches in machine learning.
4. To design appropriate machine learning algorithms for problem solving.



Applied Machine Learning

(Professional Elective-III)

Instruction : 3 Periods / week

Continuous Internal Evaluation : 30 Marks

Semester End Examination : 70 Marks

Credits : 3

Semester End Exam Duration : 3 Hours

Unit I: Introduction

Well Defined Learning problems, designing a Learning System, Perspective and Issues, Concept Learning, General to Specific Ordering of hypotheses, Fins –S, List then eliminate algorithm, Candidate elimination algorithm, Inductive Bias.

Unit II: Decision Tree and Artificial Neural Networks

Decision Tree Learning: Introduction, Decision tree representation, appropriate problems for decision tree learning, hypothesis space search in decision tree, Inductive Bias, Issues in Decision tree learning.

Artificial Neural Networks: Introduction, neural network representation, appropriate problems for neural network learning, Perceptrons, Multilayer Networks and back Propagation Algorithms.

Unit III: Evaluating Hypothesis and Bayesian learning

Evaluating Hypothesis: Estimating Hypothesis accuracy, Basics of sampling theory, Comparing learning algorithms.

Bayesian Learning: Bayes Theorem, Concept Learning, Bayes Optimal Classifier, Naïve Bayes Classifier, Bayesian Belief Network, EM Algorithm.

Unit IV: Computational Learning theory and Instance Based Learning

Computational Learning Theory: Sample Complexity for finite hypothesis spaces, Sample Complexity for Infinite hypothesis spaces, The Mistake bound Model of learning.

Instance Based Learning: K-Nearest Neighbor Learning, Locally weight Regression, Radial Basis Function, Case Base Learning.

Unit V: Genetic Algorithms

An illustrative example, Hypothesis space search, Genetic Programming, Models of evolution and learning, Learning first order rules-sequential covering algorithms, General to specific beamsearch –FOIL.

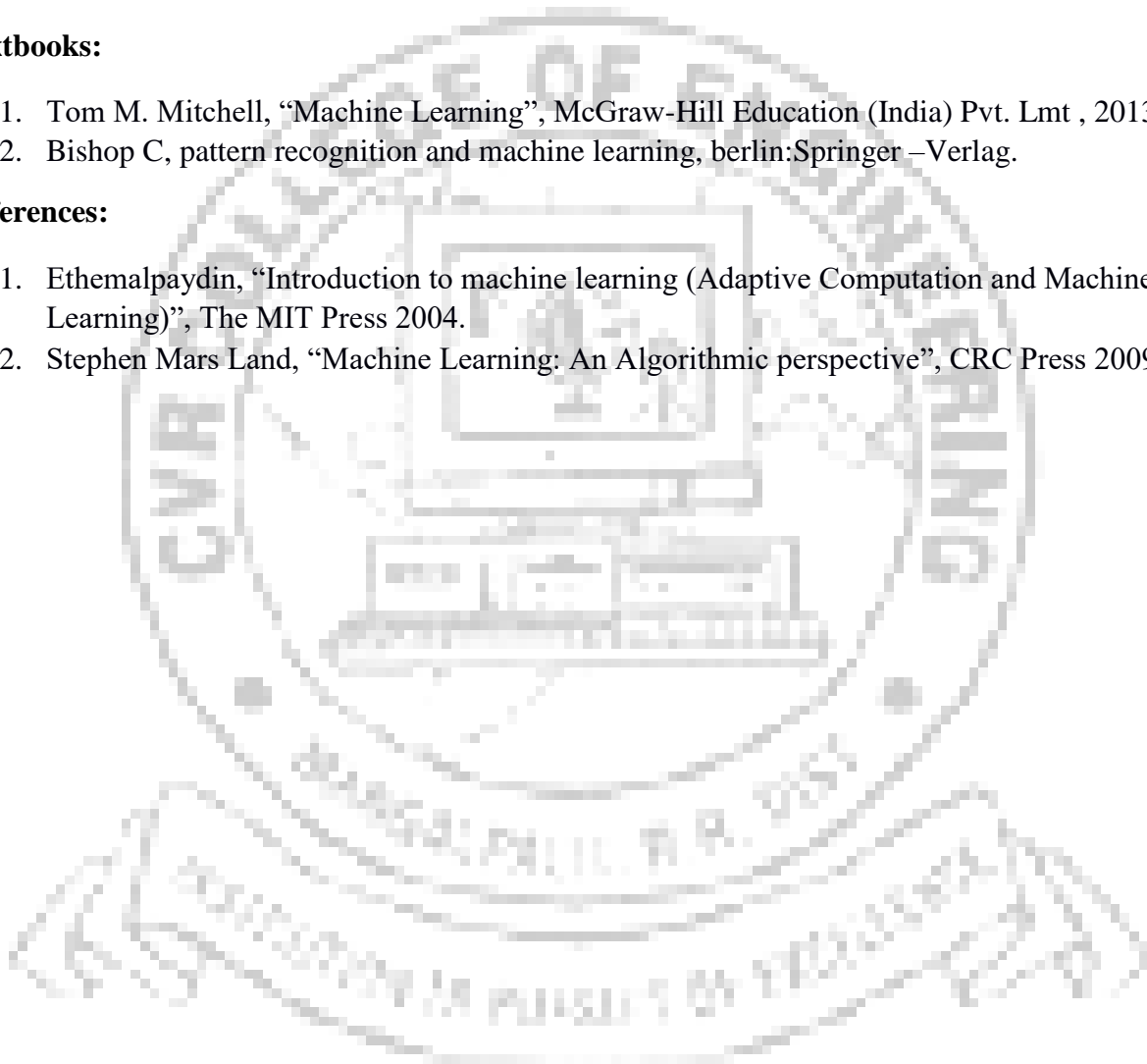
Reinforcement Learning: The Learning Task, Q – Learning.

Textbooks:

1. Tom M. Mitchell, “Machine Learning”, McGraw-Hill Education (India) Pvt. Lmt , 2013.
2. Bishop C, pattern recognition and machine learning, berlin:Springer –Verlag.

References:

1. Ethem Alpaydm, “Introduction to machine learning (Adaptive Computation and Machine Learning)”, The MIT Press 2004.
2. Stephen Mars Land, “Machine Learning: An Algorithmic perspective”, CRC Press 2009.



LECTURE SCHEDULE

S. No	Topic	Number of Classes
UNIT I		
1	Introduction to Machine Learning	1
2	Well-posed Learning, Examples	1
3	Steps for designing Learning System	2
4	Perspectives and Issues in Machine Learning	1
5	Concept Learning: Introduction to concept, concept learning	1
6	Concept Learning as Search	1
7	Find-S Algorithm	1
8	Version Spaces and Candidate Elimination Algorithm	2
9	Inductive Bias	1
	Unit I: Total number of classes	11
UNIT II		
10	Introduction to Decision tree, Decision tree Representation	1
11	Problems for Decision Tree Learning	1
12	Decision Tree Algorithm	1
13	Hypothesis Search Space in Decision Tree Learning	1
14	Issues in Decision Tree Learning	2
15	Introduction To Artificial Neural Networks	1
16	Neural network representation, appropriate problems for neural network learning,	1
17	Perceptrons: Representational Power, Training rule, Gradient Descent and Delta rule.	2
18	Multilayer Networks and back Propagation Algorithms.	2
	Unit II: Total number of classes	12
UNIT III		
19	Estimation Hypothesis Accuracy	1
20	Basics of Sampling Theory	2
21	Comparing learning algorithms	2
22	Introduction to Bayes Theorem	1
23	Bayes Theorem and Concept Learning	2
24	Bayes Optimal Classifier	1
25	Naïve Bayes Classifier	1

26	Bayesian Belief Networks	2
27	EM Algorithm	1
	Unit III: Total number of classes	13
UNIT IV		
28	Sample Complexity for finite hypothesis spaces	2
29	Sample Complexity for Infinite hypothesis spaces	2
30	Mistake Bound model of learning	1
31	Introduction to instance-based learning	1
32	K-Nearest Neighbor Learning	2
33	Locally Weighed Regression	1
34	Radial Basis Functions	1
35	Case Based Learning	1
	Unit IV: Total number of classes	11
UNIT V		
36	Genetic algorithms- An illustrative Example	2
37	Hypothesis Space Search	1
38	Genetic Programming	1
39	Models of evolutionand learning	2
40	Learning first order rules-sequential covering algorithms	1
41	Learning sets of First Order rules-General to specific beamsearch – FOIL.	2
42	Introduction to Reinforcement Learning	1
43	Learning Task	1
44	Q Learning	2
	Unit V: Total number of classes	13
	Total Number of Classes	60

Course Outcomes: At the end of the course, the student will be able to

CO1 : Differentiate between Supervised, Unsupervised, Semi –Supervised Machine Learning Approaches.

CO2 : Apply Specific Supervised Machine Learning Algorithm for a Particular Problem using decision trees. Design a neural network to solve a classification problem.

CO3 : Evaluate a hypothesis and apply Bayesian learning to a classification problem.

CO4: Apply the basics of Computational learning theory and instance-based learning to solve a problem.

CO5: Build optimal classifier using Genetic Algorithm.

Course to PO, PSO Mapping

Cour se	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O 1	PS O 2	PS O 3	PS O 4
6740 6	2	2	2	3	2	2	1	-	-	-	-	1	3	2	2	2

Course Outcome to PO, PSO Mapping

Course Outco mes	P O1	P O2	P O3	P O4	P O5	P O6	P O7	P O8	P O9	PO 10	PO 11	PO 12	PS O 1	PS O 2	PS O 3	PS O 4
CO 1	1	2	1	3	-	2	-	-	-	-	-	-	3	-	2	-
CO 2	-	2	1	2	-	-	-	-	-	-	-	1	-	2	2	-
CO 3	1	2	2	3	-	-	-	-	-	-	-	-	3	2	1	-
CO 4	2	2	1	1	2	-	-	-	-	-	-	-	2	1	-	2
CO 5	-	1	-	1	-	2	2	-	-	-	-	1	-	1	2	-

Note: - 3: High 2: Medium 1: Low

UNIT – I

Short Questions

1. Define Machine Learning?
2. List out the steps required for designing the learning system.
3. Define Concept Learning.
4. What is a Version space in machine learning?
5. What do you mean by hypothesis space and instance space?
6. What do you mean by a well-posed learning problem?
7. Write the important features that are required to well-define a learning problem.
8. Define Concept and Concept Learning
9. Define Consistent Hypothesis and Version Space

Essay Questions

1. What do you mean by well-posed learning problem? Explain with example.
2. Explain the steps in designing the learning system.
3. Explain different perspectives and issues in Machine learning
4. Define Machine learning. Explain with specific examples.
5. Define Concept Learning. Explain the task of Concept Learning
6. Describe the Candidate-Elimination Algorithm.
7. Explain the working of the Candidate-Elimination algorithm taking enjoy sport concept and training instance given below:

Example	Sky	AirTemp	Humidity	Wind	Water	Forecast	EnjoySport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

8. Explain how to model inductive systems by their deductive systems for Candidate-Elimination Algorithm.
9. How the Concept Learning can be viewed as the task of searching? Explain.
10. Explain the following with examples:
 - a. Find-S algorithm
 - b. List-Then Eliminate algorithm
11. Explain the concept of inductive bias in brief.

12. Define Hypothesis space and version space for a binary classification problem.

Determine the hypothesis space H and version space with respect to the following data:

x	2	11	17	0	1	5	7	13	20
Class	0	1	1	0	0	0	0	1	1



UNIT – II

Short Questions

1. Define preference bias
2. Write the steps involved in rule-post pruning.
3. What is entropy in Machine Learning?
4. What is information gain and Gini index?
5. What is Artificial Neural Network?
6. What do you mean by Gradient descent?
7. Define Delta rule.
8. Define Perceptron.
9. What is Gradient descent means?
10. What is Squashing function?

Essay Questions

1. Define Decision Tree learning. Explain the decision tree learning algorithm with an example.
2. Describe Hypothesis search space in decision tree learning.
3. Discuss the issues of avoiding the overfitting the data, handling the continuous data and missing values in decision trees.
4. Discuss the necessary measures required to select the attributes in building the decision trees using ID3 algorithm.
5. Write ID3 Decision Tree Algorithm and explain with suitable example
6. What is the procedure of building Decision Tree using ID3 algorithm with Gain and Entropy. Illustrate with example.
7. Explain the inductive bias in the decision tree learning.
8. Explain the issues in Decision tree learning.
9. Discuss the application of Neural network which is used for learning to steer an autonomous vehicle.
10. Explain appropriate problems for Neural Network Learning with its characteristics.
11. Explain the Single perceptron with a neat diagram.
12. With a suitable example explain back propagation in Neural Network ?
13. What is a Neural Network (NN)? What types of problems are suitable WITH NN? Explain Hidden Layer with suitable example.
14. What is Gradient Descent? Why stochastic approximation is needed for gradient descent?
15. Under what conditions the perceptron rule fails and it becomes necessary to apply the delta rule
16. What are the steps in Back propagation algorithm? Why a Multilayer neural network is required?

17. What do you mean by Gain and Entropy? How is it used to build the Decision tree in algorithm? Illustrate using an example.

UNIT –III

Short Questions

1. Define Sample error and True error.
2. What is conditional independence?
3. Define variance.
4. Define Posterior Probability.
5. Who are consistent learners?
6. Define estimate bias of a random variable.
7. Define MAP hypothesis.
8. Define Conditional Probability.
9. Define Bayes Theorem.

Essay Questions

1. Explain Binomial Distribution with an example
2. Explain Naïve Bayes Classifier.
3. Explain brute-force MAP learning algorithm.
4. What is Brute Force MAP hypothesis learner? How is it related to Concept Learning?
5. What are Bayesian Belief nets? Where are they used?
6. What are Bayesian Belief nets? Where are they used? Can it solve all types of problems?
7. How is Naïve Bayes algorithm useful for learning and classifying text?
8. Explain EM algorithm.
9. Explain Bayesian Belief Networks.
10. In which cases Naive Bayes is useful in Classification? Why?
11. Write short notes on the following:
 - a. Binomial Distribution
 - b. Estimating Hypothesis accuracy

UNIT – IV

Short Questions

1. Define Regression with respect to KNN.
2. What is mistake bound model of learning?
3. What is eager learning in machine learning?
4. What is lazy learning in machine learning?
5. What is instance-based learning?
6. What is meant by sample complexity?

7. What is mistake bound?
8. Write the disadvantages of instance-based learning.
9. Write the properties of instance-based learning.
10. What are different types of instance-based learning methods?

Essay Questions

1. Why it is necessary to estimate the accuracy of hypothesis?
2. Explain K-nearest neighbour learning algorithm with an example.
3. Discuss the major drawbacks of K-nearest Neighbour learning Algorithm and how it can be corrected.
4. Explain radial basis functions.
5. Explain in detail about mistake-bound model of learning.
6. Describe the Mistake bound model of learning in brief.
7. Explain mistake bound model of learning for find-S and halving algorithm.
8. Explain case-based reasoning.
9. Describe the method of learning using Locally weighted linear regression
10. Discuss Locally weighted linear regression
11. Explain code-based learning with an example.
12. Explain CADET System using Case based reasoning.
13. Discuss the significance of locally weighed regression.
14. Differentiate Lazy vs Eager Learners.

UNIT – V

Short Questions

1. What is meant by Genetic Algorithm?
2. What are the main steps of a genetic algorithm?
3. What is Crossover in genetic algorithm?
4. What are different types of crossovers?
5. What is mutation in genetic algorithm?
6. Define the term chromosome in Genetic Algorithm.
7. Name the important features of Genetic Algorithm.
8. What is the role of fitness function in genetic algorithm.
9. Write different operators of GA.
10. What factors contribute to the popularity of genetic algorithm?
11. What is crowding in genetic algorithm?
12. what is inductive logic programming in machine learning

Essay Questions

1. Describe the Genetic Algorithm (GA) steps using the Population, Fitness function, other necessary data and hypothesis it returns.
2. What are the steps in Reproduction cycle? Which type of applications are suitable for using GA?
3. Explain the Salient features of Genetic Algorithm.
4. Explain the operators involved in simple GA with example.
5. Describe basic genetic algorithm using all the necessary steps of fitness function evaluation
6. Brief on Learning sets of First Order rules.
7. Write down Q-learning algorithm.
8. What do you mean by reinforcement learning? How reinforcement problem differs from other function approximation tasks.?
9. Discuss learning tasks and Q-learning in the context of reinforcement learning.
10. Explain general to specific beam search.
11. What are the inductive-analysis approaches to learning with hypothesis space search.
12. Explain the following models of evolution and learning:
 - a) Lamarckian Evolution
 - b) Baldwin effect



CVR COLLEGE OF ENGINEERING

Autonomous - Affiliated to JNTUH

B.Tech. IV Year I Sem.–Mid – I Examinations,

[Model paper]

Sub: Applied Machine Learning

(Professional Elective -III)

Branch: IT

PART – A

5X2 = 10Marks

Answer all Questions

1. Define Concept Learning [CO1]
2. Define Consistent Hypothesis and Version Space. [CO1]
3. What is entropy in Machine Learning? [CO2]
4. Define Perceptron. [CO2]
5. Define Sample error. [CO3]

PART – B

3 X 10 = 30 Marks

Answer all three questions

6. Explain the steps in designing the learning system. [CO1]
(OR)
7. Explain the following with examples:
 - a. Find-S algorithm
 - b. List-Then Eliminate algorithm[CO1]
8. Discuss the necessary measures required to select the attributes in building the decision trees using ID3 algorithm [CO2]
(OR)
9. Explain the Single perceptron with a neat diagram. [CO2]
10. Explain Binomial Distribution with an example [CO3]
(OR)
11. Explain the basic definitions of Sampling theory. [CO3]



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B.Tech. IV Year I Sem. – Mid – II Examinations,

[Model paper]

Sub: Applied Machine Learning

(Professional Elective-III)

Branch:IT

PART – A

5X2 = 10Marks

Answer all Questions

1. Who are consistent learners? [CO3]
2. What is instance-based learning? [CO4]
3. What is a mistake bound? [CO4]
4. Define the term chromosome in Genetic Algorithm. [CO5]
5. What is reinforcement learning? [CO5]

PART – B

10X3 = 30

Marks

Answer all three questions

6. Explain brute-force MAP learning algorithm. [CO3]

(OR)

7. What are Bayesian Belief nets? Where are they used? [CO3]
8. Explain K-nearest neighbor learning algorithm with an example. [CO4]

(OR)

9. Describe the method of learning using Locally weighted linear regression. [CO4]
10. Explain the operators involved in simple GA with example. [CO5]

(OR)

11. Discuss Q-learning in the context of reinforcement learning. [CO5]

###



CVR COLLEGE OF ENGINEERING

Autonomous - Affiliated to JNTUH

B.Tech. IV Year I Sem.– Substitute Examinations,

[Model paper]

Sub: Applied Machine Learning

(Professional Elective-III)

Branch:IT

PART – A

5X2 = 10Marks

Answer all Questions

1. Define Concept Learning [CO1]
2. Define Consistent Hypothesis and Version Space. [CO1]
3. What is entropy in Machine Learning? [CO2]
4. Define Perceptron. [CO2]
5. Define Sample error. [CO3]

PART – B

10X3 = 30 Marks

Answer all three questions

6. Explain brute-force MAP learning algorithm. [CO3]

(OR)

7. What are Bayesian Belief nets? Where are they used? [CO3]
8. Explain K-nearest neighbor learning algorithm with an example. [CO4]

(OR)

9. Describe the method of learning using Locally weighted linear regression. [CO4]
10. Explain the operators involved in simple GA with example. [CO5]

(OR)

11. Discuss Q-learning in the context of reinforcement learning. [CO5]

###



CVR COLLEGE OF ENGINEERING

Autonomous - Affiliated to JNTUH

B.Tech. IV Year I Sem Examinations,

[Model Paper – External Exam]

Sub: Applied Machine Learning
(Professional Elective-III)

Branch: IT

PART – A

10X2 = 20Marks

Answer all Questions

1. List out the steps required for designing the learning system.
[CO1]
2. What is a Version space in machine learning?
[CO1]
3. What do you mean by Gradient Descent? [CO2]
4. What is squashing function? [CO2]
5. What is conditional independence? [CO3]
6. Who are consistent learners? [CO3]
7. Why KNN is known as lazy learning algorithm?
[CO4]
8. What is meant by sample complexity?
[CO4]
9. Write the main steps involved in Genetic algorithm [CO5]
10. What is inductive logic programming in machine learning?x [CO5]

PART – B

10X3 = 30 Marks

Answer all three questions

11. Explain different perspectives and issues in Machine learning . [CO1]
- (OR)**
12. Explain the working of the Candidate-Elimination algorithm taking enjoy sport concept and training instance given below: [CO1]

Example	Sky	AirTemp	Humidity	Wind	Water	Forecast	EnjoySport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

13. Define Decision Tree learning. Explain the decision tree learning algorithm with an example [CO2]

(OR)

14. a) Describe the characteristics of back propagation algorithm.

b) Write the algorithm for Back Propagation.

[CO2]

15. Explain Naïve Bayes Classifier and Bayesian Belief Networks.

[CO3]

(OR)

16. Write short notes on the following:

a. Binomial Distribution

b. Estimating Hypothesis accuracy

[CO3]

17. What is instance-based learning? Explain K-Nearest neighbor algorithm.

[CO4]

(OR)

18. Explain mistake bound model of learning for find-S and halving algorithm.

[CO4]

19. Describe the Genetic Algorithm (GA) steps using the Population, Fitness function, other necessary data and hypothesis it returns.

[CO5]

(OR)

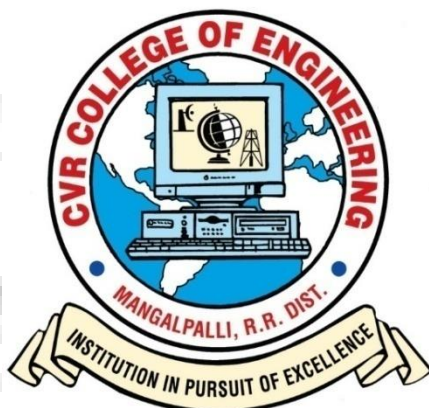
20. What do you mean by reinforcement learning? How reinforcement problem differs from other function approximation tasks.?

[CO5]

COURSE FILE
For
B.Tech. IV Year I Semester

COMPUTER FORENSICS

DEPARTMENT OF INFORMATION TECHNOLOGY



2021-2022

CVR COLLEGE OF ENGINEERING

(An Autonomous Institution)

Vastunagar, Mangalpalli (V), Ibrahimpatan (M),

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COMPUTER FORENSICS

Course Objectives:

1. The course makes the students to learn how to implement the computer forensics methodology and what are the steps taken by computer forensic scientist when data is deleted.
2. The prime goal would be to collect the evidence by following search and seizure methods including various network forensic tools.
3. The Students would be able to help law enforcement agencies in their investigations of digital related crimes, mobile phones, including the development of tools.



SYLLABUS

UNIT-I

Computer Forensics Fundamentals: What are Computer Forensics? Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps taken by Computer Forensics Specialists.

Types of Computer Forensics Technology: Types of Military Computer. Forensic Technology, Types of Law Enforcement - Computer Forensic Technology - Types of Business Computer Forensic Technology

Computer Forensics Evidence and Capture: Data Recovery Defined - Data Back-up and Recovery - The Role of Back-up in Data Recovery - The Data- Recovery Solution Evidence Collection and Data Seizure: Why Collect Evidence? Collection Options - Obstacles - Types of Evidence - The Rules of Evidence - Volatile Evidence - General Procedure - Collection and Archiving - Methods of Collection - Artifacts - Collection Steps - Controlling Contamination: The Chain of Custody

UNIT-II

Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene - Computer Evidence Processing Steps - Legal Aspects of Collecting and Preserving Computer Forensic Evidence.

Computer Image Verification and Authentication: Special Needs of Evidential Authentication - Practical Consideration - Practical Implementation.

UNIT-III

Computer Forensics analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project.

Processing Crime and Incident Scenes: Identifying digital evidence, collecting evidence in private-sector incident scenes. processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtain a digital hash, reviewing a case.

UNIT-IV

Current Computer Forensic tools: evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software.

E-Mail Investigations: Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violation, understanding e-mail servers. using specialized e-mail forensic tools.

UNIT-V

Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

Working with Windows and DOS Systems: understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS startup tasks, virtual machines.

TEXTBOOK:

1. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.
2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning

REFERENCES:

1. Real Digital Forensics by Keith J. Jones, Richard Bejtlich, Curtis W. Rose, Addison-Wesley Pearson Education
2. Forensic Compiling, A Practitioners Guide by Tony Sammes and Brian Jenkinson, Springer International edition.
3. Computer Evidence Collection & Presentation by Christopher L.T. Brown, Firewall Media.
4. Homeland Security, Techniques & Technologies by Jesus Mena, Firewall Media.
5. Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M.Slade, TMH 2005
6. Windows Forensics by Chad Steel, Wiley India Edition.

SNO	TOPIC	No of Lectures
UNIT – I		
1	Computer Forensics Fundamentals	2
2	Benefits of Professional Forensics Methodology	1
3	Steps taken by Computer Forensics Specialists	1
4	Types of Computer Forensics Technology	1
5	Types of Law Enforcement	2
6	Computer Forensics Evidence and Capture	2
7	Data Recovery Defined	2
8	Recovery Solution Evidence Collection	1
9	Methods of Collection	1
10	Controlling Contamination: The Chain of Custody	1
UNIT I Total Number of Classes		14
UNIT – II		
1	Duplication and Preservation of Digital Evidence	1
2	Computer Evidence Processing Steps	2
3	Preserving Computer Forensic Evidence	1
4	Computer Image Verification and Authentication	2
5	Practical Implementation	1
UNIT II Total Number of Classes		7
UNIT – III		
1	Computer Forensics analysis and validation	1
2	performing remote acquisitions Network Forensics	2
3	performing live acquisitions	1
4	using network tools, examining the honeynet project	1
5	Processing Crime and Incident Scenes	1
6	collecting evidence in private-sector incident scenes	2
7	securing a computer incident or crime scene	2
8	seizing digital evidence at the scene	1
9	storing digital evidence, obtain a digital hash	2
10	reviewing a case	1
UNIT III Total Number of Classes		14
UNIT IV		
1	Current Computer Forensic tools	1
2	evaluating computer forensic tool needs	1
3	computer forensics software tools	2
4	computer forensics hardware tools	2

5	validating and testing forensics software.	1
6	E-Mail Investigations: Exploring the role of e-mail in investigation	1
7	exploring the roles of the client and server in e-mail	1
8	investigating e-mail crimes and violation,	1
9	understanding e-mail servers	1
10	using specialized e-mail forensic tools	1
UNIT IV Total Number of Classes		12
UNIT V		
1	Cell phone and mobile device forensics: Understanding mobile device forensics	1
2	understanding acquisition procedures for cell phones and mobile devices.	2
3	Working with Windows and DOS Systems: understanding file systems,	1
4	exploring Microsoft File Structures	2
5	Examining NTFS disks, Understanding whole disk encryption,	2
6	windows registry, Microsoft startup tasks,	2
7	MS-DOS startup tasks, virtual machines.	2
UNIT V Total Number of Classes		12
Total Number of Classes		59

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Implement the computer forensics methodology and steps taken by computer forensic scientist.

CO2: Recover and backup the data along with verification, authentication and practical implementation.

CO3: Collect the evidence by following data seizure methods.

CO4: Understand the standard procedures for network forensics and develop various network forensic tools.

CO5 : Understand mobile device forensics and file systems.

Course to PO, PSO Mapping

COURSE	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PS O1	PS O2	PS O3	PS O4
Computer Forensics	2	3	2	3	2	2	1	2	2	-	-	1	2	2	1	2

Course Outcome to PO, PSO Mapping

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3	PSO 4
CO 1	1	2	1	3	-	2	-	-	-	-	-	-	3	-	2	-
CO 2	-	2	1	2	-	-	-	-	-	-	-	1	-	2	2	-
CO 3	1	2	2	1	-	-	-	-	-	-	-	-	3	2	1	-
CO 4	2	2	1	1	3	-	-	-	-	-	-	-	2	1	-	3
CO 5	-	1	-	1	-	2	2	-	-	-	-	1	-	1	2	-

Note: 3: High 2: Medium 1: Low

UNIT-I

Short Questions

- 1) What is computer forensics?
- 2) Write the Use of computer forensics in law enforcement?
- 3) List the computer forensic services?
- 4) List the computer evidence service options?
- 5) What are the problems of computer forensic evidence?
- 6) What is data recovery?
- 7) List the backup obstacles?
- 8) What are the solutions for data recovery?
- 9) What is the purpose for collecting evidence?
- 10) List the types of evidence?
- 11) List the rules of evidence?
- 12) How to handle corruption of original data?
- 13) Explain the Steps taken by Computer Forensics Specialist
- 14) Write three types of Computer Forensics Technologies.
- 15) Explain the Purpose of Computer Forensics?
- 16) Explain the benefits of Professional Forensics Methodology
- 17) What is the role of a computer in a crime?
- 18) What are the problems of computer forensics evidence?
- 19) What is computer forensic validation.
- 20) How to validate forensic data?
- 21) What and Explain the Role of Back-up in Data Recovery?

Essay Questions

- 1) What is computer forensics? Explain the use of computer forensics in law enforcement?
- 2) Explain the following business computer forensics technology i) creating trackable electronic documents ii) Forensic services available.
- 3) Discuss a solution for data recovery? b) Explain controlling contamination: The chain of custody?
- 4) Explain the computer forensics services?
- 5) Explain the factors that affect backup in data recovery?
- 6) Discuss the methods of collection of evidences?
- 7) What are the benefits of professional forensics methodology? Explain.

- 8) Explain how law enforcement is done in computer forensics?
- 9) Explain how data backup and recovery is done in computer forensics?
- 10) Explain the rules of collecting electronic evidence?
- 11) Explain the steps taken by computer forensics specialists?
- 12) Explain the following business computer forensics technology
 - i) Remote monitoring of target computers
 - ii) Theft recovery software for laptops and PCs.
- 13) Explain the obstacles you find in backing up applications?
- 14) Explain the types of Evidence?

UNIT-II

Short Questions

- 1) List any two-computer evidence processing steps?
- 2) What are the guidelines to have a good chance of preserving the evidence?
- 3) What is a chain of custody?
- 4) What are the points that an investigator analysis of evidence must include?
- 5) What is a software publisher ID?
- 6) How Authenticode assures the users of origin?
- 7) List any two responsibilities of VeriSign?
- 8) Write any two rules of Evidence?
- 9) Explain the Concept of Digital ID
- 10) Write the Collection Steps of Evidence in Sequence
- 11) Explain the Importance of bit-stream image back-ups

Essay Questions

- 1) What are the steps involved in computer evidence processing? Explain.
- 2) What is duplication of digital evidence? Explain its purpose?
- 3) Explain the special needs of evidential authentication?
- 4) How Authenticode works with VeriSign Digital IDs?
- 5) Explain the legal aspects of collecting and preserving computer forensic evidence?

UNIT-III

Short Questions

- 1) Define steganography?
- 2) How to detect watermarking?
- 3) What is data acquisition?
- 4) What is advanced forensic format?
- 5) List some design goals of advanced forensic format?
- 6) Steps involved in acquiring data with dd in Linux?
- 7) What is primary goal of static acquisition?
- 8) List two advantages and disadvantages of raw format?
- 9) What does logical acquisition collect for an investigation?
- 10) What is the most critical aspect of computer evidence?
- 11) What is a hashing algorithm?
- 12) Why are live acquisition becoming common?
- 13) Name the three types of log files that you have to examine after a network intrusion?
- 14) When do zero-day attacks occur?
- 15) Explain the Concept of Bit-Shifting
- 16) Explain the Process of Steganography to Hide data

Essay Questions

- 1) Explain the process of validating the forensic data?
- 2) What is live acquisition? How are they performed?
- 3) Briefly explain the process of determining of what data to collect and analyze in computer forensics?
- 4) How are standard procedures developed for network forensics?
- 5) How remote acquisition is performed in computer forensics?
- 6) Give an overview of network forensics?
- 7) Explain the process of validating the forensic data?

UNIT-IV

Short Questions

- 1) What are five required functions for computer forensic tools?
- 2) Name the tools which can examine the files created by WinZip?
- 3) List four subfunctions of reconstructing drives?
- 4) What information does the E-mail headers contain?

- 5) In Microsoft outlook what are the e-mail storage files that are typically stored on a client computer?
- 6) Which type of files can provide useful information while reexamining an e-mail server?
- 7) What are the three rules of forensic hash?
- 8) List the types of Computer Forensics Tools
- 9) Explain how to tracing an Email message
- 10) Explain the Roles of Client and Server in Email
- 11) What are the needs of computer forensic tools.
- 12) Discuss about email servers.

Essay Questions

- 1) How do you evaluate computer forensic tools?
- 2) Explain computer forensics hardware tools?
- 3) Explain the forensics tools used for e-mail investigation?
- 4) What are types of computer forensics tools?
- 5) Explain any two computer forensics software tools?
- 6) Explain the process of investigating E-mail crimes and violations?
- 7) Briefly explain the tasks performed by computer forensics tools?
- 8) What is role of e-mail in forensic investigations?
- 9) Explain the process of investigating E-mail crimes and violations?

UNIT-V

Short Questions

- 1) List four places where mobile device information will be stored?
- 2) What is TDMA?
- 3) How the GSM divides mobile stations?
- 4) List two ways you can isolate a mobile device from incoming signals?
- 5) List numeric error codes of IF error level command.
- 6) List Switches and options for the Choice command
- 7) What are the Errorlevel codes of Choice command?
- 8) What the four places where mobile device information might be stored
- 9) How many ways that we can isolate a mobile device from incoming signals
- 10) What is a virtual machine?
- 11) What is a cluster and explain what is virtual cluster in brief?
- 12) List four subfunctions of reconstructing drives
- 13) Explain the features of NTFS

- 14) What is a virtual machine?
- 15) Explain the features of NTFS
- 16) Explain the Windows Registry Commands
- 17) What is use of registers in windows?
- 18) What do you mean by encrypting a disc?

Essay Questions

- 1) Write short notes on: a) FAT disks b) Windows Registry
 - 2) Write short notes on: a) Windows Registry b) NTFS System Files.
 - 3) Write short notes on: a) MS-DOS startup tasks b) Virtual machines.
 - 4) Write short notes on: a) Windows XP startup tasks b) Virtual machines.
 - 5) Write short notes on a) Microsoft File Structures. b) Microsoft Startup Tasks.
 - 6) Write a Short Notes on a) Virtual machines. b) FAT disks
 - 7) Explain the NTFS Encrypting File System
 - 8) Write short notes on: a) Windows Registry b) NTFS System Files.
- Write short notes on MS-DOS start-up task system





CVR COLLEGE OF ENGINEERING
An UGC Autonomous Institution - Affiliated to JNTUH
B.Tech. IV Year II Sem. I Mid Examinations, Jan./Feb., - 2019

Subject: Computer Forensics

Branch: IT

Date: 29-01-2019 (AN)

Time: 2 hours

Max. Marks: 40 M

PART – A

Answer ALL questions

5x2 = 10 M

- | | |
|--|-----|
| 1. List the backup obstacles. | CO1 |
| 2. What is data recovery? | CO1 |
| 3. What are the guidelines to have a good chance of preserving the evidence? | CO2 |
| 4. What is a software publisher ID? | CO2 |
| 5. What is Known File Filter (KFF) ? | CO3 |

PART – B

Answer ALL questions

3x10 = 30 M

- | | |
|---|-----|
| 6. Explain the Types of Military Computer Forensic Technology. | CO1 |
| (OR) | |
| 7. Explain the steps involved in preservation of evidence. | CO2 |
| 8. Explain the steps involved in Preserving the Digital Crime Scene. | CO2 |
| (OR) | |
| 9. Discuss about the legal aspects of collecting and preserving computer forensic evidence. | CO2 |
| 10. How to approach forensic cases using FTK? Explain. | CO3 |
| (OR) | |
| 11. Explain the process of validating the forensic data. | CO3 |



CVR COLLEGE OF ENGINEERING
An UGC Autonomous Institution - Affiliated to JNTUH
B.Tech. IV Year II Sem. II Mid Examinations, March - 2019

Subject: Computer Forensics

Branch: IT

Date: 26-03-2019(AN)

Time: 2 hours

Max. Marks: 40 M

PART – A

Answer ALL questions

5x2 = 10 M

1. What are five required functions for computer forensic tools? CO3
2. What information does the E-mail headers contain? CO4
3. In Microsoft outlook what are the e-mail storage files that are typically stored on a client computer. CO4
4. How the GSM divides mobile stations? CO5
5. What are the Errorlevel codes of Choice command? CO5

PART – B

Answer ALL questions

3x10= 30 M

6. Explain the process of Law enforcement crime scenes. CO3
(OR)
7. What is digital evidences? How are digital forensics identified. CO3
8. Explain computer forensic software tools. CO4
(OR)
9. How do you investigate email crimes and violations? CO4
10. Write short notes on: a) NTFS disks b) Windows Registry. CO5
(OR)
11. Write short notes on Microsoft start-up task system. CO5



CVR COLLEGE OF ENGINEERING

An UGC Autonomous Institution - Affiliated to JNTUH

B.Tech. IV Year II Sem. Substitute Examinations, April - 2019

Subject: Computer Forensics

Branch: IT

Date: 09-04-2019(AN)

Time: 2 hours

Max. Marks: 40 M

PART – A

Answer ALL questions

5x2 = 10 M

1. List the computer forensic services.
2. List any two computer evidence processing steps.
3. What is a chain of custody?
4. List the types of Computer Forensics Tool.
5. What is TDMA?

PART – B

Answer ALL questions

3x10= 30 M

6. Explain the Role of Back-up in Data Recovery . CO1
(OR)
7. How Authenticode works with VeriSign Digital IDs. CO2
8. Explain the process of validating the forensic data. CO3
(OR)
9. Explain computer forensics hardware tools. CO4
10. Write short notes on: a) Windows Registry b) NTFS System Files. CO5
(OR)
11. Write short notes on a) Microsoft File Structures. b) Microsoft Startup Tasks.CO5



