

**CSHT 408: OPERATING SYSTEMS**  
**GUIDELINES**

CHAPTER	TOPIC	CONTENT
1	Introduction	1.1-1.9, 1.11
2	Operation System Structures	2.1-2.4,2.10
3	Processes	3.1-3.4,3.5.1,3.6.3.1
4	Threads	4.1-4.4.1,4.5.1 (Introduction only),4.6 (Excluding 4.6.5)
5	Process Scheduling	5.1-5.3 (up to 5.3.4),5.5
6	Synchronizati on	6.1-6.3,6.5-6.6.3,6.7.1,6.7.2
7	Deadlocks	7.1-7.3 (Excluding deadlock example on page 313)
8	Memory Management Strategies	8.1-8.5,8.6.1 (Excluding DFC example),8.6.2,8.6.3
9	Virtual Memory Management	9.1-9.4.4,9.5 (Excluding 9.5.4),9.6
10	File System	10.1-10.4(Excluding fig 10.2),10.6
11	Implementing File Systems	11.1,11.2.1,11.3-11.5.4
12	Secondary Structures	12.1.1,12.4
15	System Security	15.1,15.2.1,15.2.2,15.2.5,15.3.1,15.3.3,15.4.1( up to 15.4.1.1 introduction),15.5

**References:**

A.Silberschatz, P.B. Galvin, G.Gagne, **Operating systems Concepts, 9<sup>th</sup> Edition**, John Wiley Publications.

## CSHP 407: Practical List for Operating Systems

1. WAP to display the following:
  - a) Kernel version.
  - b) CPU type and model.
  - c) Information on configured memory, amount of free and used memory.
2. WAP to print file details including owner access permissions, file access time, where file name is given as a command line argument.
3. WAP to copy a source file into the target file and display the target file using system calls.
4. WAP (using fork () and/or exec () commands) where parent and child execute:
  - a) same program, same code
  - b) same program, different code
  - c) different programs
  - d) before terminating, the parent waits for the child to finish its task(Students should experiment with fork () system call to create hierarchy of child processes)
5. WAP to demonstrate producer-consumer problem using shared memory.
6. WAP to demonstrate Inter-Process Communication (IPC) between parent and child using pipe system call.
7. Write programs to understand working of PThread library.
8. Write programs to implement the following scheduling algorithms:
  - a) FCFS
  - b) Shortest Job First.
  - c) Shortest Remaining Time First.
  - d) Non-Preemptive priority based.
  - e) Preemptive priority based.
  - f) Round Robin.
9. WAP to implement first-fit, best-fit and worst-fit allocation strategies.
10. WAP to map logical addresses to physical addresses in a paging scheme. Define the necessary data structures required for the program. Page size and physical memory size should be taken as input from the user. Also accept process id and its size from the user and allocate memory to the process. Make an interactive program to perform the following:
  - a) Accept a process id and page no and display frame number for a valid input.
  - b) Accept a process id to de-allocate and display the frame table

**CSHT-410: SOFTWARE ENGINEERING**  
**GUIDELINES**

TOPICS	CONTENTS	REFERENCES
Introduction	<b>Ch-1: Software and Software Engineering</b> 1.1(Pg: 1-10),1.3,1.4,(Pg:12-17) <b>Ch-2: Process Models</b> up to 2.1.2 (Pg:30-34),2.3 – up to 2.3.3 (Pg:38-47) <b>Ch-3: Agile Development</b> 3.1-3.3 (Before 3.3.1) (Pg:65-69) <b>Ch-30: Software Process Improvement</b> 30.3 (Pg: 797-801)	[1]
Requirement Analysis	<b>Ch-3: Software Requirement Analysis and Specification</b> 3.1.2 (Pg:72-75),3.2 up to 3.2.2 (Pg: 75-87),3.3 up to 3.3.2 (Pg: 99-105)	[2]
Design Engineering	<b>Ch-6: Function Oriented Design</b> up to 6.2 (Pg: 215-226)	[2]
	<b>Ch-9: Architectural Design</b> 9.1.1 (Pg: 243-244),9.6 up to 9.6.1 (Pg: 265-271)	[1]
Quality	<b>Ch-14: Quality Concepts</b> 14.4 (Pg: 412,413) <b>Ch-15: Review Techniques</b> up to 15.2 (Pg: 416-420) <b>Ch-16: Software Quality Assurance</b> up to 16.2 (Pg: 432-435)	[1]
Software Testing	<b>Ch-17: Software testing Strategies</b> up to 17.1.3 (Pg: 449-453),17.3 (Pg: 456-465),17.6,17.7 (Pg:467-472) <b>Ch-18: Testing Conventional Applications</b> 18.2-18.4 (Pg: 484-492), 18.6 up to 18.6.3 (exclude 18.6.1) (Pg: 495-498)	[1]
Software Metrics	<b>Ch-23: Product Metrics</b> up to 23.1.1 (Pg:613-615), 23.2 up to 23.2.1 (Pg: 619-623) <b>Ch-25: Process and Process Metrics</b> up to 25.2.3 (Pg: 666-675), 25.3 (Pg: 679-682)	[1]
Estimation and Scheduling	<b>Ch-26: Estimation for Software Project</b> 26.5, 26.6 up to 26.6.6 (Pg: 697-705), 26.7.2, 26.7.3 (Pg: 709-712) <b>Ch-27: Project Scheduling</b> 27.5 up to 27.5.1 (Pg: 732-733)	[1]
Risk Management	<b>Ch-28: Risk Management</b> up to 28.6 (Pg: 744-757)	[1]

**References:**

- [1] R.S. Pressman, **Software Engineering: A Practitioner's Approach**, McGraw-Hill, Edition 7, 2010.  
 [2] P. Jalote, **An Integrated Approach to Software Engineering**, Narosa Publishing House, Edition 3, 2011.

**CSHT-409: DATA COMMUNICATION AND COMPUTER NETWORKS**  
**GUIDELINES**

<b>Sr.No.</b>	<b>Topic</b>	<b>Section/Pages</b>	<b>References</b>
1.	Introduction to Computer Networks	1.1, 1.2, 1.3 2.1, 2.2, 2.3, 2.4	[1]
2.	Data Communication Fundamentals and Techniques	3.1, 3.5 4.1 except multilevel and multitransition Line encoding, 4.2 up to encoding, 4.3 5.1 6.1 up to multiplexing process, Pg. 169-170 7.1, 7.2	[1]
3.	Network Switching Techniques and Access Mechanisms	Pg. 125, 2.5.5 9.2, 9.3, 9.5	[2] [1]
4.	Data Link Layer Functions and Protocol	3.1, 3.2, 3.3, 3.4, 3.6.2	[2]
5.	Multiple Access Protocol and Networks	4.2.2, 4.3 up to 4.3.1, 4.3.3, 4.3.5, 4.7.5	[2]
6.	Network Layer Functions and Protocols	5.1, 5.2 up to 5.2.4, 5.6.1, 5.6.2 up to subnets, 5.6.3	[2]
7.	Transport Layer Functions and Protocols	6.1, 6.4 up to 6.4.2, 6.5 up to 6.5.6	[2]
8.	Overview of Application Layer Protocol	7.1 up to 7.1.1, 7.3 up to URLs, 7.3.4	[2]

References: -

- [1] Data Communication and Networking: B.A. Forouzan, 4<sup>th</sup> Edition, TMH, 2007.  
[2] Computer Networks: A.S. Tanenbaum, 4<sup>th</sup> Edition, Pearson Edu, 2003.

## CSHP-409: DATA COMMUNICATION AND COMPUTER NETWORKS

### Practicals

Implement the following programs in C/C++

1. Simulate CRC-12 for Noisy Channel.
2. Simulate CRC-12 for Noiseless Channel.
3. Simulate Stop & Wait Protocol for Noisy Channel.
4. Simulate Stop & Wait Protocol for Noiseless Channel.
5. Simulate Sliding Window Selecting Repeat Protocol.
6. Simulate Sliding Window Go Back N Protocol.
7. Implement Dijkstra's Algorithm for Shortest Path Routing.

B.Sc.(H) Computer Science - Semester IV

**MAPT-404: DIFFERENTIAL EQUATIONS**  
**GUIDELINES**

**Recommended Books: -**

1. Shepley L. Ross – Differential Equations, Third Edition, John Wiley & Sons, 1984.
2. Daniel A. Murray – Introductory Courses in Differential Equations Longman Group Ltd. UK (Indian Edition) 1991.
3. J. Sneddon – Elements of Partial Differential Equations, McGraw-Hill, International Edition, 1967.

**Ordinary Differential Equations**

S.No.	TOPIC	Chapter/Page No.	References
1.	First Order exact Differential Equations, Integrating Factors	Chapter 2: Pg. 26-38	[1]
2.	Rules to find an Integrating Factor	Chapter 2: Pg. 61-64,67 Ex 1-6 Chapter 2: Pg. 23-26	[1] [2]
3.	First Order Higher Degree Equations solvable for x, y, p.	Chapter 3: Pg. 31-39 excluding Misc. Ex on Pg. 38-39	[2]
4.	Basic Theory of Linear Differential Equations, Wronskian and its properties.	Chapter 4: Pg. 102-115, 170-177	[1]
5.	Solving a Differential Equation by reducing its order, linear, non-homogenous equations.	Chapter 4: Pg. 116-125	[1]
6.	Linear Homogenous equations with constant coefficients.	Chapter 4: Pg. 125-136 Chapter 6: Pg. 63-81	[1] [2]
7.	Method of Variation of Parameters, the Cauchy Euler Equation.	Chapter 4: Pg. 155-170	[1]
8.	Simultaneous Differential Equations, Total Differential Equations.	Chapter 11: Pg. 128-139 (Excluding Article 101) Chapter 7: Pg. 264-278 up to Ex 22.	[2] [1]
9.	Applications of Differential Equations <ul style="list-style-type: none"> <li>• Vibration of a mass on a spring.</li> <li>• Mixture Problem.</li> <li>• Free Damped Motion.</li> </ul>	Chapter 5: Pg. 179-182. Chapter 3: Pg. 94-97, Ex 15-20,100. Chapter 5: Pg. 189-197 Ex 1-3.	[1]

	<ul style="list-style-type: none"> <li>• Forced Motion.</li> <li>• Resonance Phenomena.</li> <li>• Electric Circuit Problem.</li> <li>• Application to Mechanics of simultaneous Differential Equations</li> </ul>	Pg. 199-203, Ex 1 Pg. 206-210 Pg. 211-218 Pg. 278-282	
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### Partial Differential Equations

1.	Order and Degree of a partial Differential Equation, Concept of linear and non-linear partial Differential Equations, Formation of first order partial Differential Equations.	Chapter 2: Pg. 44-47	<b>[3]</b>
2.	Linear Partial Differential Equation of First Order, Lagrange's Method.	Chapter 2: Art 4, Pg. 49-55 (Th 3, Pg. 53 excluding proof)	<b>[3]</b>
3.	Charpit's Method.	Chapter 2: Art 9-11, Pg. 67-73	<b>[3]</b>
4.	Definition of complete, general and singular integrals into elliptic, parabolic and hyperbolic through illustration only.	Chapter 3: Art 5 Pg. 105 (Only definitions of elliptic, parabolic and hyperbolic and illustrations of these equation for equations of the types given in Ex. 8-10, Pg. 107-108 and Ques 4,5 Pg. 109) Chapter 14: Classification for equations given in Pg. 720-722.	<b>[3]</b>  <b>[1]</b>