Guidelines for B.Sc.(H) Computer Science Semester IV

These are only guidelines and in no case to be treated as syllabus. The guidelines may be updated from time to time. Click <u>here</u> for changes that were made in September, 2008.

December 5, 2006

<u>401 – Operating System</u>					
Sr.	Торіс	Chapter	Reference		
No.		_			
1	Introduction	1	[1]		
2	Computer system structures	2.1 - 2.5	[1]		
3	Operating system structures	3.1 – 3.8	[1]		
4	Processes	4.1 - 4.5.4	[1]		
5	Threads	5.1 – 5.4, 5.7	[1]		
6	CPU Scheduling	6.1 - 6.5,6.7.3	[1]		
7	Process Synchronization	7.1 – 7.4, 7.5.1 –	[1]		
		7.5.2			
8	Deadlocks	8.1 - 8.3	[1]		
9	Memory Mgt.	9	[1]		
10	Virtual memory	10.1 – 10.6	[1]		
11	File system interface	11	[1]		
12	File system interface	12.1 – 12.7	[1]		
13	Mass storage structures	14.1 - 14.4	[1]		
14	Protection	18.1 - 18.2.2	[1]		
15	Security	19.1 – 19.4	[1]		
16	Device Management	5	[2]		

References :

- [1] Operating Systems concepts by Silberchaltz Galvin (VI th edition)
- [2] Operating Systems: A Modern Perspective (G.Null)

Chapter	Торіс	Reference
1 The Product	Upto 1.2	[1]
2 The Process	Complete	[1]
3 The Project management concepts	Upto 3.2	[1]
4 Software Process and Project metrics	Upto 4.5	[1]
5 Software Project Planning	Complete	[1]
6 Risk analysis and Management	6.1-6.4,6.6	[1]
7 Project Scheduling and tracking	7.1.2,7.2,7.3,7.6,7.7	[1]
8 Software Quality Assurance	8.1,8.3,8.4,8.6,8.7,8.8,8.10	[1]
9 Software configuration management	Complete	[1]
10 System engineering	Upto 10.3	[1]
11 Analysis Concepts and Principles	Upto 11.3	[1]
12 Analysis modeling	Complete	[1]
13 Design Concepts and principles	Complete	[1]
14 Architectural Design	14.1,14.2,14.5,14.6	[1]
17 Software testing Techniques	Upto 17.6.4,17.7.3	[1]
18 Software Testing Strategies	18.1 except 18.1.4,18.3-18.6	[1]
19 Technical Matrices for software	19.2.2 to 19.7	[1]

402 – Software Engineering

Note : Emphasis must be given to case studies, may be done from Jalote or any other book mentioned in other references.

References:

[1] Software Engineering – A Practitioner's Approach, V Edition by – Roger S.Pressman (McGraw Hill)

Other References:

- Software Engineering by Pankaj Jalote, Narosa.
- Software Engineering : An Engineering approach by J.F.Peters,W.
- Pedrycz (John Wiley)
- Software Engineering by I.Sommervlle(Addison Wesley)
- Fundamentals of Software Engineering by C.Ghezzi, M.Jazayeri, D Mandrioli(PHI)
- System Analysis and Design by Elias M. Awad(Galgotia).
- Software Engineering Fundamentals by Ali Behforooz, Frederick J.Hudson (Oxford)
- Introduction to S.E. by K.K. Aggarwal and Yogesh Singh.

<u> 403 – Programming Paradigms</u>	<u>403 –</u>	Progra	mming	Paradi	gms
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S NO.	Chapter	Торіс	Reference
1	language Design Issue	Except 1.5	[1]
2	Impact of M/C architecture	Except 2.2.4	[1]
3	Language translation Issue	Upto 3.2	[1]
4	Modelling Language Properties	Only 4.2	[1]
5	Elementary data types	Except 5.4	[1]
6	Encapsulation	Except 6.5	[1]
7	Inheritence	Except 7.2.4	[1]
8	Sequence Control	Complete	[1]
9	Subprogram Control	Complete	[1]
10	Storage Management	Till page 426	[1]
11	ML	A.7	[1]
12	LISP	A.6	[1]
13	Language Description	Except 2.5 & 2.6	[2]
14	Logic Programming	Complete	[2]
15	1,2,3 ,5,7 Programming in Prolog	Complete	[3]

References:

[1] Programming languages, Design and Implementation 4th Edition by Terrence W.Pratt [1] Hogramming languages, Design and Implementation 4 Flatton by Perferee 4.
[2] Programming languages By Ravi Sethi Addisson Wesley.
[3] Programming in Prolog for AI 3rd edition by Pearsons Education, Ivan Bratko.

B.Sc.(H) Computer Science Semester IV

Lab. Assignments: PROLOG

Q.1. WAP using recursion:

- (a) Quick sort/Insertion sort/Bubble sort
- (b) Tower of havoi
- (c) Fibonacci series
- (d) Factorial
- (e) Generates a list of all permutations of the elements in a list of members.
- (f) Palindrome

Q.2. Consider a cyclic directed graph [edge (p, q), edge (q, r), edge (q, r), edge (q, s), edge (s,t)] where edge (A,B) is a predicate indicating directed edge in a graph from a node A to a node B WAP to check whether there is a route from one node to another node.

Q.3. WAP to generate integers from 1 to 100 by back tracking on successive calls (use accumulator)

Q.4. Traverse a binary tree in preorder/post order/in-order.

Q.5. WAP for implementing login routine which prompts a user for username and password.

- Q.6. WAP for implementing medical diagnostic system.
- Q.7. WAP for the following:
 - (a) Merging two ordered list.
 - (b) Reversing a list
 - (c) Finding last element of list $1^{st}/2^{nd}/\text{last/n}^{th}$ element
 - (d) Obtain a list after deleting all occurrences of a particular element from a given list.
 - (e) Appending of 2 lists
 - (f) Delete all occurrence of an element
 - (g) Remove duplicates
- Q.8. Write a program to flatten the given list e.g. [a,(b,c).(d),e] i.e. [a,b,c,d,e]
- Q.9. Poneer of a no.
- Q.10. Multiplication of two numbers using recursion.

<u>404 – Differential Equations</u>

SECTION WITH TITLE	REF	THEORY	PROBLEMS +	CLASSES
		CLASSES	LAB WORKS	
2.1	[1]	2	3-19	2
Homogeneous linear		All examples theory	p.71	
equations of second order		without proof	Typical problems to	
			be done in the class	
2.2- Second order	[1]	1	1 – 26	1
Homogeneous equations			p. 75	
with constant coefficients				
2.3	[1]	1	1 – 23	1
Case of complex roots,			p. 80	
complex exponential function				
2.4	[1]	Explanation	1 – 14	2
Differential operators			p. 83	
2.6	[1]	1	1 - 18 and 20	2
Euler-cauchy equation			p. 96	
2.7	[1]	2	1 – 17	1
Existence and Uniqueness			p. 100	
theory. Wronskian				
2.8	[1]	1	1,3,5,8,9, 10	1
Non-homogenous equations			p. 103	
2.10 Solutions by variation of	[1]	1	1 – 17	2
parameters			p.111	
4.1 Power series method	[1]	1	1 –12 p. 198	1
4.2 Theory of power series	[1]	2	1 21	2
method		theory to be	p. 204	
		explained without		
		proof of theorem and		
		with e.g. of power		
		series		
4.3 Legendre's equation,	[1]		1,2,6, p.209	1
Legendre polynomial				
4.4 Frobenious method	[1]	One e.g. of each case	2 – 15, p. 216	1
		1		
4.5 Bessel's equation, Bessel	[1]	Recurrence relation	11, 12, 13, p. 226	3
functions		and all formulas		
		existing in the theory		
		and problems		
4.6 Bessel functions of second	[1]	Explanation only		
kind		1		
5.2 Transforms of derivatives	[1]	Examples to be	1-9	2
and integrals. Differential		explained	12,13,15,17,20	
equations		1	p 264	

5.3 Unit step function. Second shifting theorem Dirac's Delta function	[1]	Theorems without proof, problems and examples	2,3,7,8,9,10,13,14,15 16,19,20,21,23, p. 273 lab work: sketching 2- 7	2
			8-13 p 273	2
5.4 Differentiation and integration of transforms	[1]	Only method to be explained 1		
5.7 Systems of differential equations	[1]	Only examples to be explained 1	1 – 14 p 283	1

Note 1 : Chapter 2,3, and 4 of [2] may be referred for explaining relevant examples.

Note 2: [3] may be referred for further reading.

Additions:

- 1. Preliminary ideas of first order differential equation with special reference to integrating factors.
- 2. Operator methods for finding particular Integrals for cases when are (x) is of the type

 e^{ax} , $\cos ax / \sin ax$, x^n , $xV \text{ or } x^n V$, $e^{ax}V$ (V is a function of x) including cases of failure.

 $\frac{1}{f(D)}e^{ax} = x \frac{1}{\frac{d}{dD}f(D)}e^{x}$ when f(a) = 0 with its application to sin ax and or cos ax

3. Laplace Transform (L.T.)

§ 5-1, § 5-5 (Convolution) [1]

Evaluations of some integralas with the help of L.T.

References:

- [1] Advanced Engineering Mathematics by Erwin Kreyszig. : 8th edition.
- [2] Analytical and Computational methods of Advanced Engineering Mathematics by G.B.Gustafson, C.H.Wilcox.
- [3] Differential Equations : An introduction with Mathematica by C.C.Ross.