# **Guidelines for B.Sc.(H) Computer Science Semester VI**

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.

January 24, 2007

Sr.	Торіс	Chapter	Reference
No.			
1	Languages: Alphabets, string, language, Basic Operations on language, Con- catenation, Kleene Star	2	1
2	Regular Languages: (a) Regular Expressions (b) DFA Concepts of TGs & GTGs (C) NFA (d) Regular languages (e) Pumping Theorem (f) Design of lex	4 5 6 7 9 10 (Definition Regular languages, Theorem 13 and 14 with examples) 3.3.2	1 1 1 1 1 1 2
3	Context free languages: (a) Context free grammars (b) Pushdown automata (c) Pumping Theorem (d) Properties of context free languages	12 14 16 theorem 35 theorem 36 or 7.2.2 7.3	1 1 1 2 2
	<ul> <li>Models of Computations:</li> <li>(a) RAM, TM</li> <li>(b) UTM, Language acceptability decidability, insolvability problems</li> <li>(Excluding Tiling Problem, Rice Theorem, Proof of Undecidable Problems of CEG)</li> </ul>	Ch. 4 till 4.5 And 4.7 (Introduction) 5	3 3

# 601 – Theory of Computation

## **References**

1 Daniel I.A.Cohen, Introduction to computer theory, Second Edition (2000) - John Wiley.

- 2 Hoperoft, Aho, Ullman, **Introduction to Automata theory, Language & Computation** II Edition, Pearson Education.
- 3 Lewis & Papadimitriou, Elements of the theory of computation II Edition PHI.

#### References For Paper No. 601, 602, 603, 604, 605

- 1 Daniel I.A.Cohen, Introduction to computer theory John Wiley (1986)
- 2 Hoperoft, Aho, Ullman, Introduction to Automata theory, Language &
   Computation II Edition, Pearson Education.
- 3 Lewis & Papadimitriou, **Elements of the theory of computation** II Edition PHI
- W. Richard Stevens, Unix Network Programming Networking APIS:Sockets &
   XTI Vol. 1 2<sup>nd</sup> Edition.
- 5 Nemeth Synder & Hein, Linux Administration Handbook Pearson Edition
- 6 J.D.Foley Computer Graphics: Principles & Practice –II Edition
- 7 Donald Hearn & MP Baker Computer Graphics, II Edition, PHI
- 8 D.F.Rogers, Adams Mathematical Elements for computer Graphics, II Edition
- 9 H.A.Taha, Operations Research: An Introduction Seventh Edition
- 10 A.Ravindran, D.T.Phillips, J.S.Solberg, Operations Research
- 11 Rich & Knight, Artificial Intelligence Tata McGraw Hill
- 12 DAN.W. Patterson, Introduction to A.I and Expert Systems PHI
- 13 J.Jeffcoate, Multimedia in Practice

Sr.	Topic	Chapter	Reference
No	- opic	onupter	
110.			
1	Introduction	1	1
2	Transport Layer : TCP & UDP	2	1
3	Sockets Introduction	3	1
4	Elementary TCP Sockets	4	1
5	TCP Client-Server Example	5	1
6	I/O Multiplexing	6	1
7	Socket Options	7	1
8	Title?????	8	1
9	Elementary Name & Address	9	1
	Conversions		
10	IPV4 & IPV6 Interoperability	10.1 – 10.3	1
11	TCP/IP Networking	Chapter 13 Upto pg	2
		264 (Self Study)	
		Pg 264 – 274	
		Pg 278 – 302	
12	Networking Management &	20	2
	Debugging		

# 602 – Network Programming and Administration

#### **References:**

- 1 W. Richard Stevens, Unix Network Programming Networking APIS:Sockets & XTI Vol. 1 2<sup>nd</sup> Edition.
- 2 Nemeth Synder & Hein, Linux Administration Handbook Pearson Edition

#### **Suggested Practicals:**

- 1. Implement TCP Echo Client & TCP Echo Server (Concurrent)
- 2. Implement TCP daytime Client & TCP daytime Server (Iterative)
- 3. Implement UDP Echo Client & UDP Echo Server (Concurrent)
- 4. Implement UDP daytime Client & UDP daytime Server (Iterative)
- 5. Write a program to print all IP addresses of a host machine.

Sr.	Торіс	Chapter	Reference
No.			
1	Overview of CG sys.	2	2
		8(8.2 only)	2
		1 (1.9 only)	3
3	Raster Graphics	3 till 3.17.3	1
		(leaving 2 <sup>nd</sup> order	
	Clipping	differentials order)	
4	Transformation & Viewing	2, 3	3
			3
5	Geometric Modeling	11.1 – 11.2.3 (just def.)	1
		(introduction of 11.2.4,	
		11.2.5(Defenitions	
		only)),	
		11.2.7 - 11.2.10	
6	Hidden lines and surfaces	15.4, 15.5.1, 15.7.1	1
7	Shading	14.1 – 14.5	2
8	Animation	16	2

# **References:**

- 1 J.D.Foley Computer Graphics: Principles & Practice –II Edition
- 2 Donald Hearn & MP Baker Computer Graphics, II Edition, PHI
- 3 D.F.Rogers, Adams Mathematical Elements for computer Graphics, II Edition

## **Practical List**

- 1. Implement scan conversion algorithm DDA, Bresenham, mid-pt circle, mid-pt ellipse (create a library).
- 2. WAP to draw a polygon and fill it using scan-line fill algorithm.
- 3. WAP to draw a line with following attributes width, color, style.
- 4. WAP to draw a line and clip it with a window using (i) cohen suther and (ii) cyrus-bick algorithm.
- 5. WAP to implement Sutherland hodgeman algorithm of polygon clipping.
- 6. WAP to create any new font e.g. A, B
- 7. WAP to translate, scale & rotate any list, 2-D object.
- 8. WAP to model a 3-dimentional object say a cube and project it using parallel and puspective projection.
- 9. WAP to implement buffer algorithm.
- 10. WAP to display a cubic parametric termite & bezier curve.
- 11. WAP to show sun rise and sun set.

## <u>604 – Operational Research Techniques</u>

Sr.	Торіс	Chapter	Reference
No.			
1	The nature of Operations Research	1.1 - 1.4	2
2	Introduction to Linear Programming	2.1, 2.2.1, 2.2.2.	1
3	The Simplex Method	3.1,3.2,3.3.1,3.3.2,3.4	1
4	Duality and Sensitivity Analysis	4.1,4.2,4.3,4.5.1	1
5	Transportation Model and its variants	5.1,5.3.1,5.3.2,5.4.1	1
6	Decision Analysis and Games	14.4.1,14.4.2 (Graphical	1
		approach only)	
7	Network Analysis	3.7	2
		Pages 109-118	
		(PERT) 122-126	
8	Deterministic Dynamic Programming	10.1, (Page 403 onwards)	1
		10.2, 10.3.1, (selected	
		applications libe knapsack	
		problem/Cargo loading	
		problem	
9	Queuing Models	7.1 – 7.11	2
10	Classical Optimization Theory	20.2.2 Wolfe's method to be	1
		done from any other book on	
		operations research	

# **References:**

- 1 H.A.Taha, Operations Research: An Introduction Seventh Edition
- 2 A.Ravindran, D.T.Phillips, J.S.Solberg, Operations Research.
- 3. Kantiswaroop & Manmohan Gupta, Introduction to operational Research.

# <u>605 – Artificial Intelligence</u>

Sr.	Торіс	Chapter	Reference
No.			
1	What is Artificial Intelligence	1	1
2	Problems, Problem Spaces and Search	2	1
3	Heuristic Search Techniques	2	1
4	Lisp and other AI Programming Language	3	2
5	Formalized symbolic logics	4	2
6	Dealing with inconsistencies uncertainties	5	2
7	Probabilistic Reasoning	6	2
8	Structured knowledge: graph, frames & related	7	2
	structures		
9	Natural language processing	12	2
10	Pattern Recognition	13	2
11	Expert Systems Architectures	15	2

## **References:**

- 1 Rich & Knight, Artificial Intelligence Tata McGraw Hill
- 2 DAN.W. Patterson, Introduction to A.I and Expert Systems PHI

#### <u>605 – Multimedia Applications</u>

Sr.No.	Торіс	Reference
1.	1	1
2.	2	1
3.	3.1, 3.2	1
4.	4	1
5.	5.1-5.3	1
6.	6.1, 6.2, 6.3.3	1
7.	7.1, 7.3, 7.4.3	1
8.	8.1, 8.3	1
9.	9.1, 9.2, 9.6.1	1
10.	12	1
11.	13	1
12.	16.2.3	1
13.	Virtual Reality (Xerox Notes)	Notes

- 1. J. Jeffcoate, Multimedia in Practice
- 2. Principles of Multimedia by Ranjan Parekh, TMH © 2006

**Practicals:** HTML done in 1<sup>st</sup> Semester to be used for operating MM files using different audio & video compression like JPEG, MPEG, etc.

## MULTIMEDIA LAB. LIST (Using Javascript HTML)

- 1. Create a script that repeatedly flashes an image on the screen (fade in fade out).
- 2. Create a script that repeatedly zooms in and zooms out an image on the screen.
- 3. Use filters to display an image in grey scale, invert, x-ray normal.
- 4. Create a script that repeatedly flashes an image on the screen. Also inters pence image with text. Allow user to control blink speed.
- 5. Program to make playlist of songs.
- 6. Program to make playlist of videos.