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

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

July 21, 2006

101 Programming Fundamentals

Chapter	Reference
Chap 1 to 10, 12, 13	[1]
Chap 14	[1] (for lab only)

[1] H. Schildt, Java 2: The Complete Reference Book, Tata McGraw Hill

[2] R.G. Dromey, How to solve it by Computer, Prentice Hall of India

[3] H.M. Deitel, P.J. Deitel, JAVA: How to program, Pearson Education

Note: The scope of problems is indicated by Dromey's book. Also consult Deitel's book for more examples.

GUIDELINES OF B.Sc. (H) COMPUTER SCIENCE

I SEMESTER 2001-2002

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102 Discrete Structures

Chapter	Reference	Approximate Weightage
Ch 3.1-3.5	[1]	05 marks
Ch 5, 6	[1]	20 marks
Ch 9, 10	[1]	10 marks
Ch 1, 2, 3, 4, Appendix A Ch 1.23, 1.24	[2] [3]	20 marks
Ch 1 (except 1.2.5, 1.2.15, 1.4.4)	[4]	20 marks

[1] C.L. Liu, Elements of Discrete Mathematics, Tata McGraw-Hill.

[2] T.H. Cormen, C.E. Leiserson, R.L. rivest, Introduction to Algorithms, Prentice Hall of India, Second Edition.

[3] D.E. Knuth, The Art of Computer Programming Vol. I: Fundamental Algorithms, Addison Wesley

[4] J.P. Trembley, R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill

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103 Calculus I

Chapter	Reference
Ch 8: 8.1, 8.2 (Till page 626, Exclude Picards Method), 8.3-8.6, 8.7 (Till page 659, Exclude rearranging Series)	[1]
Ch 1: Review of 1.1-1.4	[1]
Ch 2: Review upto 2.5	[1]
Ch 1: 1.5, 1.6	[1]
Ch 3: 3.1, 3.2, 3.3	[1]
Ch 8: 8.9, 8.10	[1]
Ch 6: 6.6	[1]
Ch 3: 3.4, 3.7	[1]
Ch 12: 12.1-12.6	[1]
Ch 11: 11.1	[1]
Ch 12: 12.7, 12.8, 12.9, 12.10	[1]
Differentiation under Integration Pg 71-82	[2]

Approximate distribution of marks:

Ch 1, 2, 8	25 marks
Ch 3	16 marks
Ch 12	25 marks
§6.6	04 marks
§11.1	04 marks
Ref [2] Pg 71-82	06 marks

[1] Thomas and Finney, Calculus and Analytic Geometry, Ninth Edition, Addison Wesley

[2] R. Courant, F. John, Introduction to Calculus and Analysis Vol II, Springer Verlag, 1989.

[3] P. Lax, S. Burstein, A.Lax, Calculus with Applications and Computing, Narosa Publications.

[4] R.L. Wilson, Much Ado about Calculus, a Modern Treatment with Applications Prepared for use with the Computer, Springer Verlag

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Notes:

- Proofs of major theorems are to be covered which sometimes appear as exercises. Proof of Theorem 2, 4 and 6 in §8.2 and §8.3, Taylor's Theorem in §8.10 (in Lab), Theorem 3 in §12.4 are to be covered. Proof of Theorem 7 in §8.2, Theorem 2 in §12.2 may however be skipped.

- Experiments and explorations for class individual and group work with the help of grapher, calculator, Computer Algebra System (CAS) or other computer systems are to be encouraged.

- Textbooks should be supplemented by tool-books like multivariable calculus with Mathematics by K.R. Combes, R.L. Lipsman and J.M. Rosenberg (Springer Verlag)

- Students should be encouraged to consult Websites on Visual Mathematics or discussion of topics with pictures/ audio-visuals and to see mathematical video films.

- Students should be encouraged to read or consult Computer Corner Proofs without words in various Mathematics Periodicals such as the College Mathematics Journal, Mathematics Magazine and American Mathematical Monthly published by Mathematical Association of America.

- Two periods per week per student should be allocated for Lab. The use of Lab is particularly recommended for Reference [1] §8.1 (exercises), §8.2, §8.4 -§8.7, §8.10 (Taylor's Theorem), §1.1 - §1.2, §2.1 - §2.3, Ch 3, §6.6, §3.3, §12.1, §12.7 - §12.10 (one class on each article).

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Minimum set of exercises (to be carried out as take home assignment and lab assignments) and general suggestions for the effective use of Lab in teaching are as follows:
Section Numbers and Problem Numbers are as in Calculus and analytic Geometry, G.B. Thomas, R.L. Finney, Ninth Edition, Addison Wesley.

(1) Chapters 1, 2, 3, 6, 8 and 11:

Section	Take home Assignment	Lab Assignment	Remarks
8.1	34, 37, 39, 41	23, 24, 29, 55, 60	
8.2	1, 10, 18, 21, 25, 44, 60, 63, 64, 67, 71	68	
8.3	3, 12, 19, 30, 35, 36, 39, 43, 48, 57, 61 to 70, 77	53, 78, 75, 76	
8.4	23, 25, 31, 34, 39		
8.5	1, 4, 7, 19, 25, 35	41	
8.6	3, 4, 22, 27, 29, 36	Example 1	
8.7	3, 5, 18, 42	45, 47, 50, 51	
8.9	5, 12, 27		
8.10			Class in Lab
1.1, 1.2 Review unit		Review in Lab	
1.3 Review unit	8, 11, 14, 22, 24	61, 63	
1.4 Review unit	3, 20, 23		
1.5, 1.6 Review unit			Class in Lab
2.1 to 2.3		Review in Lab	

Review unit			
2.4, 2.5 Review unit			Theory Class
3.1	1, 5, 13, 15, 21		
3.2		29, 30, 45, 52	
3.3, 3.4			Class in Lab
3.7			Class in Lab
6.6			Class in Lab
11.1		62, 63	

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(2) Chapter 12:

For Chapter 12, Lab should be used for illustrations and examples. On average one class for each section should be held in Lab. For instance, following division can be followed.

Section	Take home assignments	Lab Assignment	Remarks
12.1 Definitions up to Example 6		19, 21, 27, 35	Class in Lab: Example 7 onwards
12.2 Up to Example 3		Example 4, Graphs & other similar Illustrations through Internet. Exercises like 31, 36	
12.3	53, 57	Up to Example 5	Example 8 onwards in Class Room
12.4		Illustration like Examples 5, 6	Up to Example 1 in Class room, Rest in Lab
12.5			Up to Example 1 in Class Room
12.6	All Examples	Illustrations in Lab	
12.7 to 12.10			Remark: After giving Definitions and Basic theory in Class Rooms the Classes for these sections should be conducted in Lab to facilitate the Illustrations. Formal Proofs of the Theorems in these sections may be omitted

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104 Digital Electronics

Chapter	Reference
Ch 1: 1.1-1.9	[1]
Ch 2: 2.1-2.8	[1]
Ch 3: 3.1-3.11	[1]
Ch 4: 4.1 to 4.9	[1]
Ch 5: 5.1 to 5.6	[1]
Ch 6: 6.1 to 6.8	[1]
Ch 7: 7.1 to 7.5, 7.9	[1]
Ch. 9, 9.1, 9.2	[1]
Ch 7: Complete	[2]
Ch 8: 8.5 to 8.9	[2]
Ch 11: 11.1 to 11.5, 11.10 to 11.16	[3]

[1] Morris Mano, Digital Design Second Edition, PHI
[2] Milos Ercegovac, Tomas Lang, Jaime H.Moreno, Introduction to Digital Systems, John Wiley and Sons
[3] Ronald J. Tocci, Digital Systems Principle and Applications Sixth Edition, PHI
[4] Malvino, Digital Principles and Applications, Tata McGraw Hill.

105 Language: Form and Function

Chapter	Reference
Ch 1, 3, 5 to 11, 13, 19, 20	[1]
Ch 1 to 7, 9	[2]
Entire Text	[3]

[1] G. Yule, The Study of Language, Cambridge University Press
[2] Akmajian, R.A. Demers, R.M. Harnish, Linguistics: An Introduction to Language and Communication, MIT Press, Cambridge, London
[3] R. Grishman, Computational Linguistics, Cambridge University Press
[4] J. Altchison, The Articulate Mammal, Hutchinson, London
[5] J. Lyons, Language and Linguistics: An Introduction, Cambridge University Press

106 `Practical: Exercises based on work mentioned in the syllabus

Q 1 WAP to compute the sum of the first n terms of the follow ng series.

S=1+1/2+1/3+1/4+------

Q 2 WAP to compute the sum of first n terms of the following series.

S=1-2+3-4+5+……..

Q 3 WAP to compute the factorial of a given no N

Q 4 WAP to reverse a given integer N

Q 5 Write a method to find whether a given no, is prime or not. Use the same to generate the prime nos. less than 100.

Q 6 WAP to compute the factors a given no N

Q 7 Write a recursive method to generate the nth term of fibonacci sequence

Q 8 Write a recursive method to generate the g.c.d of two + ve nos.

Q 9 WAP to find max number in a set of N nos.

Q 10 WAP to remove duplicate from an ordered array.

Q 11 WAP that sorts a list a N nos using selection sort

Q 12 WAP that sorts a list N nos using insertion sort

Q 13 WAP that sorts a list a N nos using bubble sort

Q 14 Given 2 ordered arrays of integers, WAP to merge the 2 – arrays.

Q 15 WAP that search for a given element x in a set of N nos using linear search.

Q 16 WAP that seach for a given element x in an ordered set of N nos using Binary Search.

106 `Practical: Exercises based on work mentioned in the syllabus

Q 17 Create a class called **Rational** for performing arithematic with rational nos. Use integer variables to represent the private instance variables of the class, numerator and denominator. Write a constructor method that enables an object of this class

to be initialized when it is declared. Provide a no argument constructor with default values in case no initializers are provided. Write methods for

(a) Addition
(b) Subtraction
(c) Multiply
(d) Division
(e) Printing in the form a/b

WAP to test the above class

Q 18 Create a class **Matrix** for implementing Matrix operations. Write methods for performing following Matrix operations

(a) Addition
(b) Multiplication
(c) Transpose
(d) Printing Matrix

Q 19 Create class **SavingsAccount**. Use a static class variable to store the **annualInterestRate** for all account holders. Each object of the class contains a private instance variable **savingsBalance** indicating the amount the saver currently has on deposit. Provide a method **calculateMonthlyInterest** to calculate the monthly interest. This interest should be added to savingsBalance. Provide a static method **modifyInterestRate** that sets the annualInterestRate to a new value.

WAP to test class SavingsAccount. Instantiate 2 savingsAccount objects saver1 and saver2 with balances of $2000.00 and $3000.00. Set annual InterestRate to 4%, then calculate the monthly interest and print the new balances for each of the savers. Then set the annualInterestRate to 5% and calculate the next month's interest and print the new balances for each of the savers.

Q 20 Create a base class Person with the following instance variables – name, age, father's name, dob and the methods to get the name, age, father's name and dob. Write a method toString for this class.

Create a sub class called **Student.** It contains RollNo, Class, Marks_Obtained as its instance variables. Write methods to get the rollNo, Class, Marks_obtained for this Class. Also write a method toString for this class.

WAP to test the above classes.

106 Practical: Exercises based on work mentioned in the syllabus

Q 21 Create a package pck1. Create a class person (as in Q 20) in pck1. Create another package pck2 . Create a class Student in pck2.

WAP that creates an object of class student and print all information about that object.

Q 22 Create a base class called Shape. It should contain 2 methods getcoord() and showcorrd () to accept X and Y coordinates and to display the same respectively.

Create a sub class called Rect. It should also contain a method to display the length and breadth of the rectangle called showCorrd().

In main method, execute the showCorrd() method of the Rect class by applying the dynamic method dispatch concept.

Q 23 Create an interface called **VariableTest** which contains a method called **disp()**. And two variables x, y which are integers and whose value is set to 10 and 20. Create a class called **VarIntTest** which implements this interface. The disp() method should display a message "Inside interface – variable Test and method disp". Write a method called display() within VarIntTest class to print the value of x.

Q 24 WAP that encodes English language phrases into a pigLatin. To translate each English phrase into a pigLatin word, place the first letter of the English word at the end of the word and add the letters "ay". Thus the word "jump" becomes "umpjay". Blanks should remain blank.
Write a method printLatin Word that should display each word. Enable the user to input the sequence.

Q 25 WAP that reads several lines of text from the keyboard and print a table indicating the no. of occurances of each letter of alphabet in the test.

Q 26 WAP that inputs several lines of text and a search character and uses method String Method index Of to determine the no. of occurances of the character in the text.

Q 27 WAP that copies one file to another. Pass the names of the files through command-line-arguments

106 Practical: Exercises based on work mentioned in the syllabus

Features of HTML (Web Page Designing using HTML) to be covered

1. Browser and World Wide Web
2. Basic HTML file, Header elements h1 through h6

3. Text formatting (bold, italic, font, colors etc.)
4. Horizontal Lines
5. Internal linking, linking to other web pages, linking to an email address
6. Manipulating images in HTML files, use of images as link anchors
7. Inserting special characters in hyper text document
8. Lists (ordered, unordered, nested)
9. Simple table designing
10. Simple form designing (text boxes, check boxes, radio buttons etc)

Distribution of Marks for the Semester Examination for the Practical Paper 106 :

2 Java programs	:	70 Marks
HTML program	:	08 Marks
Power point presentation	:	06 Marks
Spreadsheet	:	06 Marks
Viva-voce	:	30 Marks
Internal Assessment	:	30 Marks

Practical Paper : 106 (based on 101)

Total Marks : 150

Internal Marks	: 30
Viva	: 30
Java (2 progs)	: (35 + 35)
HTML	: 35
MS office	: 10