

FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS

FOR

B.Sc. (Information Technology)

Examination – 2010



GURU NANAK DEV UNIVERSITY AMRITSAR

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Price : Rs. 80-00

Eligibility :

Admission to Bachelor of Science Information Technology, course shall be open to a candidate who has passed 10+2 examination with 40% marks in aggregate from Punjab School Education Board or equivalent thereto.

Scheme for *B.Sc. Information Technology Part – I*

<i>Paper No.</i>	<i>Subject</i>	<i>M. Marks</i>
Paper - I	Communication Skills	100 Marks
Paper - II	Basic Mathematics & Statistics	100 Marks
Paper - III	PC Computing	100 Marks
Paper - IV	Fundamentals of Information Technology & Operating Systems	100 Marks
Paper - V	Programming in C	100 Marks
Paper - VI	Principles of Electronics	100 Marks Theory : 75 Practical : 25
Paper - VII	Basic Accountancy	100 Marks
Paper - VIII	Practical: C Language	50 Marks
Paper – IX	Practical: PC Computing	50 Marks
Paper – X	Punjabi/Punjab History and Culture	100 Marks

B.Sc. (Information Technology) Part – II

Paper No.	Subject	Marks
Paper - I	Numerical Methods & Statistical Techniques	100 Marks
Paper - II	Internet Applications	100 Marks
Paper - III	Computer Architecture	100 Marks
Paper - IV	Object Oriented Programming Using C++	100 Marks
Paper - V	Database Management System & Oracle	100 Marks
Paper - VI	Data Structure	100 Marks
Paper - VII	Environmental Studies	75 Marks
Paper - VIII	Programming Lab – I	100 Marks
Paper - IX	Programming Lab – II	100 Marks
Paper - X	Environmental Studies (Field Studies)	25 Marks

Scheme for *B.Sc. Information Technology Part – III*

<i>Paper No.</i>	<i>Subject</i>	<i>Marks</i>
Paper – I	Computer Networks	100
Paper – II	Operating Systems	100
Paper – III	E – Business	100
<p>Paper IV & V will be based on any of the three specialization options:</p> <p>Option (I): Database Application</p> <ul style="list-style-type: none"> - Paper – IV RDBMS - Paper – V Practical Lab: Based on Oracle 8.0 & Developer 2k <p>Option (II): Web Based Application</p> <ul style="list-style-type: none"> - Paper – IV JAVA & Web Programming. - Paper – V Practical Lab: Based on JAVA & Web Designing. <p>Option (III): Network Management</p> <ul style="list-style-type: none"> - Paper – IV Networking Operating System / Client Server Application - Paper – V Practical Lab: Based on NOS. 		
Paper – IV & V		
	- Paper – IV JAVA & Web Programming.	100
	- Paper – V Practical Lab: Based on JAVA & Web Designing.	100
	- Paper – IV Networking Operating System / Client Server Application	100
	- Paper – V Practical Lab: Based on NOS.	
Paper – VI	Project Report	300

Paper-I Communication Skills**Time: 3 Hours****M. Marks : 100****Theory : 70****Pract. : 30****Contents:**

1. **Reading Skills** : Model of reading to learn - P.S.O.R; Reading Tactics and strategies; Reading purposes-kinds of purposes and associated comprehension; Reading for meaning; Reading outcomes structure of meaning technique, paraphrase, summary writing.

Activities

- a) Develop an awareness of “Reading to learn Procedure”.
- b) State reading purposes and comprehension.
- c) Check on reading outcomes including paraphrasing and writing of summary.

2. **Writing Skills** : Guidelines for effective writing; writing styles for application, personal resume, business letter, memo; technical report-style, arrangements, illustration, main section and appendices, conclusion, list references, table of contents, synopsis, revision.

Activities

- a) Writing of an application, business letter, memo and personal resume.
- b) Writing a technical report.

3. **Listening Skills** : Barriers to listening; effective listening skills; feedback skills. Attending telephone calls; note taking.

Activities

- a) Listening exercises - Listening to News/TV
- b) Note-taking of a speech/lecture

4. **Speaking and Discussion Skills** : Components of an effective talk/presentation; planning and organizing content for a talk/presentation, use of visual aids, effective speaking skills, discussion skills.

Activities

- a) Making presentation on a given topic.
- b) Participating in a group discussion.
- c) Conducting a meeting.

Recommended Books

1. Oxford Guide to Effective Writing and Speaking by John Seely
2. A Course in Listening and Speaking-I by V. Sasikumar et. al.,
Foundation Books.

Suggested Books :

1. Reading to learn by Sheila H.A. Smith, M and Thomas, L. Methuen; London, 1982.
2. Basic Managerial Skills for all; McGrath S.J.; Prentice Hall of India, New Delhi, 1991.
3. Technical Reporting Writing British Association for Commercial and Industrial Education, BACTE, 1972.
4. Handbook of Practical Communication Skills; Chrassie Wright (Ed), JAICO Books, 1996.

Practical

1. Oral presentation with/without audio visual aids.
2. Group discussion
3. Listening to any recorded material and asking oral questions for listening comprehension.

Suggested Pattern of Question Paper

- A) The question paper will consist of five skill-oriented questions from Reading and Writing Skills. Each question will carry 10 marks. There will be internal choice wherever possible.
- i) Comprehension of a passage
 - ii) Summary/Precis
 - iii) Application
 - iv) Business correspondence
 - v) Minutes of a meeting
 - vi) Business/Technical reports
 - vii) Memo
 - viii) Resume
- B) There will be two simple questions on the theory of four skills. Each question will be of 10 marks. There will be internal choice, if possible.
- i) Different types of reading
 - ii) Skimming
 - iii) Scanning
 - iv) Reading purpose
 - v) Learning to Read
 - vi) Reading to Learn

- vii) Topic Sentence
- viii) Coherence
- ix) Unity
- x) Barriers to Listening
- xi) How to prepare for Presentation
- xii) How to conduct a meeting
- xiii) How to make communication effective etc.

Note : Similar question can be added on the four skills.

Oral Testing**Marks : 30***Contents*

1. Oral Presentation with/without audio visual aids.
2. Group Discussion.
3. Listening to any recorded material and asking oral questions for listening comprehension.

Note :

1. Oral Presentation will be of 5 to 10 minutes duration.
(Topic can be given in advance or it can be of student's own choice)
Use of audio visual aids is desirable but not necessary.
2. Group discussion comprising 8 to 10 students on a familiar topic. Time for each group will be 15 to 20 minutes.
3. Oral test will be conducted by external examiner with the help of internal examiner. The oral test examiner will be appointed from those teachers who are actually teaching the subject.

Paper – II Basic Mathematics and Statistics**Time: 3 Hours****Max. Marks: 100**

Note : 1. Eight questions will be set. The examinee will have to attempt any five. All questions carry equal marks.

2. The student can use only Non-programmable & Non-storage type Calculator.

Unit - I

Real line, intervals, bounds, lub and glb. the Lub property of real numbers. Order properties of real number. Absolute values and related inequalities. Extended real number system.

Limits of real-valued functions of a real variable. Algebra of limits, one sided limits.

Continuous functions, types of discontinuities. Algebra of continuous. Composite functions and their continuity.

Sign of a function in a neighbourhood of a point of continuity.

Statements and applications of intermediate-value theorems.

Unit - II

Theorems on maxima and minima. Continuity of inverse functions defined on intervals.

Leibnitz theorem, Rolle's Theorem, Lagranges Mean value Theorem, Cauchy's mean value Theorem, Taylor's Theorem, Inequalities Taylor series, Approximation, sign of a derivative. Intervals of increase and decrease of a given function, Infinite limits, indeterminate forms.

Unit - III

Convexity, concavity, asymptotes and curve tracing of curves of the form, $f(x,y)=0$. Parametric equations, Theorems on derivatives of inverse functions. Hyperbolic and inverse hyperbolic functions and their derivatives.

Tracing of curves given in terms of parametric equations.

Curvature of a curve (cartesian and parametric forms).

Unit - IV

Reduction formulae for integrands of the type.

$x^n e^x, x^m (\log x)^n, x^n \cos^n$ and $x^n \sin^n x, \cos^n x, \sin^n x, \sin^m x \cos^n x$

Integrals involving inverse trigonometric and hyperbolic functions.

Unit - V

Definite integrals (cartesian , parametric), Computation of length of arcs and areas under given curves. Methods of approximation (simpson's Rule and Trapezodial Rule).

Unit-VI

Probability and Statistics : Mathematical and statistical probability, axiomatic approach to probability, Law of addition of probability, dependence of events, Baye's Theorem.

Unit-VII

1. Matrices and Determinants : Introduction and definition of matrices, types of matrices, matrix addition and scalar multiplication, transpose and inverse of matrix, solouion of system of linear equations, definition and properties of determinants (statement only), characteristic polynomial, eigen values, nature of eigen values, certain types of matrices, Cayley - Hamilton theorem.

Paper – III PC Computing**Time: 3 Hours****M. Marks: 100**

Note:1. In theory, eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks.

2. The student can use only Non-programmable & Non-storage type Calculator.

1. Introduction to Windows vista**2. Basic of Windows vista**

- a) The Desktop, the Taskbar.
- b) Start Menu.
- c) Program, Document, Settings, Find, Help, Run, Shutdown.
- d) About the My Computer Icon.
- e) About the Networking Neighborhood Icon.
- f) Recycle Bin.
- g) Folders – Creation and Definition.
- h) New Rules for File Names.
- i) Windows Explorer (Definition)
- j) Shortcut Icons with creation and definition.

3. Introduction to MS – Office 2003**4. Introduction to Word (Word for Windows).**

- a) Introduction to Word.
- b) Introduction to parts of a Word Window (Title Bar, Menu Bar, Tool Bar, the Ruler, Status area.)
- c) Creating New Documents.
- d) Opening an Existing Document.
- e) To insert a second document into an open document.
- f) Editing a document.
- g) Deleting text, replacing text, moving and copying text.
- h) Page setup.
- i) Margins and Gutters.
- j) Changing Fonts and Font Size.
- k) To make text bold, italic or underline.
- l) Line Spacing.
- m) Centering, Right Alignment and Left Alignment.
- n) Page Breaks.

- o) Headers and Footers.
- p) Putting Page Numbers in Headers and Footers.
- q) Saving Documents
 - Naming Word Document.
 - Saving in different Formats.
 - Saving on different disks.
- r) Spell Checking.
- s) Printing.
- t) Creating a Table Using: the Table Menu.
 - Entering and editing text in tables.
 - Selecting in tables.
 - Adding Rows.
 - Changing row heights.
 - Deleting Rows.
 - Inserting Columns.
 - Changing Columns and Cell Width.
- u) Borders and Shading.
- v) Templates and Wizards.
- w) Working with Graphics.
- x) Drawing Objects.
- y) Using Frames to Position Objects.
- z) Mail Merge.
- aa) Using Word and Word Documents with other Applications.

6. Introduction to MS – PowerPoint

I. Introduction to MS Power Point.

II. Power Point Elements.

- Templates.
- Wizards.
- Views
- Color Schemes

III. Exploring Power Point Menu.

- Opening and Closing Menus.
- Working with Dialog Boxes.

IV. Adding text, adding Title, moving text area, resizing text boxes, adding art.

V. Starting a new slide.

VI. Starting a Slide Show.

VII. Saving Presentation.

VIII. Printing Slides.

IX. Views

- Slide View, Slide Sorter view, notes view, outline view.

- X. Formatting and enhancing text formatting.
 - a) Formatting
 - Changing format with a new layout.
 - Using a pick a look wizard to change format.
 - Alignment of Text.
 - Working with text spacing.
 - b) Enhancing
 - Using Bullets.
 - Changing text font and size.
 - Selecting text style, effect and color.
 - Picking up and applying styles.
 - Choosing the transition.
- XI. Creating Graphs.
- XII. Displaying slide show and adding multi-media.
- XIII. Adding slide transitions.
 - Choosing the Transition.
 - Choosing the transition period.
- XIV. Timing Slide Display
- XV. Building Slides.
- XVI. Adding Movies and Sounds.

Text Book:

1. R.K. Taxali : Introduction to Software Packages, Galgotia Publicaions.
2. MS-Office 2003 compiled by SYBIX
3. MS-Office 2003 BPB Publications.

Paper – IV Fundamentals of Information Technology & Operating Systems**Time: 3 Hours****M. Marks: 100**

Note:1. In theory, eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks. The maximum marks of the paper is 100.

2. The student can use only Non-programmable & Non-storage type Calculator.

Part – A***Fundamentals of Information Technology:***

History of computers; basic computer organization, Numbers system, computer codes, computer arithmetic, Boolean Algebra & logic circuits, primary storage, secondary storage devices, input – output devices, computer software & hardware, flow – charting, computer languages.

Part – B***Operating Systems:***

1. What is an operating System – Evolution of OS, Machine Languages, Assembly, Compiler, interpreter.
2. Types of Operating Systems with Examples.
 - a) Single User Systems: MS DOS.
 - b) Multi User Systems: Unix.
3. Brief History of MS – DOS.
4. Terminology for MS DOS.
 - a) File.
 - b) Types of File (Data, Program).
 - c) Wild Cards (*, ?).
 - d) Directory (Root, Single, Multi, Current)
 - e) Relative and Absolute Path.
 - f) Booting a System (ROM, BIOS self test, Post, IO.SYS, MSDOS.SYS, Autoexec.Bat, Config.Sys, Command.Com).

5. Internal & External Commands with Syntax (Arguments & Parameters).
 - a) Internal: cls, date, time, md, cd, copy con, dir, type, ren, delete, rd, copy.
 - b) External: chkdsk, scandisk, mem, attrib, xcopy, diskcop, diskcomp, backup, restore.
6. Features and Benefits of Unix.
7. Unix System (Multi – Programming, time sharing, multi – tasking).
8. Types of Files (Ordinary, directory and special files).
9. Types of users in Unix – levels of users (0 – 2)
10. Login and Logout from Unix session.
11. Simple Directory and File Commands.

cat, ls, ln, chmod, mail, who am i, cal, pwd, date, ps, mkdir, cd, rmdir, rm, tput, clear.
12. Piping, filters, batch processing, shell programming (echo, read, case constructs).
13. Editors (vi): Commands for opening, inserting, modifying, deleting and saving a file.

Paper – V Programming in C**Time: 3 Hours****M. Marks: 100**

- Note :**
- 1. In theory, eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks. The maximum marks of the paper is 100.**
 - 2. The student can use only Non-programmable & Non-storage type Calculator.**

Fundamentals: Character set, identifiers and key words, data types, constants, variables, expressions, statements, symbolic constants.

Operators and expressions: Arithmetic operators, unary operators, relational and logic operators, assignment and conditional operators, library functions.

Data input and Output: Preliminaries, single character Input, single character output, entering input data, more about scanf function, writing output data more about printf functions, gets and puts functions, interactive programming.

Control Statements: Preliminaries, while, do-while and for statements, nested loops, If-else, switch, break - continue statements.

Functions: Brief overview, defining, accessing function, passing arguments to a function, specifying argument data types, function prototypes, recursion. Storage classes: Automatic, external and static variables.

Arrays: Defining and processing as array, passing array to a function, multi – dimensional arrays, Strings: String declaration, string functions and string manipulation.

Pointers: Fundamentals, pointer declaration, passing pointers to a functions, pointer and one dimension arrays, operation on pointers, pointers & multi-dimensional arrays, passing functions to other functions, more about declarations.

Structures & Unions: Defining and processing a structure, user defined data types, structures and pointers, passing structures to a functions, self referential structure, unions.

Data Files: Opening, closing, creating and processing of data files.

References:

1. Programming in C : Schaum Outlines series.
2. C Programming : Stephen G. Kochan.

Paper – VI Principles of Electronics**Time: 3 Hours****M. Marks: 100****Theory: 75****Practical: 25**

Note:1. In theory, eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks. The maximum marks of the paper is 100.

2. The student can use only Non-programmable & Non-storage type Calculator.

Band theory, n-and p-semi-conductors, pn-junction, depletion Region, barrier potential, capacitance effects, reverse and forward biased p-n junction Applications of pn-junction (as a Rectifier). The transistor, PNP, NPN, FETS, MOS, FET, biasing of transistors, Bias stability, sterility factor for self-bias, h-parameters and their use in transistor circuit analysis, basic amplifiers .

Thevenin theorem, Norton theorem, Maximum power transfer theorem, Delta-Y transformation. Boolean algebra, De-morgan's theorems, logical gates, truth tables, k-maps SOP and POS reduction, logical circuits : half adder, full adder, subtractor, multiplexer, demultiplexer, comparator, parity generator and checker, code conversion ; BCD ;to binary, binary to BCD, decimal to BCD, encoder, octal to binary encoder. Flip Flpps, RS, JK, D-type, master- slave flip flops-registers; shift registers, counters.

References

Mehta	Basic Electronics
M.M. Mano	Digital logic and Computer Design
Bhargva Kulshershta	Basic Electronics and linear circuits
J. Millman & CC Halkias	Electronics circuits & Devices.

List of Practicals

1. Study of P – N junction Diode.
2. Study of Zener Diode characteristics.
3. Determination of the characteristics of N – P and P – N – D transistor and Biasing.
4. Determination of the characteristics of F.E.T.
Paper:
5. Study of full wave (center top and bridge) Rectifier using P – N junction Diode.
6. Verification of Truth – Tables of following gates:
AND, OR, NAND, NOR, XOR.
7. To realize AND, OR gates using NAND gates and verify their Truth – Table.
8. Verification of Truth – Tables of D and JK flip – flop.
9. Construct a 4 bit shift register using JK flip flop.
10. To verify the maximum power transfer theorem and reciprocal theorem.
11. To verify Thevenin & Norton theorems for a given network.

Paper – VII Basic Accountancy**Time: 3 Hours****M. Marks: 100****Note: Eight questions will be set and examiners will have to attempt any five.****The student can use only Non-programmable & Non-storage type Calculator.****Part – A**

An introduction to accountancy, Accounting principles: Concept and conventions, double entry systems of accounting, subsidiary book, preparation of final accounts of sole trader.

Part – B

Management Accounting: Meaning, objectives, advantages, functions and limitations, interpretation and analysis of financial statements. Working capital Analysis, ratio analysis, Cost accounting its objective, advantage and functions, Distinction between cost & financial accounting. Inventory control, variable costing.

Text/Reference

- | | | |
|----|--|--|
| 1. | Computer land Business | Schaum series |
| 2. | Introductions Data Processing. | I.S. Series |
| 3. | Cost Accounting | A.C. Katyal, T.R. Sikka, N.S. Bhalla,
C.B. Gaur |
| 4. | Cost Accounting | Jain & Narang |
| 5. | Management Accounting | Sharma & Shashi K. Gupta |
| 6. | Accountancy | Juneja, Chawla, Saxena |
| 7. | Management Analysis & Financial
Control | S.N. Maheshwari |

Paper – VIII***Practical – C Language******M. M. 50***

Paper – IX***Paper – PC Computing******M. M. 50***

Practical based on Windows Vista, MS-Word 2003, Power Point, ACCESS, Front Page EXCEL).

DOS Commands : Internal & external, batch files, time editor.

PAPER-X

ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ

ਸਮਾਂ : 3 ਘੰਟੇ

ਕੁਲ ਅੰਕ : 100

ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ : 4

1. ਆਤਮ ਅਨਾਤਮ (ਕਹਾਣੀ ਭਾਗ) ਸੰਪਾ. ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਸੁਹਿੰਦਰਬੀਰ ਸਿੰਘ,
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ, 2007
 - (ੳ) ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ (ਦੋ ਵਿੱਚੋਂ ਇੱਕ) 5 ਅੰਕ
 - (ਅ) ਕਿਸੇ ਇੱਕ ਕਹਾਣੀ ਦਾ ਵਿਸ਼ਾ ਵਸਤੂ/ਕੇਂਦਰੀ ਭਾਵ/
ਸਾਰ/ਕਹਾਣੀ-ਕਲਾ ਤੇ ਪਾਤਰ ਚਿਤਰਨ (ਦੋ ਵਿੱਚੋਂ ਇੱਕ) 20 ਅੰਕ

2. ਆਤਮ ਅਨਾਤਮ (ਕਵਿਤਾ ਭਾਗ) ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਸੁਹਿੰਦਰਬੀਰ ਸਿੰਘ,
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ, 2007
 - (ੳ) ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ (ਦੋ ਵਿੱਚੋਂ ਇੱਕ) 5 ਅੰਕ
 - (ਅ) ਕਿਸੇ ਇੱਕ ਕਵੀ ਦੀਆਂ ਸੰਗ੍ਰਹਿ ਵਿਚ ਸ਼ਾਮਲ ਕਵਿਤਾਵਾਂ
ਵਿਚਲੇ ਵਿਚਾਰ/ਕਿਸੇ ਇੱਕ ਕਵਿਤਾ ਦਾ ਵਿਸ਼ੇ ਵਸਤੂ
(ਦੋ ਵਿੱਚੋਂ ਇੱਕ) 20 ਅੰਕ

3. ਲੇਖ (ਜੀਵਨੀ ਪਰਕ ਸਮਾਜਿਕ ਤੇ ਚਲੰਤ ਵਿਸ਼ਿਆਂ ਉਤੇ)
 - (ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ) 30 ਅੰਕ
 4. ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ 5X2=10 ਅੰਕ
 5. (ੳ) ਮੁਹਾਵਰੇ ਤੇ ਅਖਾਣ 5 ਅੰਕ
 - (ਅ) ਵਿਸ਼ਰਾਮ ਚਿੰਨ੍ਹ 5 ਅੰਕ

Paper-X : Punjab History and Culture (1450-1947)**Time: 3 Hours****Max. Marks: 100****Note: Instructions for the paper setters/examiners:**

Each question paper shall consist of two sections viz A and B as under :-

Section A- The examiner shall set 10 questions and the candidates will attempt any 7 questions carrying 4 marks each . Answer to each question shall be in 10 to 15 sentences. The total weightage of this section shall be 28 marks.

Section B- The examiner shall set 8 questions which will cover the entire syllabus. The candidates shall attempt any 4 questions in atleast 5 pages each . Each question shall carry 18 marks. The total weightage of this section will be 72 marks.

1. Bhakti Movement
2. The Mughals and their Legacy
3. Guru Nanak Dev and His Teachings
4. Development of Sikhism from Guru Angad Dev Ji to Guru Tegh Bahadur Ji.
5. Guru Gobind Singh and Foundation of the Khalsa
6. Banda Bahadur and Sikh Struggle for Sovereignty
7. Misl and the Rise of Maharaja Ranjit Singh
8. Ranjit Singh as Sovereign of the Punjab
9. Anglo-Sikh Wars and Annexation of the Punjab into British Empire.
10. Socio-Religious Reforms Movements: Namdhari, Nirankari, Arya Samaj, Singh Sabha, Ahmadiya Movement.
11. Struggle for freedom.
12. Development of Punjabi language, literature, famous legends and social life.

Suggested Readings:

Kirpal Singh (ed), History and Culture of the Punjab Part-II, Punjabi University, Patiala, 1990 (3rd ed.).

Fauja Singh (ed.), History of Punjab, Vol. III, Punjabi University, Patiala, 1987.

----- , A Brief History of Freedom Struggle in the Punjab, Punjabi University, Patiala, 1974.

J.S. Grewal, The Sikhs of the Punjab, New Cambridge History of India, Cambridge University, Cambridge, 1991.

Paper – I Numerical Methods & Statistical Techniques**Time: 3 Hours****M. Marks: 100**

Note : 1. In theory eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks. The maximum marks of the paper is 100.

2. The student can use only Non-programmable & Non-storage type Calculator.

Introduction

1. Numerical Methods, Numerical methods versus numerical analysis, Errors and Measures of Errors.
2. Non-linear Equations, iterative Solutions, Multiple roots and other difficulties, Interpolation methods, Methods of bi-section, False position method, Newton Raphson - method.
3. Simultaneous Solution of Equations, Gauss Elimination Method, Gauss Jordan Method, Gauss Seidel Method.
4. Interpolation and Curve Fitting, Lagrangian Polynomials, Newton's Methods: Forward Difference Method, Backward Difference Method, Divided Difference Method.
5. Numerical Integration and different Trapezoidal Rule, Simpson's 1/ 3 Rule Simpson's 3/8 Rule.
6. Numerical differentiation by Polynomial Fit.

Statistical Techniques:

1. Measure of Central Tendency, Preparing frequency, Distribution table, Mean Arithmetic, Mean geometric, Mean harmonic, Mean Median Mode.
2. Measure of dispersion, Skewness and Kurtosis Range, Mean deviation, Standard deviation, Co-efficient of variation, Moments Skewness Kurtosis.
3. Correlation.
4. Regression Linear Regression.
5. Least square fit linear trend, Non-linear trend.

$$Y = ax^b$$

$$Y = ab^x$$

$$Y = ae^x$$

$$\text{Polynomial fit: } Y = a+bx+cx^2$$

Note for Paper Setter:

- I. That the program for numerical and statistical methods are to be written in Fortran language.
- II. Paper setter indicating thereby that the greater weightage is to be given to exercises rather than theoretical derivation of all numerical and statistical methods.

Books Recommended:

1. V. Rajaraman: Computer Oriented Numerical Methods, Prentice Hall of India Private Ltd., New Delhi.
2. B.S. Grewal, Numerical Methods for Engineering, Sultan Chand Pub.

Paper – II Internet Applications**Time: 3 Hours****M. Marks: 100**

Note : 1. In theory eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks. The maximum marks of the paper is 100.

2. The student can use only Non-programmable & Non-storage type Calculator.

1. **Introduction :** About internet and its working, business use of internet, services effect by internet, evaluation of Internet, Internet Service Provider (ISP) windows environment for dial up networking (connecting to internet), audio on internet, internet addressing (DNS) and IP addresses.
2. E-Mail Basic Introduction, advantage and disadvantage, structure of an email message, working of e-mail (sending and receiving messages), managing email (creating new folder, deleting messages, forwarding messages, filtering messages, implementation of outlook express.
3. Internet protocol Introduction, file transfer protocol (FTP), Gopher, Telnet, other protocols like HTTP and TCP/IP.
4. New Group: Basic concepts of news group, connecting to a news server, subscribe to newsgroup, organisation of articles, reading messages, posting replies and new messages, managing newsgroup and messages.
5. WWW introduction, working of WWW, Web browsing (opening, viewing, saving and printing a web page and bookmark), web designing using HTML, DHTML with programming techniques.
6. Search engine: About search engine, component of search engine, working of search engine, difference between search engine and web directory.
7. Internet and extranet: Introduction, application of intranet, business value of intranet, working of intranet, role of extranet, working of extranet, difference between intranet and extranet.

Paper – III Computer Architecture**Time: 3 Hours****M. Marks: 100**

Note : 1. In theory eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks. The maximum marks of the paper is 100.

2. The student can use only Non-programmable & Non-storage type Calculator.

Information Representation Number Systems, Fixed Point Representation, Floating Point Representation, Error Detection & Correcting Codes, Alphanumeric Codes.

Register Transfer, Various Registers, Implementing Common Bus Using Multiplexers: Logical; Arithmetic & Shift Micro – operations.

Basic Computer Design Instruction Codes, Interfacing various Registers, Computer Instructions, Timing Signals, Instruction Cycle, Design of a Basic Computer.

CPU Design Stack Organized CPU, Instruction Formats, Addressing Modes, Program Control, Hardwired & Microprogrammed (Wilhe's Design) Control Unit.

Memory Organization Memory Hierarchy, Designs & Concepts of Main Memory, Auxiliary Memory, Associative Memory, Cache and Virtual Memory.

I/O Organization I/O Interface, Modes of Transfer, Program Interrupt, DMA & I/O Processor.

Pipeline & Vector Processing Parallel Processing Pipelining, Parallel & Distributed Computers, SISD, SIMD & MISD, MIMD Machines, Vector Processing.

References:

Computer System Architecture: M.M. Mano (PHI)

Computer Architecture: J.P. Hayes.

Computer Architecture: Patterson & Hemessy.

Paper – IV Object Oriented Programming using C++**Time: 3 Hours****M. Marks: 100**

Note : 1. In theory eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks. The maximum marks of the paper is 100.

2. The student can use only Non-programmable & Non-storage type Calculator.

C++ Programming Basics	Basic Program Construction, Output using cout, Preprocessor Directive, Comments, Integer Variables, Declaration and Definitions, Character Variables, Input using cin, Type float, Manipulators, Unsigned data types, Type conversions, Arithmetic Operators, Library functions.
Loops and Decisions	Relational Operators, Loops: The for loop, for loop variations, The while loop, do loop, Decision: The if statement, The else.... If construction, The switch statement, The conditional operators, Logical Operators: Logical AND operator, The logical OR operator, The logical NOT operator, Other Control Statements: The break statements, The continue statement, The goto statement.
Structures	Defining and processing a structure, user defined data types structure, Enumerated Data Types.
Functions	Brief overview defining, Accessing function, Passing Arguments to functions, Returning values from functions, Overloaded functions, Inline functions, Default Arguments, Variables and Storage Classes: Automatic Variables, External Variables, Static Variables, Storage.
Object & Classes	A simple Class: Classes and objects, Specifying the class Using the class, C++ Objects as physical Objects, C++ Objects as Data types, Constructors, Objects as Functions Arguments: Overloaded Constructors, Member Functions Defined Outside the Class, Objects as Arguments, Returning Objects from Functions, Static Class Data.
Arrays	Defining and processing an array, passing array to a function, multi – dimensional arrays, Strings: String declaration, string functions and string manipulation.
Operator Overloading	Overloading Unary Operators, Overloading Binary Operators, Data Conversion, Pitfalls of Operators Overloading and Conversion.

Inheritance	Derived Class and Base Class, Derived Class Constructors, Overriding Member Functions, Inheritance in the English Distance Class, Class Hierarchies, Public and Private Inheritance, Levels of Inheritance, Multiple Inheritance.
Pointers	Addresses and pointers, Pointers and Arrays, Pointers and Functions, Pointers and Strings, Memory Management: The new operator, The delete Operator, Pointers to objects, Pointers to pointers.
Virtual Functions and other Subtleties	Virtual Functions, Friend Functions, Static Functions, Assignment and Copy Initialization, The this operator.
Files and Streams	Streams: The Stream Class Hierarchy, Stream Classes, Header Files, String I/O, Character I/O. Object I/O, I/O with Multiple objects, File pointers, Disk I/O with Member Functions, Error Handling, Redirection, Command Line Arguments, Printer Output, “Overloading the Extraction and Insertion Operators”.

Paper – V Database Management System and Oracle**Time: 3 Hours****M. Marks: 100**

Note : (i) In theory eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks.

(ii) The maximum marks of the paper is 100.

(iii) As per as possible except in the Computer language papers no programmer may be asked in theory papers. Emphasis should be on algorithm development.

(iv) The student can use only Non-programmable & Non-storage type Calculator.

Practical marks will include the appropriate weightage for proper maintenance of Lab record.

Introduction to Data, fields, record, file, database, database management system, structure of database system, advantage & disadvantage, levels of database system, Relational model, Hierarchical model, Network model, comparison of these model, E-R diagram, different keys used in a relations system, SQL.

DBA, responsibilities of DBA, Relational form like 1NF, 2NF, 3NF, BCNF, 4th NF, 5th NF, DBTG, Concurrency control and its management, protection, security, recovery of database.

Oracle

SQL * PLUS: Introduction to Oracle 8, SQL-DDL, DML, DCL, Join methods & sub query, Union Intersection, Minus, Tree Walking, Built in Functions, Views, Security amongst users, Sequences, Indexing Object Oriented Features of Oracle 8.0.

PL/SQL: Introduction to PL/SQL, Cursors-Implicit & explicit, Procedures, Functions & Packages Database Triggers.

References :

Introduction to Database by C.J.Date.

Database Management System by B.C.Desai.

Database Concept by korth

Oracle-Developer- 2000 by Ivan Bayross.

Database System concepts & Oracle(SQL/PLSQ)-AP Publishers

Paper – VI Data Structures**Time: 3 Hours****M. Marks: 100**

Note : 1. In theory eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks. The maximum marks of the paper is 100.

2. The student can use only Non-programmable & Non-storage type Calculator.

Basic Data Structure	Introduction to elementary Data Organization, Common Operation on Data Structures, Algorithm Complexity, Big O Notation, Time – Space trade off between Algorithms.
Arrays	Array Defined, Representing Arrays in Memory, Various Operations on Linear Arrays, Multidimensional Arrays.
Linked Lists	Types of Linked Lists, Representing Linked Lists in Memory, Advantages of using Linked Lists over Arrays, Various Operations on Linked Lists.
Stacks	Description of STACK structure, Implementation of Stack using Arrays and Linked Lists, Applications of Stacks – Converting Arithmetic expression from infix notation to polish and their subsequent evaluation, Quicksort Technique to sort an array.
Queues	Description of queue structure, Implementation of queue using arrays and linked lists, Description of priorities of queues, Dequeues.
Trees	Description of Tree Structure and its Terminology, Binary Trees and Binary Search Trees, Representing Binary Trees and Binary search Trees in Memory, Various Operation on Binary Search Trees, Heap, Heapsort.
Graphs	Description of Graph Structure, Implement Graphs in Memory using Adjacency Matrix, Path Matrix, Warshell's algorithms, Shortest paths, linked representation of a graph, Traversing a graph.
Sorting and Searching	Sorting Algorithms, Bubble Sort, Searching Algorithms, Linear Search and Binary Search.

References :

Seymour Lipschutz, Theory and Problems of Data Structures, Schaum's Outline Series, McGraw Hill Company

Tanenbaum, Data Structure using C.

Paper-VII**Environmental Studies****Theory Lectures: 50 Hours****Time of Theory examination****Regular students : 2½ Hours****Private students : 3 Hours.****Max. Marks: 75+25 = 100****Regular students : 75****Private students : 100**

Instructions for the paper setters : The question paper will consist of two sections for regular students and three sections for private students.

Unit-I**(Compulsory for all students)****Section A (30 Marks)**

It will consist of ten short answer type questions. Candidates will be required to attempt six questions, each question carrying five marks. Answer to any of the questions should not exceed two pages.

Section B (45 Marks)

It will consist of six essay type questions. Candidates will be required to attempt three questions, each question carrying fifteen marks. Answer to any of the questions should not exceed four pages.

1. The multidisciplinary nature of environmental studies: Definition, scope and importance, Need for public awareness.

2. Natural resources: Natural resources and associated problems.

- a) Forest resources: Use of over exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people.
- b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d) Food resources: World food problems, change caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- e) Energy resources: Growing energy needs, renewable and non-renewable energy, use of alternate energy sources. Case studies.
- f) Land resources: Land as a resources, land degradation, man induced landslides, soil erosion and desertification.
- g) Role of an individual in conservation of natural resources, Equitable use of resources for sustainable lifestyles.

3. Ecosystem

Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids.

Introduction, types, characteristic features, structure and function of the following ecosystem:

- a. Forest ecosystem
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems (ponds, streams lakes, rivers, oceans, estuaries).

4. Biodiversity and its conservation

Definition: Genetic, species and ecosystem diversity, Biogeographical classification of India.

Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values.

Biodiversity of global, National and local levels, India as mega-diversity nation, Hot-spots of biodiversity.

Threats to biodiversity: Habitat loss, poaching of wildlife, man wildlife conflicts Endangered and endemic species of India.

Conservation of biodiversity: *In situ* and *Ex-situ* conservation of biodiversity.

5. Environmental pollution

Definition, causes, effects and control measures of:

- a) Air Pollution
- b) Water Pollution
- c) Soil Pollution
- d) Marine Pollution
- e) Noise Pollution
- f) Thermal Pollution
- g) Nuclear Pollution

Soil Waste Management: Causes effects and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution.

Pollution case studies.

Disaster Management: Floods, Earthquake, Cyclone and Landslides.

6. Social Issues and Environment

* From unsustainable to sustainable development

* Urban problems related to energy

* Water conservation, rain water harvesting, watershed management

B.Sc. (Information Technology) PART-II

- * Resettlement and rehabilitation of people: its problem and concerns. Case studies
- * Environmental ethics: Issues and possible solutions.
- * Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- * Waterland reclamation
- * Consumerism and waste products
- * Environmental Protection Act
- * Air (Prevention and Control of Pollution) Act
- * Water (Prevention and Control of Pollution) Act
- * Wildlife Protection Act
- * Forest Conservation Act
- * Issues involved in enforcement of environmental legislation
- * Public awareness

7. Human population and the environment

- * Population growth, variation among nations
- * Population explosion-Family welfare programme
- * Environment and human health
- * Human rights
- * Value education
- * HIV/AIDS
- * Women and child welfare
- * Role of information technology in environmental and human health
- * Case studies

Unit-II**(Compulsory for Private Candidates only)****Section C (25 Marks)**

It will consist of two questions. Candidate will be required to attempt one question only. Answer to the question should not exceed 5 pages. In this section the students will be required to write on the status of environment of an area/ecosystem/village/ industry/ disaster/ mine/ dam/ agriculture field/ waste management/ hospital etc with its salient features, limitations, their implications and suggestions for improvement.

Paper – VIII

Lab – I: Based on C++ Programming Language 100 Marks

Paper – IX

Lab – II: Based on RDBMS 100 Mark

**Environmental Studies (Field Study)
(Practical for Regular Students Only)****Max. Marks : 25**

The candidate will be required to undertake field study trips to study animals and plants in their natural habitats, status of pollution in the area and to undertake tree plantation drives. The candidates will be required to submit the field study report of about 10 pages listing their observation of the habitats studied and their contributions for conservation of habitats. The reports will be evaluated by the examiner appointed by the Principal of the concerned college.

Paper – I Computer Networks**MM: 100****Time: 3 Hrs.**

Note : 1. In theory eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks. The maximum marks of the paper is 100.

2. The student can use only Non-programmable & Non-storage type Calculator.

Basic concepts of Computer Networks, Client Server Network topologies.

OSI Reference Model, TCP/IP Model Comparison Critiques Routers, bridges, Repeaters, Gateways.

Data Transmission: - Analog & Digital Transmission, Modem, Codec, Pulse Code, Modulation Multiplexing, Circuit Switching, Packet Switching, message Switching, Hybrid Switching.

Transmission Media: - Twisted Pair, Co-axial Cable, Baseband, Broadband, Fibre optics, Satellite, Wireless Transmission, Telephone System

The Data link Layer: Design Issues, Error Detection and Correction, Data Link * Sliding Window Protocols.

IEEE Standard 802 for LAN's and MAN's Routing Algorithm.

Internetworking, Network Security.

References:

1. Tanenbaum A.S. 'Computer Network', PHI.
2. Stalings W., 'Data and Computer Communications' PHI.

Paper – II Operating Systems**Time: 3 Hrs.****Max. Marks: 100**

Note : 1. In theory eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks. The maximum marks of the paper is 100.

2. The student can use only Non-programmable & Non-storage type Calculator.

Introduction:

Definition, evolution, need, early system, function, buffering spooling, single user, multiuser, multiprogramming, multiprocessing, multitasking, multithreading, batch processing, real time, time systems, time sharing systems, security, protection.

Processor Management / CPU Scheduling:

CPU - I/O Basic Cycle, process state, process control lock, Scheduling, Queue, Schedulers, Scheduling Algorithms, Performance criteria, FCFS, SJF, Priority, SRTF, Round Robin, Multi - Levels users Algorithm.

Memory Management:

Preliminaries, Machine Resident monitor, relocation, Swapping, backing storage, swap time, registers, base and limit registers, MFT, MFT job scheduling, region size selection, memory fragmentation, MVT, MVT job scheduling compaction, paging, Hardware, Job Scheduling.

Virtual Memory:

Overlays, demand paging, page fault, performance of demand paging, page replacement, page replacement algorithm, FIFO, optional replacement fault frequency, page size.

Device Management:

I/O and device management physical characteristics, FCFS, SSTF, SCAN, CSCAN.

File Management:

Disk and File Management.

Deadlocks:

Definition, Necessary condition, to occur RAG, Deadlock Prevention Mutual exclusion, Hold and wait, No pre-emption, circular wait Banker's algorithms, Recovery from deadlock, semaphores.

Paper – III E – Business**Time: 3 Hrs.****Max. Marks : 100**

Note : 1. In theory eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks. The maximum marks of the paper is 100.

2. The student can use only Non-programmable & Non-storage type Calculator.

E – Commerce:

Its definition, aims, process tools and results, EDI, VAN's and internet as Promoters, Types of E – Commerce, Commerce – net.

Steps to Start E – Commerce:

H/W & S/W Requirements, steps involved in opening your own online business.

EDI:

EDI Vs Traditional Systems, EDI enabled procurement process, components of EDI system, EDI implementation issues.

Concerns for E – Commerce:

Basic challenges to E – Commerce, Technological, legal and regulators heads, Internet Bandwidth & Technological Issues.

NII: Technical issues, standards & Services GII, Issues that confront us in relation to securing electronic transactions. Implementation of digital signatures. Authentication Mechanisms. Electronic cash, its elements, legal issues, risks, paper document versus Electronic document Laws for E – Commerce legal issues for Internet Commerce.

Re – Engineering for Change:

Business process re – engineering BPR, Methodology Planning Methods for change to EC / EDI.

Case Studies: To demonstrate usefulness of E – Commerce in various business areas.

Banks, Reservations, E – Governance, supply – chain, Management, manufacturing, retailing and online – publishing.

E – Commerce in India:

EDI service providers in India, EDI Projects in the Government regulatory agencies. The Internet in India, laws for E – Commerce in India.

References:

E – Commerce – The Cutting Edge of Business.
Kamlesh K. Bajaj.
Debjani Nag.

Paper – IV
OPTION (I): DATABASE APPLICATION
Relational Database Management System

M.M. 100**Time: 3 Hrs.**

Note : 1. In theory eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks. The maximum marks of the paper is 100.

2. The student can use only Non-programmable & Non-storage type Calculator.

An overview of Database Management (Database, Database System, why database, Data independence)

Relational Model : Relational Data Objects : Domain and relations, Relational Data Integrity, Relational Algebra, Relational Calculus and SQL Language.

Database Design : Concepts of functional dependencies, multivalued functional dependencies, Normalization concept, 1NF, 2NF, 3NF, BCNF, Higher Normal Forms, An overview of the E/R Model & E/R diagrams.

Data Protection: Recovery, Concurrency, Security & Integrity.

Oracle 8.0 & Developer 2000**SQL *PLUS**

Introduction to Oracle 8

SQL - DDL, DML, DCL.

Join methods & Sub query, Union, intersection, Minus, Tree Walking.

Built in Functions, Views, Security amongst users, Sequences, indexing Object Oriented Features of Oracle 8.0.

PL / SQL

Introduction to PL / SQL.

Cursors – Implicit & Explicit.

Procedures, Functions & Packages.

Database Triggers.

Developer 2000

Forms 5.0

Introduction, Creation & Customization of new forms, blocks, Different Objects in Forms, Input Items and Non – input items, LOVs, Canvases, Alerts Messages, Object Library and PL / SQL library, multiple Forms & Menus, Forms Triggers.

Report 3.0

Introduction, types of reports, different objects in Reports, Computed columns, User parameters & Runtime Parameter Form for a report, Working with graphs.

Layout, Break report, Master Detail Report, Data Links
Matrix Report, Connecting reports with Forms Menu.

Paper – V**Practical Lab: Based on Oracle 8.0 & Developer 2k.****Time : 3 Hours****M.M. : 100**

Paper IV
Option (II) : Web Based Applications

JAVA & WEB PROGRAMMING

Time: 3 Hours

Max. Marks: 100

Note : 1. In theory eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks. The maximum marks of the paper is 100.

2. The student can use only Non-programmable & Non-storage type Calculator.

Introduction to Concepts of Programming: Object Orientation Concepts, Platform, Independence & Cross Platform Computing.

Introduction to Java: Control Statements, Operators Data Types.

Introduction to OOPS: Classes & Methods, constructors, Inheritance & Polymorphism. Packages & Interfaces, Multithreading in Java, Exception Handling, String handling in Java & Input/Output in Java.

Introduction to Applet Programming, Applets in conjunction with multithreading and graphics, Java Services & Swings.

Introduction to Web Designing through HTML.

Paper-V

Practical Lab: Based on JAVA & Web Designing

Time: 3 Hours

Max. Marks: 100

Paper-IV**Option (III): Network Management
Networking Operating System/Client-Server Application****Time: 3 Hours****Max. Marks : 100**

Note : 1. In theory eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks. The maximum marks of the paper is 100.

2. The student can use only Non-programmable & Non-storage type Calculator.

Basic Concept: History & Evaluation of Operating System, Various View of Operating System, Basic Concepts of Networking

Fundamentals of Networking O.S. : Introduction components of various networking O.S. , Case Studies of various Network Operating System Windows 95/Windows NT/Novel Netware.

Fundamental of Client Server: Basics of Client Server model and its applications, Designing a Client Server model by Creating Proxy Server, Database server and Networking O.S. Server.

Paper V
Practical Lab: Based on NOS

Time: 3 Hours

Max. Marks : 100

Note: In theory eight questions are to be set in all. The candidates are required to attempt five of them. All questions are to be of equal marks. The maximum marks of the paper is 100.

Lab: Networking O.S./Client-Server Lab.

Designing of homogenous and heterogenous lab.

Creating Windows 95/NT/Novell Netware Server.

Creating of Proxy Server.

Creating of Database Server.

Paper – VI
PROJECT REPORT

Max. Marks: 300

Note: **Project Report will be evaluated by** the Board of Three Examiners. Report to be submitted by 31st December each year.

- (i) Head/Nominee. Department of Computer Science & Engineering, G.N.D.U.
- (ii) External Examiner
- (iii) Internal Examiner