

# FACULTY OF ENGINEERING & TECHNOLOGY

## SYLLABUS

### FOR

### Bachelor of Computer Applications

Examination – 2010



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# GURU NANAK DEV UNIVERSITY

## AMRITSAR

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**Price : Rs. 80-00**

**Eligibility :**

a) +2 examination with 40% marks

OR

b) Any other examination with 40% marks recognized equivalent to (a) above by the Guru Nanak Dev University.

**Scheme of Study for Bachelor of Computer Applications – I**

<b>Paper No.</b>	<b>Paper</b>	<b>M. Marks</b>
Paper-I	Introduction to Programming C	100
Paper-II	PC Computing	100
Paper –III	Introduction to Computers and Information Technology	100
Paper-IV	Mathematics	100
Paper-V	Communication Skills	100
Paper-VI	Computer Organization and Architecture	100
Paper-VII	Principles of Digital Electronics	100
Paper-VIII	Practical-I (C Programming)	50
Paper-IX	Practical-II (PC Software)	50
Paper-X	Punjabi/Punjab History and Culture	100

**Scheme of Study for Bachelor of Computer Applications – II**

<b>Paper No.</b>	<b>Paper</b>	<b>M. Marks</b>
Paper – I	Numerical Methods & Statistical Techniques	100
Paper – II	Internet Applications	100
Paper - III	Database Management System & Oracle	100
Paper - IV	C++ (OOP Language)	100
Paper - V	Data Structures and File Processing	100
Paper - VI	Information Systems	100
Paper - VII	Environmental Studies	75
Paper – VIII	Programming Lab. – I	100
Paper–IX	Practical in Oracle	100
Paper - X	Environmental Studies (Field Study)	25

**Scheme of Study for Bachelor of Computer Applications – III**

<b>Paper</b>	<b>Subject</b>	<b>Max. Marks</b>
Paper-I	Computer Networks	100
Paper-II	Software Engineering	100
Paper-III	Operating System	100
Paper-IV	Computer Graphics	100
Paper-V	Programming Lab	100
Paper-VI	Project Report	300

**Paper-I****Introduction to Programming (C)****Time: 3 Hours****M. Marks: 100**

**Note:1. Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.**

**2. The students can use only Non-Programmable & Non-Storage Type Calculators.**

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

**Operations and Expressions:** Arithmetic operators, unary operators, relational operators, logical operators, assignment and conditional operators, library functions.

**Data Input and Output:** Preliminaries, single character Input, single character output, entering input data, more about scan functions, writing output data, more about print functions, the gets and the 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 functions, passing arguments to function, specifying argument data types, function prototypes, recursion.

**Program Structure Storage Class :** Automatic, external and static variables, multiple programs, more about library functions.

**Arrays:** Defining and processing an arrays passing arrays to a function, multi-dimensional arrays, arrays and strings.

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

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

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

**References:**

1. Balaguruswamy : “ Programming in ANSI C”.
2. Scaum Outline series : “ Programming in C”.
3. Dennis & Ritchie : “Programming in C”.
4. Stephen G. Kochar : “C Programming”.

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

**Note:1. Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.**

**2. The students can use only Non-Programmable & Non-Storage Type Calculators.**

1. **MS - Windows:** History of Windows and introduction to Windows vista, Desk Top cell user interface action, icon on desk top, closing windows, renaming icons, folders format of a Window, moving windows, resizing windows (maximizing and minimizing), control panel.
2. **MS-Word 2003 :** Overview, creating, saving, opening, importing, exporting and inserting files, formatting pages, paragraphs and sections, indents and outdents, creating lists and numbering. Headings, styles, fonts and font size. Editing, positioning and viewing texts, Finding and replacing text, inserting page breaks, page numbers, book marks, symbols and dates. Using tabs and tables, header, footer and printing.
3. **MS-Excel:** Worksheet overview, entering information, worksheet creation, opening and saving workbook, formatting numbers and texts, protecting cells, producing charts and printing operations.
4. **MS-Access:** Introduction, understanding databases, creating, tables, queries, forms, reports, Adding graph to your report.

**Books Recommended:**

1. MS-Office 2003 Compiled by SYBIX
2. MS-Office 2003 BPB Publications.
3. Introduction to Software Packages, Galgotia Publications.

**Paper-III Introduction to Computers and Information Technology****Time: 3 Hours****M. Marks: 100**

**Note:1. Eight questions are to be set. The candidates are required to attempt any five. All questions carry equal marks.**

**2. The students can use only Non-Programmable & Non-Storage Type Calculators.**

**Introduction to Computers and its Applications:**

- Computer as a system, basic concepts, functional units and their inter relation.
- Milestones in Hardware and Software.
- Batch oriented / on-line / real time applications.
- Application of computers, computers in corporate environment: Financial accounting, sales, (retail and wholesales), shipping and receiving, manufacturing, purchasing, marketing, personal and human resource development.

**Interacting with the Computer:**

**Input Devices:** Keyboard, mouse, pens, touch screens, Bar Code reader, joystick, source data automation, (MICR, OMR, OCR), screen assisted data entry: portable / handheld terminals for data collection, vision input systems.

**Output Devices:** Monitor, Serial line page printers, plotters, voice response units.

**Data Storage Devices and Media:** Primary storage (Storage addresses and capacity, type of memory), Secondary storage.

1. Magnetic storage devices (Magnetic tape, magnetic disk: fixed & removable. Floppy disk driver, Winchester disk drive, conventional disk drives),
2. Optical Storage Devices (Connecting devices to computers: expansion slots, adapter boards, Serial / Parallel I/O ports, SCSI).

**Data Representation:**

CPU, memory, factors affecting processor speed, resistors, memory, computation power, internal clock, bus, cache, math co-processor, processors used in personal computers; Intel, Motorola, RISC and Parallel processors.

**Operating Systems:**

Functions of operating systems, multi-user, multi-tasking and multi-programming operating systems and their examples.

**Problem Analysis:**

Problem definitions, flowcharts, algorithms, decision tables and pseudocodes.

**Careers in Computers:**

Role of Programmers, program analysis, system analyst, system administrator, system managers, system integrators, DTP managers and administrators, MIS director.

**Text/References:**

1. Computer Fundamentals - P.K. Sinha.
2. Introduction to Computers - N. Subramanian.
3. Introduction to Computers - Peter Norton.  
Glencoe MacMillan/McGraw Hill.

**Paper - IV :****Mathematics****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 students can use only Non-Programmable & Non-Storage Type Calculators.**

**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.

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

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 Trapezoidal 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**

Matrices and Determinants : Introduction and definition of matrices , types of matrices, matrix addition and scalar multiplication , transpose and inverse of matrix , solution 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-V****COMMUNICATION SKILLS****M. Marks: 100****Theory: 70****Practical: 30****Credit Hours: 6**

**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) Developing 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.

**Note:** Adequate allocation be made for practical training within the approved number of periods.

**Recommended Books:**

1. Geetha Nagaraj, A Course in Grammar and Composition, Foundation Books, 2006.
2. John Seely, Oxford Guide to Effective Writing and Speaking, OUP.

**Instructions for paper-setter/examiner:****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.

**Theory:**

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 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.  
(Topics 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 of a familiar topic. Time for each group will be of 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-VI Computer Organisation and Architecture****Time: 3 Hours****M. Marks: 100\**

**Note:1. Eight questions are to be set. The Candidates are required to attempt any five. All questions carry equal marks.**

**2. The students can use only Non-Programmable & Non-Storage Type Calculators.**

**Prerequisite:**

Introductory course on Digital Computer Electronics, knowledge of Boolean Algebra, Information Representation and techniques necessary to design small digital systems.

**Objective:**

To acquaint the student with structure and behaviour of various functional modules of the computer and how they interact to provide an efficient processing environment.

To introduce advanced topics of Parallel & Multiprocessing environment.

**Course Contents:**

Basic computer organisation design Register Transfer Language & operations. Various Arithmetic, Logic and Shift micro operations, instruction codes, computer registers, instructions, timing & control, instruction cycle, design of a complete basic computer & its working.

**Programming and Controlling the Basic Computer:** Machine & Assembly Language, Hardwired & Micro programmed control, Design of a control unit.

**CPU Architecture:** General register & stack organisation, instruction formats and addressing modes, ALU & Control Unit architecture.

**Memory Organisation:** Memory hierarchy, main, auxiliary cache memory, virtual memory paging and segmentation.

**I/O Organisation:** Peripheral Devices, input-output interface, Modes of data transfer programmed & interrupt initiated I/O, DMA, I/O processors.

**References:**

1. Morris Mano, Computer System Architecture, PHI.
2. Hays J.P. Computer Architecture & Organisation, McGraw Hill.
3. Stone: Introduction to Computer Architecture: Galgotia.
4. Tenenbaum: Structured Computer Organisation PHI.
5. \*Malvino, Brown: Digital Computer Electronics, TMH.  
\*(For prerequisite course).

**Paper-VII Principles of Digital Electronics****Time: 3 Hours****M. Marks: 100**

**Note:1. Eight questions are to be set. The Candidates are required to attempt any five. All questions carry equal marks.**

**2. The students can use only Non-Programmable & Non-Storage Type Calculators.**

**Prerequisite:** Basic idea of Atom theory.

**Objective:** To familiarise students with the hardware concepts.

**Course Contents:**

<b>Semiconductors</b>	Junction diodes, Bipolar and FET transistors, biasing techniques, transistor as a switch.
<b>Information Representation</b>	Number Systems, Integer and Floating point representation, character codes (ASCII, EBCDIC), Error detecting and correcting codes. TTL, STTL, CMOS logic families.
<b>Logic Design</b>	Logic gates, flip - flops, clocks and timers, registers, counters.
<b>Digital IC's</b>	Basic laws of Boolean algebra, circuit design standard (NAND) gates, Adder, coder/demulti encoder / multiplexer design.
<b>Boolean Algebra &amp; Circuit Design</b>	Semiconductor memory, static and dynamic devices, read only & random access memory chips, PROMS and EPROMS. Address selection logic. Read and write control timing diagrams for ICs.
<b>MOS and LSI digital Systems</b>	Analog to digital and Digital to analog conversion techniques, Microprocessor compatible ADCs and interfacing techniques.

**References:**

1. Integrated Electronics by Millman, Halkias McGraw Hill.
2. Malvino: Digital Computer Electronics, McGraw Hill.
3. B. Taub & D. Schilling, Digital Integrated Electronics, McGraw Hill.
4. D.A. Hodges & H.G. Jackson, Analysis and Design of Integrated Circuits, International. 1983.
5. Richard S. Sandige, Modern Digital Design, McGraw Hill.
6. John F. Wakerley, Digital Principles and Practices.
7. Ujjenbeck, John: Digital Electronics; A Modern Approach, Prentice Hall.
8. Bignell J.W.: Digital Electronics, 3rd edition.
9. Mano, M. Morris: Digital Logic and Computer Design, edition.

**Paper - VIII****Practical - I (C Programming)****50 Marks****Paper - IX****Practical - II (PC Software)****50 Marks**

Practical based on Windows Vista, MS-Word 2003 (Power Point, EXCEL, ACCESS, Front Page, DOS Commands, internal & external), batch files, time editor.

ਪੇਪਰ - 10  
ਸਮਾਂ : 3 ਘੰਟੇ

(ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ)

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।
  - (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।
  - (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

**PUNJAB HISTORY & CULTURE****HISTORY & CULTURE OF THE PUNJAB (1450-1947)****(from earlier Times to 1000 A.D.)****(Special paper in lieu of Punjabi Compulsory)****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 will 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. Misls 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 Reform 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 (3 <sup>rd</sup> 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.**

**2. The students can use only Non-Programmable & Non-Storage Type Calculators.**

**Note for Paper Setter:**

- I. That the program for numerical and statistical methods are to be written in C/C++**
- 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.**

**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 Tryapezoidal Rule, Simpson's 3/8 Rule.
6. Numerical differentiation by Polynomial Fit.

**Statistical Techniques:**

1. Measure of Central Tendency, Preparing frequency distribution tabs, Mean Arithmetic, mean geometric, Mean harmonic, Mean Medial Mode.
2. Measures 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.

$$Y = ax^b$$

$$Y = ab^x$$

$$Y = ae^x$$

Polynomial fit:  $Y = a+bx+cn^2$

**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 Publication.

**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.**

**2. The students can use only Non-Programmable & Non-Storage Type Calculators.**

- 1 **Introduction:** About internet and its working, business use of internet, services offered 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 e-mail message, working of e-mail (sending and receiving messages), managing e-mail (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 TCPIP.
- 4 **New Group:** Basic concepts of newsgroup, connecting to a news server, subscribing to newsgroup, organization 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 **Intranet 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****Database Management System & Oracle****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 students can use only Non-Programmable & Non-Storage Type Calculators.**

Introduction to data, field, record, file, database, database management system. Structure of database system, Advantage and disadvantage, levels of database system, Relational model, hierarchical model, network model, comparison of these models, E-R diagram, different keys used in a relational system, SQL.

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

**ORACLE 10g**

**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 10g.

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

**Books:**

1. Introduction to Database System By C.J. Date.
2. Database Management System By B.C. Desai.
3. Database Concept by Korth.
4. Simplified Approach to DBMS- Kalyani Publishers
5. Oracle – Developer – 2000 by Ivan Bayross.
6. Database System concepts & Oracle (SQL/PLSQ) – AP Publishers.

**Paper – IV****C++ (OOP Language)****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 students can use only Non-Programmable & Non-Storage Type Calculators.**

- 1 **Getting Started**
  - 1.1. Introduction.
  - 1.2. A brief history of C++
  - 1.3. Variable, constant, Expression, Statements, Comments and keywords of C++
  - 1.4. **Operator:** Arithmetic, Relational, Logical, Assignment, Increment/Decrement, Conditional, Precedence of Operators.
  - 1.5. Data type, Type Conversion, library function.
  
- 2 **Input / Output Statements**
  - 2.1. Inputting using in and outputting using cout statements.
  - 2.2. Preprocessor directives.
  - 2.3. Basic program construction.
  - 2.4. **A Complete C++ Program :** Invoking Turbo C++, naming your program, using the editor, saving your program, compiling and linking, running the program.
  - 2.5. **Errors :** Compiler, linker and runtime.
  - 2.6. **Other IDE Features :** Compiling and linking shortcut exiting from IDE, examining files, opening an existing file, DOS shell.
  
- 3 **Decision Making and Looping Statement**
  - 3.1. If Statement, If..else statement, nesting of if statement, switch statement, conditional operator statement.
  - 3.2. While loop, do loop, for loop, nesting of loops, break and continue statement, go to statement.
  
- 4 **Arrays**
  - 1.1. Defining an array, array type, array elements, Accessing and averaging array elements, initializing array.
  - 1.2. Programming of C++ with array.
  - 1.3. String handling, array of strings.

- 5 **Functions**
  - 5.1. What is a function?
  - 5.2. Declaring and defining function.
  - 5.3. Local, global variables, execution of function.
  - 5.4. Passing argument to function.
  - 5.5. Return values.
  - 5.6. Reference arguments.
  - 5.7. Overloading functions.
  - 5.8. Inline function and default parameter.
  - 5.9. Variable and storage classes.
  
- 6 **Object Oriented Programming**
  - 6.1. Objects & Classes.
  - 6.2. Constructor & Destructor.
  - 6.3. Operator overloading.
    - a) Overloading unary operators.
    - b) Overloading binary operators.
    - c) Data conversion.
    - d) Pitfalls operator overloading and conversion.
  - 6.4. **Inheritance**
    - a) Derived class and Base Class.
    - b) Derived Class Constructors.
    - c) Overriding member functions.
    - d) Inheritance in the English distances class, class hierarchies.
    - e) Public and Private inheritance.
    - f) Level of inheritance.
  - 6.5. **Polymorphism**
    - a) Problems with single inheritance.
    - b) Multiple inheritance.
  
- 7 **Structures**
  - 7.1. A simple structure, specifying the structure, defining a structure variable.
  - 7.2. Accessing Structure member.
  - 7.3. Other structure features.
  - 7.4. Structure within structure.
  - 7.5. Structure and classes.
  - 7.6. Arrays of structure.
  
- 8 **Pointers**
  - 8.1. Addresses and pointers.
  - 8.2. Pointers and Arrays.
  - 8.3. Pointers and Functions.
  - 8.4. Pointers and Strings.
  - 8.5. Pointer to objects.
  - 8.6. Pointer to pointers.

- 9 **Files and Streams**
- 9.1. Overview of streams.
  - 9.2. String I/O, character I/O, object I/O.
  - 9.3. I/O with multiple objects.
  - 9.4. File Pointers
  - 9.5. Disk I/O with member functions.
  - 9.6. Redirections.
  - 9.7. Error Handling.
  - 9.8. Command - line Argument.

**Books**

1. C++ & Graphics by Vijay Mukhi's
2. Turbo C++ by Robert Lafore.
3. Mastering C++.
4. C++ Programming Language by Schaum's outline series.

**Paper – V****Data Structures and File Processing****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 students can use only Non-Programmable & Non-Storage Type Calculators.**

<b>Basic Data Structures</b>	Introduction to elementary Data Organization and operations, complexity of Algorithms and Time space trade off, string processing. Arrays, Stacks, Queues, Linked Lists, Trees Binary Trees & Binary Search Trees. Graphs and Algorithms to manipulate them.
<b>Searching Techniques</b>	Linear and Binary Search.
<b>Sorting Techniques</b>	Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort.
<b>File Organization</b>	Concept of field, record, file, blocking and compaction.
<b>File Organization Techniques</b>	Sequential, indexed, indexed sequential, Direct, Hashing. Concept of master and transaction files.
<b>Text/Reference</b>	Data Structure - Seymour Lipschutz, Schaum Outline Series.  File Structure & Data Structures by E. Loomis.  Data Structures by Trabley & Soreuson.

**Paper – VI****Information 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.**

**2. The students can use only Non-Programmable & Non-Storage Type Calculators.**

**Introduction:**

1. Fundamental aspects of Information, Capturing of Information, Converting Information to Computer - readable form, source of Information, on-line Information access and capture.
2. What are systems? Information Systems? Categories of Information Systems, Development Life Cycle of Information system.
3. Technologies for Information System: Latest trends in Hardware and Software.
4. Various types of information systems: Transaction processing systems, office Automation systems, MIS and decision support system.
5. Case studies of the Information System: Accounting Information systems, Inventory control systems & Marketing systems.

**References:**

“Information Systems” by Mudride & Ross.

“Business Information Systems” Muneesh Kumar.

“Information Systems for Managers” Ashok Arora and A.K. Shaya Bhatia.

**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
- \* 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**

<b>Lab - I:</b>	Based on C++ Programming Language	:	50 Marks
	Based on Numerical Methods and Statistical Techniques	:	50 Marks

**Paper - IX**

<b>Lab - II:</b>	Practical in Oracle	:	100 Marks
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**Paper - X**  
**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****Time: 3 Hours****M. Marks: 100**

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

**2. The students can use only Non-Programmable & Non-Storage Type Calculators.**

1. **Introduction:** Network Definition, Basic components of a network, network types and topologies, Uses of computer networks, network architecture.  
Transmission Media: Coaxial cable, twisted pair cable, fibre optics & satellites. OSI referable model, TCP/IP references model, comparison of OSI and TCP reference model.
2. **Introduction to Analog and Digital Transmission:** Telephone system, Modems, Types of modems, pulse code modulation.  
Transmission & Switching: Multiplexing, circuit switching packet switching, hybrid switching, ISDN service transmission.
3. **Local Area Network Protocols:** CSMA Protocols, BRAP, MLMA, IEEE standards 602, Token Bus, Token Ring, FDDI.
4. **Data Link Layer Design Issues:** Services provided to Network layer framing, error control, flow control, link management. Error detection & correction, Elementary Datalink Protocols.
5. **Design Issues of Network Layer:** Services provided to transport layer, routing, connection, internet & world wide web.
6. **Network Security and Privacy:** Brief Introduction to Cryptography.
7. **Network Services:** File transfer, Access & Management, Electronic Mail, Remote logic

**References:**

1. Tannanium, A.S. : Computer Networks, Prentice Hall, 1982, 2<sup>nd</sup> Edition.
2. Tannanium, A.S. Computer Networks, Prentice Hall, 1992, 3<sup>rd</sup> Edition.
3. Stgerllings, William: Local networks: An Introduction : Macmillan Publishing Co.
4. Sterllings, William: Data Computer Communication, Macmillan Publishing Co.
5. Link, Data Network (PHI), 1968.

**Paper – II****SOFTWARE ENGINEERING****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 students can use only Non-Programmable & Non-Storage Type Calculators.**

1. **Introduction to Software** : Definition, Software characteristics, Software components, Software Applications.
2. **Introduction to Software Engineering**: Definition, Software Engineering Paradigms, waterfall method, prototyping, interactive Enhancement, The Spiral model, Fourth Generation Technique.
3. **Software Metrics**: Role of Metrics and measurement, Metrics for software productivity and quality, Measurement software, size-oriented metrics, function oriented metrics, Metrics for software quality, Integrating metrics within the software engineering process.
4. **Software Requirement Specification (SRS)**: Problem analysis, structuring information, Data flow diagram and data dictionary, structured analysis, Characteristics and component of (SRS), Metrics of SRS, function point, Number of errors and found, change request frequency.
5. **Planning a Software Project**: Cost estimation, uncertainties in cost estimation, Single variable model, COCOMO model, On software size estimation, Project scheduling and milestones, Software & Personal Planning, Rayleigh curve, Personal Plan, Quality Assurance Plan, Verification & Validation (V & V), inspection & review.
6. **System Design**: Design Objectives, Design Principles, problem, Partitioning, Abstraction, Top Down and Bottom-up techniques, Structure Design, Structure Charts, Design Methodology, Design Review, Automated Cross Checking, Matrix, total number of modular, number of parameters.
7. **Detailed Design**: Module specification, Specifying functional module, specifying data abstraction, PDL and Logic/Algorithm Design.
8. **Coding**: Coding by Top-down and Bottom-up, Structured Programming, Information Hiding, Programming style, Internal Documentation.
9. **Testing**: Level of testing, Test cases and test criteria. Test Oracles, Psychology of Testing, Functional Testing, Structural Testing.

**References**

1. Software Engineering, Roger S. Pressman.
2. Integrated Approach to Software Engineering, Pankaj Jalote

**Paper – III****Operating System****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 students can use only Non-Programmable & Non-Storage Type Calculators.**

1. **Introduction:** Definition, Early Systems, Simple Batch system, Multi programmed Batch. Time Sharing Systems, Personal Computer System, Parallel Systems, Distributed Systems, Real-time Systems.
2. **Processes:** Process concepts, Process Scheduling, threads.
3. **CPU-Scheduling:** Basic concepts, scheduling criteria, scheduling algorithms, algorithm evaluation.
4. **Process Synchronization:** Background critical – section, problem, semaphores, classical problem of synchronization.
5. **Memory Management:** Background, Logical v/s Physical address space, swapping, continuous allocation, paging, segmentation.
6. **Virtual Memory:** Background, demand paging, performance of demand paging, page replacement, page replacement algorithms, allocation of frames, thrashing.
7. **Secondary Storage Structures:** Disk structures, Disk scheduling, Disk Reliability.
8. **Deadlocks:** System Model, Deadlock characterization, methods for handling deadlocks, Deadlocks Prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock, combined approach to deadlock handling.

**References:**

1. “Operating System Concepts”, Fourth edition by Silberschatz Galvin Addison Wesley.
2. “Operating Systems: A design oriented approach” by Crowley, Published by Tata McGraw Hill.
3. “Operating Systems” second edition by Dietel, Addison Wesley.

**Paper – IV****Computer Graphics****Time: 3 Hours****M. Marks: 100**

**Note 1: The paper setter is required to set eight questions in all and the candidates will be required to attempt any five. All questions carry equal marks.**

**2. The students can use only Non-Programmable & Non-Storage Type Calculators.**

Computer Graphics and their applications.

Overview of graphics system.

**Display Devices:** CRT Monitors (Random - Scan and Raster Scan, DVST, Plasma – Panel Display, LED and LCD Monitors.

**Graphics Software.**

**Elementary Drawing:** Points and various line drawing Algorithms and their comparisons efficiency contact.

Cycle generating algorithms

Other objects like ellipses, arcs, section spirits.

**Two Dimensional Transformations:** Basic Transformations.Ceiling, Translation, Rotation, Deflection, Sherw Matrix representation of Basic transformations and homogenous coordinates.

**Composite Transformations.**

Windowing and clipping. Windowing concedes, clipping and its algorithms. Window-to-view port transformations. Three Dimensional concepts. 3 D Coordinate Systems. 3 transformations. translation, scaling, rotation, projections, parallel projections. Perspective projection.

**Implementation in C :** C programming for drawing 2 D objects – line rectangle, arc., circle and ellipse. C Programming for 2-D and 3-D transformations which include translation, rotation, scaling, reflection and shear.

**References:**

1. Computer Graphics by Donal Hearn M. Pardive Baker (PHI) Easter Economy Edition.
2. Computer Graphics by Roy A. Plastock and Gordon Kalley – Schaum’s Series.
3. Computer Graphics by MARC BERGER.

**Paper-V****Programming Laboratory****Time: 3 Hours****Max. Marks : 100**

<b>Lab I:</b>	<b>Applications of Computer Graphics in C++/C</b>	<b>50 Marks</b>
<b>Lab II:</b>	<b>Operational Knowledge of UNIX/Windows NT</b>	<b>50 Marks</b>

**Paper-VI**

Project Report of 300 Marks to be submitted by 31<sup>st</sup> December of every year.