FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS

FOR

BACHELOR OF COMPUTER APPLICATIONS
(Semester: I–VI)
Session: 2016-17

GURU NANAK DEV UNIVERSITY
AMRITSAR

Bachelor of Computer Applications

SCHEME

SEMESTER – I:

Paper No.	Paper	M. Marks
Paper–I	Introduction to Programming C - I	75
Paper–II	Introduction to Computers and Information Technology	75
Paper–III	Mathematical Foundation of Computer Science	75
Paper–IV	Communication Skills in English – I	50
Paper–V	Punjabi / Basic Punjabi (Mudhli Punjabi) (Compulsory)	50
Paper–VI	Practical–I (MS Office 2010 and Basic C Programming)	75

SEMESTER – II:

Paper No.	Paper	M. Marks
Paper – I	Introduction to Programming C – II	75
Paper – II	Principles of Digital Electronics	75
Paper – III	Numerical Methods & Statistical Techniques	75
Paper – IV	Communication Skills in English – II (Th.35+Pr.15)	50
Paper – V	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory)	50
Paper – VI	Practical – I (Advanced C Programming)	75

SEMESTER – III:

Paper No.	Paper	M. Marks
Paper–I	Computer Architecture	75
Paper–II	Database Management System & Oracle	75
Paper–III	C++ (OOP Language)	75
Paper–IV	* Environmental Studies – I (Compulsory)	50
Paper–V	Programming Lab – C++	50
Paper–VI	Programming Lab – Oracle	25

SEMESTER – IV:

Paper No.	Paper	M. Marks
Paper – I	Data Structure & File Processing	75
Paper – II	Information Systems	75
Paper – III	Internet Applications	75
Paper – IV	System Software	75
Paper – V	* Environmental Studies – II (Compulsory)	50
Paper – VI	Lab – Data Structures Implementation using C++	50
Paper – VII	Lab – Web Designing and use of Internet	50

* Marks of Paper EVS will not be included in Grand Total.

Bachelor of Computer Applications

SEMESTER – V:

Paper No.	Paper	M. Marks
Paper – I	Computer Networks	75
Paper – II	Web Technologies using ASP.NET	75
Paper – III	Operating System	75
Paper – IV	JAVA Programming Language	75
Paper – V	Lab based on JAVA Programming Language	50
Paper-VI	Lab based on ASP.NET	50

SEMESTER – VI:

Paper No.	Paper	M. Marks
Paper – I	Computer Graphics	75
Paper – II	Software Engineering	75
Paper – III	Lab. Implementation of Applications of Computer Graphics in C++/C	50
Paper – IV	Project	200

Bachelor of Computer Applications (Semester – I)

Paper–I: Introduction to Programming (C) – I

Time: 3 Hours   **M. Marks: 75**

Note:
1. **Eight questions are required to be set giving equal weightage to all the units. The candidates 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
Logic Development and Program Development Tools: Data Representation, Flowcharts, Problem Analysis, Decision Trees/Tables, Pseudo code and algorithms.

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.

UNIT–II
Data Input and Output: single character Input, single character output, entering input data, more about scan functions, writing output data, more about print functions, gets and puts functions, interactive programming.

Control Statements: Preliminaries, While, Do–while and For statements, Nested loops, If–else, Switch, Break – Continue statements.

UNIT–III
Functions: Brief overview, defining, accessing functions, passing arguments to function, specifying argument data types, function prototypes, recursion.

Arrays: Defining, processing an arrays, passing arrays to a function, multi–dimensional arrays.

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".

Bachelor of Computer Applications (Semester – I)

Paper–II: Introduction to Computers and Information Technology

Time: 3 Hours   **M. Marks: 75**

Note:
1. **Eight questions are required to be set giving equal weightage to all the units. The candidates 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
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.

UNIT-II
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, Magnetic storage devices and Optical Storage Devices

UNIT-III
MS–Word: 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

MS–Power Point: Presentation overview, entering information, Presentation creation, opening and saving presentation, inserting audio and video

Text/References:
1. Computer Fundamentals   –   P.K. Sinha.
2. Introduction to Computers   –   N. Subramanian.
3. Introduction to Computers   –   Peter Norton Mcgraw Hill.
4. MS–Office   _   BPB Publications.
5. Windows Based Computer Courses   Gurvinder Singh & Rachpal Singh, Kalyani Pub.

Paper – III: Mathematical Foundation of Computer Science

Time: 3 Hours   **Max. Marks: 75**

Note:
1. **Eight questions are required to be set giving equal weightage to all the units. The candidates 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
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 using matrices and Cramer rule, definition and properties of determinants (statement only), characteristics polynomial, eigen values, nature of eigen values , certain types of matrices, Cayley – Hamilton theorem.

UNIT-II
Set Theory, Relation: Elements of a set, methods of describing a set, types of sets, operation on sets – union, intersection and difference of sets, Venn diagrams, statement problems, Associative laws, Distributive laws, DeMorgan's laws, duality, partitioning of a set. Basic definition of Relation and types of relations, graphs of relations, properties of relations (domain, range, inverse and composite relations).

UNIT-III
Differentiation and Integration: Laws of derivative, Chain rule, Differentiation using log, repeated derivatives, derivatives of implicit functions. Integration of algebraic, Logarithmic and Exponential function, Integration of functions using partial fraction (Simple form using properties), Integration of functions by parts, Definite integral

Probability: Mathematical and Statistical probability, axiomatic approach to probability, Elementary events, Sample space, Compound events, Types of events, Mutually exclusive, Independent events, addition law of probability, Conditional probability, Multiplication theorem of probability, Baye's Theorem.

Books Recommended:

1. Text Book of Engineering Mathematics by N.P. Bali
2. Higher Engineering Mathematics by B.S. Grewal

Bachelor of Computer Applications (Semester – I)

PAPER – IV: COMMUNICATION SKILL IN ENGLISH – I

Time: 3 Hours   **Max. Marks: 50**

Course Contents:

1. Reading Skills: Reading Tactics and strategies; Reading purposes–kinds of purposes and associated comprehension; Reading for direct meanings; Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/ expressions.

Activities:
   a) Active reading of passages on general topics
   b) Comprehension questions in multiple choice format
   c) Short comprehension questions based on content and development of ideas

2. Writing Skills: Guidelines for effective writing; writing styles for application, resume, personal letter, official/ business letter, memo, notices etc.; outline and revision.

Activities:
   a) Formatting personal and business letters.
   b) Organising the details in a sequential order
   c) Converting a biographical note into a sequenced resume or vice-versa
   d) Ordering and sub-dividing the contents while making notes.
   e) Writing notices for circulation/ boards

Suggested Pattern of Question Paper:
The question paper will consist of five skill–oriented questions from Reading and Writing Skills. Each question will carry 10 marks. The questions shall be phrased in a manner that students know clearly what is expected of them. There will be internal choice wherever possible.
                                                                      10x5=50 Marks
   i)   Multiple choice questions on the language and meanings of an unseen passage.
   ii) Comprehension questions with short answers on content, progression of ideas, purpose of writing etc. of an unseen passage.
   iii) Personal letter and Official/Business correspondence
   iv) Making point-wise notes on a given speech/ technical report   OR
        Writing notices for public circulation on topics of professional interest
   v)   Do as directed (10x1= 10 Marks) (change of voice, narration, combination of 2 simple sentences into one, subject-verb agreement, using appropriate tense, forms of verbs.

Recommended Books:

   1. *Oxford Guide to Effective Writing and Speaking* by John Seely.
   2. *English Grammar in Use* (Fourth Edition) by Raymond Murphy, CUP

Paper-V: ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ)

ਸਮਾਂ : 3 ਘੰਟੇ   ਕੁਲ ਅੰਕ : 50

ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

1. **ਗਿਆਨ ਮਾਲਾ** (ਵਿਗਿਆਨਕ ਤੇ ਸਮਾਜ-ਵਿਗਿਆਨਕ ਲੇਖਾਂ ਦਾ ਸੰਗ੍ਰਹਿ),

   (ਸੰਪਾ. ਡਾ. ਸਤਿੰਦਰ ਸਿੰਘ, ਪ੍ਰੋ. ਮਹਿੰਦਰ ਸਿੰਘ ਬਨਵੈਤ), ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

   ਲੇਖ : ਪਹੀਆ ਪ੍ਰਦੂਸ਼ਣ, ਭਰੂਣ ਹੱਤਿਆ ਦੇ ਦੇਸ਼ ਵਿਚ, ਨਾਰੀ ਸ਼ਕਤੀ, ਵਾਤਾਵਰਣੀ ਪ੍ਰਦੂਸ਼ਣ ਅਤੇ ਮਨੁੱਖ, ਏਡਜ਼ : ਇਕ ਗੰਭੀਰ ਸੰਕਟ।

2. **ਆਤਮ ਅਨਾਤਮ** (ਸੰਪ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ)

   (ਪ੍ਰੋ. ਮੋਹਨ ਸਿੰਘ, ਅੰਮ੍ਰਿਤਾ ਪ੍ਰੀਤਮ, ਸ਼ਿਵ ਕੁਮਾਰ ਬਟਾਲਵੀ, ਸੁਰਜੀਤ ਪਾਤਰ, ਪਾਸ਼) ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

3. **ਪੈਰ੍ਹਾ ਰਚਨਾ**

4. **ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ।**

5. (ੳ) **ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ** : ਉਚਾਰਨ ਅੰਗ, ਉਚਾਰਨ ਸਥਾਨ ਤੇ ਵਿਧੀਆਂ, ਸਵਰ, ਵਿਅੰਜਨ, ਸੁਰ।

   (ਅ) **ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ** : ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ-ਭਾਸ਼ਾ ਦਾ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪ-ਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ-ਚਿੰਨ੍ਹ।

6. **ਮਾਤ ਭਾਸ਼ਾ ਦਾ ਅਧਿਆਪਨ**

   (ੳ)   ਪਹਿਲੀ ਭਾਸ਼ਾ ਦੇ ਤੌਰ ਉੱਤੇ

   (ਅ)   ਦੂਜੀ ਭਾਸ਼ਾ ਦੇ ਤੌਰ ਉੱਤੇ

Bachelor of Computer Applications (Semester – I)

ਅੰਕ–ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ:

1. ਕਿਸੇ ਨਿਬੰਧ ਦਾ ਸਾਰ ਜਾਂ ਉਸਦਾ ਵਿਸ਼ਾ ਵਸਤੂ (ਦੋ ਵਿੱਚੋਂ ਇਕ) ।   10 ਅੰਕ

2. **ਆਤਮ ਅਨਾਤਮ** : ਸਾਰ, ਵਿਸ਼ਾ–ਵਸਤੂ, ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ, ਕਲਾ ਪੱਖ   10 ਅੰਕ

3. ਪੈਰ੍ਹਾ ਰਚਨਾ : ਤਿੰਨ ਵਿਸ਼ਿਆਂ ਵਿੱਚੋਂ ਕਿਸੇ ਇਕ ਉੱਤੇ ਪੈਰ੍ਹਾ ਲਿਖਣ ਲਈ   05 ਅੰਕ
    ਕਿਹਾ ਜਾਵੇ ।

4. ਪੈਰ੍ਹਾ ਦੇ ਕੇ ਉਸ ਬਾਰੇ ਪੰਜ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ।   05 ਅੰਕ

5. ਨੰਬਰ 5 ਉੱਤੇ ਦਿੱਤੀ ਵਿਆਕਰਣ ਦੇ ਆਧਾਰ 'ਤੇ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ।   10 ਅੰਕ

6. ਨੰਬਰ 6 ਵਿਚ ਮਾਤ ਭਾਸ਼ਾ ਦੇ ਪਹਿਲੀ ਭਾਸ਼ਾ ਅਤੇ ਦੂਜੀ ਭਾਸ਼ਾ ਵਜੋਂ
    ਅਧਿਆਪਨ, ਮਹੱਤਵ ਅਤੇ ਸਮੱਸਿਆਵਾਂ ਬਾਰੇ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ,
    ਜਿਨ੍ਹਾਂ ਵਿੱਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ ਦੋ ਦਾ ਉੱਤਰ ਦੇਣਾ ਹੋਵੇਗਾ।   5×2=10 ਅੰਕ

PAPER – V: ਮੁੱਢਲੀ ਪੰਜਾਬੀ

(In lieu of Compulsory Punjabi)

ਸਮਾਂ : 3 ਘੰਟੇ   ਕੁਲ ਅੰਕ: 50

ਪਾਠ-ਕ੍ਰਮ

1.   ਪੈਂਤੀ ਅੱਖਰੀ; ਪੈਰ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ ਅਤੇ ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ, ਲਗਾਂ ਮਾਤਰਾਂ

2.   ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ)

3.   (ੳ)   ਵਿਸ਼ਰਾਮ ਚਿੰਨ੍ਹਾਂ ਦੀ ਵਰਤੋਂ,

      (ਅ)   ਨਾਂਵ, ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਵਿਸ਼ੇਸ਼ਣ, ਲਿੰਗ ਅਤੇ ਵਚਨ

ਅੰਕ ਵੰਡ ਤੇ ਪੇਪਰ ਸੈੱਟਰ ਲਈ ਹਦਾਇਤਾਂ

1.   ਪੈਂਤੀ ਅੱਖਰੀ ਦੀ ਬਣਤਰ ਅਤੇ ਤਰਤੀਬ ਨਾਲ ਸੰਬੰਧਿਤ ਪ੍ਰਸ਼ਨ।   **10 ਅੰਕ**
      (ਦੋ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚੋਂ ਇੱਕ ਕਰਨਾ ਹੋਵੇਗਾ)
      ਕਵਰਗ, ਚਵਰਗ, ਤਵਰਗ, ਟਵਰਗ ਆਦਿ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ ਪੁੱਛਿਆ ਜਾ
      ਸਕਦਾ ਹੈ। ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ ਅਤੇ ਲਗਾਂ ਮਾਤਰਾਂ ਦੀ ਵਰਤੋਂ ਨਾਲ
      ਸੰਬੰਧਿਤ ਪ੍ਰਸ਼ਨ (ਦੋ ਵਿਚੋਂ ਇੱਕ ਕਰਨਾ ਹੋਵੇਗਾ)   **10 ਅੰਕ**

2.   ਬਿੰਦੀ, ਟਿੱਪੀ ਅਤੇ ਅੱਧਕ ਦੀ ਵਰਤੋਂ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ   **10 ਅੰਕ**

3.   (ੳ)   ਵਿਸ਼ਰਾਮ ਚਿੰਨ੍ਹਾਂ ਦੀ ਵਰਤੋਂ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ   **10 ਅੰਕ**

      (ਅ)   ਨਾਂਵ ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਵਿਸ਼ੇਸ਼ਣ ਅਤੇ ਲਿੰਗ ਵਚਨ ਸੰਬੰਧੀ ਮੁੱਢਲੀ
             ਕਿਸਮ ਦੇ ਪ੍ਰਸ਼ਨ (ਦੋ ਵਿਚੋਂ ਇੱਕ ਕਰਨਾ ਹੋਵੇਗਾ)   **10 ਅੰਕ**

Bachelor of Computer Applications (Semester – I)

Paper – VI: Practical – I
(MS Office 2010 & Basic C Programming)

M. Marks: 75

Operational Knowledge of:

1. C Programming

2. Windows Based Operating System

3. MS – OFFICE (Word and Power Point)

Bachelor of Computer Applications (Semester – II)

Paper–I: Introduction to Programming (C) - II

Time: 3 Hours   **M. Marks: 75**

Note:

1. **Eight questions are required to be set giving equal weightage to all the units. The candidates will have to attempt any five. All questions carry equal marks.**
2. **The student can use only Non–programmable & Non–storage type Calculator.**

Strings: String declaration, string functions and string manipulation

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

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

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.

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".

Bachelor of Computer Applications (Semester – II)

Paper–II: Principles of Digital Electronics

Time: 3 Hours   **M. Marks: 75**

Note:
1. **Eight questions are required to be set giving equal weightage to all the units. The candidates 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
Number System: Introduction, number conversion system , binary arithmetic, representation of signed binary numbers, 1's and 2's complement, Codes: straight binary code, BCD Code Excess3 Code, Grey Code ASCII, Integer and floating point representation

Logic Gates and Boolean Algebra: Logic gates, Universal Gates, Boolean algebra and Minimization techniques, canonical forms of Bookean expressions, K-Map

UNIT-II
Combinational Circuits: Adder, Subtracter, Multiplexer, Demultiplexer, Decoeer, Encoder

Sequential Circuits: Flip-flops, clocks and timers, registers, counter

UNIT-III
Semiconductor memories: Introduction, Static and dynamic devices, read only & random access memory chips, PROMS and EPROMS Address selection logic. Read and write control timing diagrams for ICs

References:

1. Integrated Electronics by Millman, Halkias McGraw Hill.
2. Malvino: Digital Computer Electronics, McGraw Hill.
3. D.A. Hodges & H.G. Jackson, Analysis and Design of Integrated Circuits, International, 1983.
4. Joph. F. Wakerley, Digital Principles and Practices.
5. Ujjenbeck, John: Digital Electronics: A Modern Approach, Prentice Hall, 1994.
6. Mano, M. Morris: Digital Logic and Computer Design, Edition, 1993.
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Bachelor of Computer Applications (Semester – II)

Paper–III: Numerical Methods & Statistical Techniques

Time: 3 Hours   **M. Marks: 75**

Note:
1. **Eight questions are required to be set giving equal weightage to all the units. The candidates will have to attempt any five. All questions carry equal marks.**
2. **The student can use only Non–programmable & Non–storage type Calculator.**

Note for Paper Setter:
I. **That the program for numerical and statistical methods are to be written in 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.**

UNIT-I
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.

UNIT-II
4. Numerical Integration and different Trapezoidal Rule, Simpson's 3/8 Rule.
5   Interpolation and Curve Fitting, Lagrangian Polynomials, Newton's Methods: Forward Difference Method, Backward Difference Method Divided Difference Method.
6   Least square fit linear trend, Non–linear trend.
   $Y = ax^b$
   $Y = ab^x$
   $Y = ae^x$
   Polynomial fit: $Y = a+bx+cn^2$

UNIT-III
Statistical Techniques:
1. Measure of Central Tendency, Mean Arithmetic, Mean geometric, Mean harmonic, Mean, Median, Mode.
2. Measures of dispersion, Mean deviation, Standard deviation, Co–efficient of variation.
3. Correlation.

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.

Bachelor of Computer Applications (Semester – II)

PAPER–IV: COMMUNICATION SKILLS IN ENGLISH – II

Time: 3 Hours   **Max. Marks: 50**
                                                               Theory Marks: 35
                                                               Practical Marks: 15

Course Contents:

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

    Activities:
    a) Listening exercises – Listening to conversation, News and TV reports
    b) Taking notes on a speech/lecture

2. **Speaking and Conversational Skills**: Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics.
    The study of sounds of English, stress
    Situation based Conversation in English
    Essentials of Spoken English

    Activities:
    a) Making conversation and taking turns
    b) Oral description or explanation of a common object, situation or concept
    c) Giving interviews

Suggested Pattern of Question Paper:

The question paper will consist of seven questions related to speaking and listening Skills. Each question will carry 5 marks. The nature of the questions will be as given below:-

Two questions requiring students to give descriptive answers.

Three questions in the form of practical exercises requiring students to give an appropriate response to a question, a proposal, a proposition, an invitation etc. For example, the paper setter may give a proposition and ask the students to agree or disagree with it or introduce a character giving invitations and ask the students to accept or refuse it etc.

Two questions requiring students to transcribe simple words in IPA symbols, marking stress.

Bachelor of Computer Applications (Semester – II)

PRACTICAL / ORAL TESTING

Marks: 15

Course Contents:

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

Questions:

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.

2. Group discussion comprising 8 to 10 students on a familiar topic. Time for each group will be 15 to 20 minutes.

Note: Oral test will be conducted by external examiner with the help of internal examiner.

Bachelor of Computer Applications (Semester – II)

PAPER–V: ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ)

ਸਮਾਂ : 3 ਘੰਟੇ   ਕੁਲ ਅੰਕ : 50

ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

1. **ਗਿਆਨ ਮਾਲਾ** (ਵਿਗਿਆਨਕ ਤੇ ਸਮਾਜ-ਵਿਗਿਆਨਕ ਲੇਖਾਂ ਦਾ ਸੰਗ੍ਰਹਿ)
    (ਸੰਪ. ਡਾ. ਸਤਿੰਦਰ ਸਿੰਘ, ਪ੍ਰੋ. ਮਹਿੰਦਰ ਸਿੰਘ ਬਨਵੈਤ), ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ,
    ਅੰਮ੍ਰਿਤਸਰ, 2007
    ਲੇਖ : ਸਾਹਿਤ ਤੇ ਲੋਕ ਸਾਹਿਤ, ਅੱਖਾਂ, ਅਚੇਤਨ ਦਾ ਗੁਣ ਤੇ ਸੁਭਾਅ, ਕੰਪਿਊਟਰ ਅਤੇ
    ਇੰਟਰਨੈੱਟ, ਮਨੁੱਖੀ ਅਧਿਕਾਰ।
2. **ਆਤਮ ਅਨਾਤਮ** (ਸੰਪ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ) (ਕਹਾਣੀਆਂ)
    ਪਠਾਣ ਦੀ ਧੀ (ਸੁਜਾਨ ਸਿੰਘ), **ਸਾਂਝੀ ਕੰਧ** (ਸੰਤੋਖ ਸਿੰਘ ਧੀਰ), **ਉਜਾੜ** (ਕੁਲਵੰਤ ਸਿੰਘ
    ਵਿਰਕ), **ਘਟਨਾ** (ਮੋਹਨ ਭੰਡਾਰੀ), **ਦਲਦਲ** (ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ)
    ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

3. **ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ** : ਪਰਿਭਾਸ਼ਾ, ਮੁੱਢਲੇ ਸੰਕਲਪ
4. **ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ**
5. **ਪੈਰ੍ਹਾ ਰਚਨਾ**
6. **ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ**
7. **ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ**

ਅੰਕ–ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ:

1. ਕਿਸੇ ਨਿਬੰਧ ਦਾ ਸਾਰ ਜਾਂ ਉਸਦਾ ਵਿਸ਼ਾ ਵਸਤੂ (ਦੋ ਵਿਚੋਂ ਇਕ) ।   10 ਅੰਕ
2. **ਆਤਮ ਅਨਾਤਮ** : ਸਾਰ, ਵਿਸ਼ਾ ਵਸਤੂ, ਪਾਤਰ ਚਿਤਰਣ, ਸਾਹਿਤ ਨੂੰ ਦੇਣ   10 ਅੰਕ
3-4. 3-4 ਨੰਬਰ ਉੱਤੇ ਦਿੱਤੀ ਵਿਆਕਰਣ ਦੇ ਆਧਾਰ ਤੇ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ।   10 ਅੰਕ
5. ਪੈਰ੍ਹਾ ਰਚਨਾ : ਤਿੰਨ ਵਿਸ਼ਿਆਂ ਵਿਚੋਂ ਕਿਸੇ ਇਕ ਉੱਤੇ ਪੈਰ੍ਹਾ ਲਿਖਣ ਲਈ   05 ਅੰਕ
    ਕਿਹਾ ਜਾਵੇ ।
6. ਪੈਰ੍ਹਾ ਦੇ ਕੇ ਉਸ ਬਾਰੇ ਪੰਜ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ   05 ਅੰਕ
7. ਨੰਬਰ 7 ਵਿਚ ਅੱਠ ਅਖਾਣ ਅਤੇ ਅੱਠ ਮੁਹਾਵਰੇ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ
    ਵਿਦਿਆਰਥੀ ਨੇ ਪੰਜ-ਪੰਜ ਨੂੰ ਵਾਕਾਂ ਵਿਚ ਵਰਤ ਕੇ ਅਰਥ ਸਪੱਸ਼ਟ ਕਰਨੇ ਹੋਣਗੇ।
                                                                                      5+ 5=10 ਅੰਕ

Bachelor of Computer Applications (Semester – II)

PAPER – V: ਮੁੱਢਲੀ ਪੰਜਾਬੀ
(In lieu of Compulsory Punjabi)

ਸਮਾਂ: 3 ਘੰਟੇ   ਕੁਲ ਅੰਕ: 50

ਪਾਠ – ਕ੍ਰਮ

1.   ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ
     ਸੰਯੁਕਤ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ
     ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ   **20 ਅੰਕ**
2.   ਭਾਸ਼ਾ ਅਤੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ
     ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀਆਂ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ   **15 ਅੰਕ**
3.   ਪੰਜਾਬੀ ਵਾਕ ਬਣਤਰ
     ਸਾਧਾਰਨ ਵਾਕ: ਕਿਸਮਾਂ
     ਸੰਯੁਕਤ ਵਾਕ: ਕਿਸਮਾਂ
     ਮਿਸ਼ਰਤ ਵਾਕ: ਕਿਸਮਾਂ
     ਪੰਜਾਬੀ ਵਾਕਾਂ ਦੀ ਵਰਤੋਂ ਦੇ ਵਿਭਿੰਨ ਸਮਾਜਿਕ ਪ੍ਰਸੰਗ   **15 ਅੰਕ**

ਯੂਨਿਟ ਅਤੇ ਥੀਮ

1.   **ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ:** ਸੰਯੁਕਤ ਸ਼ਬਦ; ਸਮਾਸੀ ਸ਼ਬਦ (ਜਿਵੇਂ ਲੋਕ ਸਭਾ); ਦੋਹਰੇ ਸ਼ਬਦ / ਦੁਹਰਰੁਕਤੀ (ਜਿਵੇਂ ਪੁਤ ਧਾੜ / ਭਰ ਭਰ), ਮਿਸ਼ਰਤ ਸ਼ਬਦਾਂ ਦੀ ਬਣਤਰ/ਸਿਰਜਨਾ; ਅਗੇਤਰਾਂ ਰਾਹੀਂ (ਜਿਵੇਂ ਉਪ ਭਾਸ਼ਾ), ਪਿਛੇਤਰਾਂ ਰਾਹੀਂ (ਜਿਵੇਂ ਰੰਗਲਾ), ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ: ਪੜਨਾਵੀਂ ਰੂਪ, ਕਿਰਿਆ/ਸਹਾਇਕ ਕਿਰਿਆ ਦੇ ਰੂਪ; ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ: ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਮੌਸਮਾਂ, ਗਿਣਤੀ ਨਾਲ ਸੰਬੰਧਿਤ ।

2.   I.   ਭਾਸ਼ਾ ਅਤੇ ਮਾਤ ਭਾਸ਼ਾ ਦੇ ਮਹੱਤਵ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ

     II. ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀਆਂ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ ਸੰਬੰਧੀ ਪ੍ਰਸ਼ਨ

3.   **ਪੰਜਾਬੀ ਵਾਕ ਬਣਤਰ:** ਕਰਤਾ ਕਰਮ ਕਿਰਿਆ; ਸਾਧਾਰਨ ਵਾਕ, ਬਿਆਨੀਆ, ਪ੍ਰਸ਼ਨਵਾਚਕ, ਆਗਿਆਵਾਚਕ, ਸੰਯੁਕਤ ਅਤੇ ਮਿਸਰਤ ਵਾਕਾਂ ਦੀਆਂ ਕਿਸਮਾਂ; ਸੁਤੰਤਰ ਅਤੇ ਅਧੀਨ ਉਪਵਾਕ; ਸਮਾਨ (ਤੇ/ਅਤੇ) ਅਤੇ ਅਧੀਨ (ਜੋ/ਕਿ) ਯੋਜਕਾਂ ਦੀ ਵਰਤੋਂ; ਪੰਜਾਬੀ ਵਾਕਾਂ ਦੀ ਵਰਤੋਂ: ਵਿਭਿੰਨ ਸਮਾਜਕ/ਸਭਿਆਚਾਰਕ ਪ੍ਰਸੰਗ; ਘਰ ਵਿਚ, ਬਾਜ਼ਾਰ ਵਿਚ, ਮੇਲੇ ਵਿਚ, ਸ਼ੋਪਿੰਗ ਮਾਲ/ਸਿਨਮੇ ਵਿਚ, ਵਿਆਹ ਵਿਚ, ਧਾਰਮਿਕ ਸਥਾਨਾਂ ਵਿਚ, ਦੋਸਤਾਂ ਨਾਲ ਆਦਿ।

Bachelor of Computer Applications (Semester – II)

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪਹਿਲੇ ਯੂਨਿਟ ਵਿੱਚੋਂ ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ ਨਾਲ ਸਬੰਧਿਤ 5-5 ਅੰਕਾਂ ਦੇ ਤਿੰਨ ਵਿਹਾਰਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਅੰਕਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਇਕ-ਇਕ ਜਾਂ ਦੋ-ਦੋ ਅੰਕਾਂ ਦੇ ਛੋਟੇ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕੀਤੀ ਜਾ ਸਕਦੀ ਹੈ।

   ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਸ਼ਬਦਾਵਲੀ ਨਾਲ ਸਬੰਧਿਤ ਇਕ-ਇਕ ਅੰਕ ਦੇ ਪੰਜ (ਆਬਜੈਕਟਿਵ) ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।

   20 ਅੰਕ

2. ਦੂਸਰੇ ਯੂਨਿਟ ਵਿੱਚ ਭਾਸ਼ਾ ਅਤੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ ਨਾਲ ਸੰਬੰਧਿਤ 5-5 ਅੰਕਾਂ ਦੇ ਤਿੰਨ ਵਿਹਾਰਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਅੰਕਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਇੱਕ-ਇੱਕ ਜਾਂ ਦੋ-ਦੋ ਅੰਕਾਂ ਦੇ ਛੋਟੇ ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕੀਤੀ ਜਾ ਸਕਦੀ ਹੈ।

   15 ਅੰਕ

3. ਤੀਜੇ ਯੂਨਿਟ ਵਿੱਚ ਪੰਜਾਬੀ ਵਾਕ-ਬਣਤਰ ਨਾਲ ਸਬੰਧਿਤ 5-5 ਅੰਕਾਂ ਦੇ ਦੋ ਵਿਹਾਰਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਅੰਕਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਇਕ-ਇਕ ਜਾਂ ਦੋ-ਦੋ ਅੰਕਾਂ ਦੇ ਛੋਟੇ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕੀਤੀ ਜਾ ਸਕਦੀ ਹੈ।

   ਪੰਜਾਬੀ ਵਾਕਾਂ ਦੀ ਵਿਹਾਰਕ ਵਰਤੋਂ ਨਾਲ ਸਬੰਧਿਤ 5 ਅੰਕਾਂ ਦਾ ਇਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛਿਆ ਜਾਵੇਗਾ, ਜਿਸ ਵਿਚ ਵਿਦਿਆਰਥੀ ਨੂੰ ਕਿਸੇ ਸਮਾਜਿਕ/ਸਭਿਆਚਾਰਕ ਪ੍ਰਸੰਗ ਵਿਚ ਵਰਤੇ ਜਾਂਦੇ ਪੰਜ ਵਾਕ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇਗਾ।

   ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਭਾਸ਼ਾ ਸਰਲ ਅਤੇ ਸਪਸ਼ਟ ਰੱਖੀ ਜਾਵੇ।

   15 ਅੰਕ

Bachelor of Computer Applications (Semester – II)

Paper – VI: Practical–I

(Advanced C Programming)

M. Marks: 75

Operational Knowledge and Implementation of Numerical Methods & Statistical techniques using C language.

Bachelor of Computer Applications (Semester – III)

Paper – I: Computer Architecture

Time: 3 Hours   **M. Marks: 75**

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 75.**
2. **The student can use only Non–programmable & Non–storage type Calculator.**

UNIT-I
Information Representation   : 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.

UNIT-II

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.

UNIT-III

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.

Bachelor of Computer Applications (Semester – III)

Paper – II: Database Management System & Oracle

Time: 3 Hours   **M. Marks: 75**

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.

UNIT-I

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.

UNIT-II

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

UNIT-III

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.

Bachelor of Computer Applications (Semester – III)

Paper – III: C++ (OOP Language)

Time: 3 Hours   **M. Marks: 75**

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.

UNIT-I

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**
- 1.1. Inputting using in and outputting using cout statements.
- 1.2. Preprocessor directives.
- 1.3. Basic program construction.
- 1.4. **A Complete C++ Program:** Invoking Turbo C++, naming your program, using the editor, saving your program, compiling and linking, running the program.
- 1.5. **Errors :** Compiler, linker and runtime.
- 1.6. **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.

UNIT-II

1   **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.

2	**Functions**	5.1. What is a function?

1.2. Declaring and defining function.
1.3. Local, global variables, execution of function.
1.4. Passing argument to function.
1.5. Return values.
1.6. Reference arguments.
1.7. Overloading functions.
1.8. Inline function and default parameter.
1.9. Variable and storage classes.

UNIT-III

1	**Object Oriented Programming**	1.1. Objects & Classes.

1.2. Constructor & Destructor.
1.3. Operator overloading.
    a) Overloading unary operators.
    b) Overloading binary operators.
    c) Data conversion.
    d) Pitfalls operator overloading and conversion.
1.4. **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.
1.5. **Polymorphism**
    a) Problems with single inheritance.
    b) Multiple inheritance.

2	**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.

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.

Bachelor of Computer Applications (Semester – III)

PAPER–IV: ENVIRONMENTAL STUDIES-I

Time: 3 Hrs.   **Max. Marks: 50**
Theory Lectures: 1½ Hours/ Week

Section–A: (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying five marks. Answer to any of the questions should not exceed two pages.
Section–B: (20 Marks): It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying ten marks. Answer to any of the questions should not exceed four pages.
Section–C: (15 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.

1. **The Multidisciplinary Nature of Environmental Studies:**
   - Definition, scope & its 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 or modern agriculture, fertilizer–pesticide problem, salinity, case studies.
     e) **Energy Resources**: Growing of energy needs, renewable and non–renewable energy resources, use of alternate energy sources, case studies.
     f) **Land Recourses**: Land as a resource, land degradation, soil erosion and desertification.
   - 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 ecosystems:
     a. Forest ecosystem
     b. Grassland ecosystem

      c. Desert ecosystem

      d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

4. 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 problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions.
- Climate change, global warning, acid rain, ozone layer depletion, nuclear accidents and holocause. Case studies.
- Wasteland 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.

5. National Service Scheme

- **Introduction and Basic Concepts of NSS:** History, philosophy, aims & objectives of NSS; Emblem, flag, motto, song, badge etc.; Organizational structure, roles and responsibilities of various NSS functionaries.
- **Health, Hygiene & Sanitation:** Definition, needs and scope of health education; Food and Nutrition; Safe drinking water, water borne diseases and sanitation (Swachh Bharat Abhiyan); National Health Programme; Reproductive health.

References/Books:
1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Down to Earth, Centre for Science and Environment, New Delhi.
4. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
5. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
6. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
7. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
8. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
9. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar.
10. Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.

Paper – V
(Programming Lab-I)

Lab – I: Based on C++ Programming Language   :   50 Marks

Paper – VI
(Programming Lab-II)

Lab – II: Practical in Oracle   :   25 Marks

Bachelor of Computer Applications (Semester – IV)

Paper – I: Data Structures and File Processing

Time: 3 Hours   **M. Marks: 75**

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.

UNIT-I

Basic Data Structures: 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.

UNIT-II

Searching Techniques: Linear and Binary Search.

Sorting Techniques: Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort.

UNIT-III

File Organization: Concept of field, record, file, blocking and compaction.

File Organization Techniques: Sequential, indexed, indexed sequential, Direct, Hashing. Concept of master and transaction files.

Text/References:

1. Data Structure – Seymour Lipschutz, Schaum Outline Series.

2. File Structure & Data Structures by E. Loomis.

3. Data Structures by Trabley & Soreuson.

Paper – II: Information Systems

Time: 3 Hours   **M. Marks: 75**

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.

UNIT-I

Fundamental aspects of Information, Capturing of Information, Converting Information to Computer – readable form, source of Information, on–line Information access and capture.

UNIT-II

What are systems? Information Systems? Categories of Information Systems, Development Life Cycle of Information system.

Technologies for Information System: Latest trends in Hardware and Software.

UNIT-III

Various types of information systems: Transaction processing systems, office Automation systems, MIS and decision support system.

Case studies of the Information System: Accounting Information systems, Inventory control systems & Marketing systems.

References:

1. "Information Systems" by Mudride & Ross.

2. "Business Information Systems", Muneesh Kumar.

3. "Information Systems for Managers", Ashok Arora and A.K. Shaya Bhatia.

Paper – III: Internet Applications

Time: 3 Hours   **M. Marks: 75**

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.

UNIT-I

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).

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.

UNIT-II

Internet Protocol: Introduction, file transfer protocol (FTP), Gopher, Telnet, other protocols like HTTP and TCPIP.

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.

UNIT-III

Search Engine: About search engine, component of search engine, working of search engine, difference between search engine and web directory.

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.

References:

1. "Understanding The Internet", Kieth Sutherland, Butterworth-Heinemann; 1st Edition (October 31, 2000).
2. "Internet Technologies", S. K. Bansal, APH Publishing Corporation (April 1, 2002).
3. "Data Communications and Networking", Behrouz A. Forouzan, 3rd Edition.

Bachelor of Computer Applications (Semester – IV)

Paper – IV: SYSTEM SOFTWARE

Time: 3 Hours   **M. Marks: 75**

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.**

UNIT-I
Introduction to System Software
Introduction to System Software and its components
Translators, loaders, interpreters, compiler, assemblers

UNIT-II
Assemblers
Overview of assembly process, design of one pass and two assemblers

Macroprocessors
Macro definition and expansion, concatenation of macro parameters, generations of unique labels, conditional macro expansion, Recursive macro expansion

UNIT-III
Compilers
Phases of Compilation Process, Lexical Analysis, Parsing, Storage Management Optimization Incremental Compilers, Cross Compilers.

Loaders and Linkage editors
Basic loader functions. Relocation, program linking, linkage, editors, dynamic linking, Bootstrap loaders

References:

1. Leland L. Beck: System Software, An Introduction to System Programming, Addison Wesley.
2. D.M. Dhamdhere: Introduction to System Software, Tata McGraw Hill.
3. D.M. Dhamdhere: System Software and Operating System, Tata McGraw Hill, 1992.
4. Madrich, Stuarte: Operating Systems, McGraw Hill, 1974.
5. Stern Nancy Assembler Language Programming for IBM and IBM Compatible Computers, John Wiley, 1991.

Bachelor of Computer Applications (Semester – IV)

PAPER–V: ENVIRONMENTAL STUDIES-II

Time: 3 Hrs.   **Max. Marks: 50**
Theory Lectures: 1½ Hours/ Week

Section–A: (15 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying five marks. Answer to any of the questions should not exceed two pages.
Section–B: (20 Marks): It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying ten marks. Answer to any of the questions should not exceed four pages.
Section–C: (15 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.

1. **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 wild life, man wildlife conflicts.
   - Endangered and endemic species of India.
   - Conservation of Biodiversity: In situ and Ex–situ conservation of biodiversity.

2. **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 Hazards
     h) Electronic Waste
   - Solid 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.

3.   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 environment and human health.
- Case studies.
- Road Safety Rules & Regulations**:** Use of Safety Devices while Driving, Do's and Don'ts while Driving, Role of Citizens or Public Participation, Responsibilities of Public under Motor Vehicle Act, 1988, General Traffic Signs.
- Accident & First Aid**:** First Aid to Road Accident Victims, Calling Patrolling Police & Ambulance.

4. National Service Scheme
- **Entrepreneurship Development:** Definition & Meaning; Qualities of good entrepreneur; Steps/ ways in opening an enterprise; Role of financial and support service Institutions.
- **Civil/Self Defense:** Civil defense services, aims and objectives of civil defense; Needs for self defense training.

5. Field Visits:
- Visit to a local area to document environmental assets–river/forest/grassland/hill/ mountain.
- Visit to a local polluted site–Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems–pond, river, hill slopes etc.
- Contribution of the student to NSS/any other social cause for service of society.

Note: In this section the students will be required to visit and write on the environment of an area/ ecosystem/vi1lage industry/disaster/mine/dam/agriculture field/waste management/ hospital etc. with its salient features, limitations, their implications and suggestion for improvement.

References/Books:
1.   Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2.   Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3.   Down to Earth, Centre for Science and Environment, New Delhi.
4.   Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
5.   Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
6.   Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
7.   Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
8.   Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
9.   Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar
10.   Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.

Paper – VI: LAB - I

Time: 3 Hours   **M. Marks: 50**

Lab – Data Structure implementation using C++

Paper – VII: LAB - II

Time: 3 Hours   **M. Marks: 50**

Lab – Web Designing and use of Internet

Bachelor of Computer Applications (Semester – V)

Paper – I: Computer Networks

Time: 3 Hours   **M. Marks: 75**

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.

UNIT – I
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 reference model, TCP/IP reference 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.

UNIT – II
3. **Local Area Network Protocols:** CSMA Protocols, BRAP, MLMA, IEEE standards 802, 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.

UNIT – III
6. **Network Security and Privacy:** Brief Introduction to Cryptography.

7. **Network Services:** File transfer, Access & Management, Electronic Mail, Remote login

References:
1. Tannanbum, A.S.: Computer Networks, Prentice Hall, 1992, 3rd Edition.
2. Stallings, William: Local Networks: An Introduction: Macmillan Publishing Co.
3. Stallings, William: Data Computer Communication, Macmillan Publishing Co.

Bachelor of Computer Applications (Semester – V)

Paper- II: Web Technologies using ASP.NET

Time: 3 Hours   **M. Marks: 75**

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.

UNIT-I
1.   **Introduction to Standard Controls:** Display information, Accepting user input, Submitting form data, Displaying images, Using the panel control, Using the hyperlink control.

2.   **Introduction to Validation Controls**: Using the required field validator control, Using the range validator controlusing the compare validator control, Using the regular expression validator control, Using the custom validator control, Using the validation summary controls.

3.   **Introduction to Rich Controls**: Accepting file uploads ,Displaying a calendar, Displaying advertisement, Displaying different page views, Displaying a wizard.

UNIT-II
4.   **Designing Website with Master Pages**: Creating master pages, Modifying master page content, Loading master page dynamically.

5.   **SQL Data Source Control**: Creating database connections, Executing database commands, Using ASP.NET parameters with the SQL data source controls, Programmatically executing SQL data source commands, Cashing database data with the SQL data Source controls.

6.   **List Controls**: Dropdown list control, Radio button list controls, list box controls, bulleted list controls, custom list controls.

UNIT-III
7.   **Grid View Controls**: Grid view control fundamentals, Using field with the grid view control, Working with grid view control events extending the grid view control.

8.   **Building Data Access Components with ADO.NET**: Connected the data access, Disconnected data access, Executing a synchronous database commands, Building data base objects with the .NET framework.

Reference:
ASP.NET 3.5: Stephen Walther, Pearson Education, 2005.

Bachelor of Computer Applications (Semester – V)

Paper – III: Operating System

Time: 3 Hours   **M. Marks: 75**

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.

Unit – I

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.

Unit – II

4. **Process Synchronization**: 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.

Unit – III

7. **Secondary Storage Structures**: Disk structures, Disk scheduling, Disk Reliability.

8. **Deadlocks**: System Model, Deadlock characterization, methods for handing 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.

Bachelor of Computer Applications (Semester – V)

Paper – IV: JAVA PROGRAMMING LANGUAGE

Time: 3 Hours **Max. Marks: 75**

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 75.**
2. **The student can use only Non–programmable & Non–storage type Calculator.**

UNIT-I
Introduction to JAVA: Object Orientation Concepts, Platform Independence & Cross Platform Computing, Control statements, Operators & Data types.
UNIT-II
Classes & Methods, constructors, Inheritance & Polymorphism. Packages & Interfaces, Multithreading in Java.
UNIT-III
Exception Handling, String handling in Java & Input/Output in Java.

References:
1. "Java–The Complete Reference", Hurbert Schildt, Tata MacGraw Hill.
2. "Introduction to Java Programming", Y. Daniel Mliang, Pearsons Publications.
3. "Beginning Web Programming with HTML, XHTML, and CSS", Jon Duckett, John Wiley & Sons, 06 Aug. 2004.

Paper–V

Time: 3 Hours   **Marks: 50**

Lab :   **Lab based on JAVA Programming Language**

Paper–VI

Time: 3 Hours   **Marks: 50**

Lab :   **Lab based on ASP.NET**

Bachelor of Computer Applications (Semester – VI)

Paper – I: Computer Graphics

Time: 3 Hours **Total Marks: 75**

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.

UNIT – I

1. **Overview of Graphics system:** Computer Graphics and their applications.

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

3. **Graphics Software.**

UNIT – II

4. **Elementary Drawing:** Points and various line drawing Algorithms and their comparisons. Circle generating algorithms, Algorithms for ellipse, arc and spiral

5. **Two Dimensional Transformations:** Basic Transformations, Scaling, Translation, Rotation, Reflection, Shear, Matrix representation of Basic transformations and homogenous coordinates.

UNIT – III

6. **Composite Transformations:** Windowing and clipping. Windowing concepts, 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.

7. **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.

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.

Bachelor of Computer Applications (Semester – VI)

Paper – II: Software Engineering

Time: 3 Hours **M. Marks: 75**

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.

UNIT – I
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.

UNIT – II
4. **Software Requirement Specification (SRS)**: Problem analysis, structuring information, Data flow diagram and data dictionary, structured analysis, Characteristics and component of (SRS).
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.

UNIT – III
7. **Detailed Design**: Module specification, Specifying functional module, specifying data abstraction, PDL and Logic/Algorithim 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, Functional Testing, Structural Testing.

References:

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

Bachelor of Computer Applications (Semester – VI)

Paper – III: Programming Laboratory

Time: 3 Hours

Lab: **Implementation of Applications of Computer Graphics in C++/C   Marks: 50**

Bachelor of Computer Applications (Semester – VI)

Paper – IV: PROJECT

Max. Marks: 200

General Instructions:

1. A software module based on the work done in the entire course is to be developed.

2. The soft copy of the module shall be submitted to the College/Institute till April 30 of the respective semester.

3. The software module shall be developed in groups, consisting of at most two students in a group.

4. The respective college shall depute guide(s)/supervisor(s) under whose supervision the software module shall be developed. The guide/supervisor shall clarify that the work done is original & authenticated. The certificate found to be incorrect at any stage shall attract the proceedings against all the stakeholders, as per the University rules.

5. The evaluation of the module shall be done as per the common ordinance of UG/PG w.e.f. 2012–2013 under semester system.