Bachelor of Computer Applications Syllabus

Session (2020-2021)

Note:

Bachelor of Computer Applications

Semester – I

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Practical	Internal Assessment	Total	
1	Paper–I	Introduction to Programming -C	56	-	19	75	73
2	Paper–II	Introduction to Computers and Information Technology	56	-	19	75	74-75
3	Paper–III	Applied & Discrete Mathematics	56	-	19	75	76
4	Paper–IV	Communication Skills in English	37	-	13	50	77
5	Paper–V	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory)	37	-	13	50	78-79
6	Paper–VI	Practical–I (MS Office 2010/Open Office and C Programming)	-	56	19	75	80
7	Paper–VII	*Drug Abuse: Problem, Management and Prevention(Compulsory Paper)	37		13	50	81-82

- **Marks of Paper-VII will not be included in the Total Marks**

Bachelor of Computer Applications (Semester – I)

Paper–I: Introduction to Programming - C

Time: 3 Hours   **M. Marks: 75**
Theory Marks: 56
Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks**.

Unit -I

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 statements

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

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

Unit -II

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

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

Strings: String declaration, string functions and string manipulation

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.

References:
1. Balaguruswamy: "Programming in ANSIC".
2. Scaum Outline Series: "Programming inC".
3. Dennis & Ritchie: "Programming inC".
4. Stephen G. Kochar: "CProgramming".

Bachelor of Computer Applications (Semester – I)

Paper–II: Introduction to Computers and Information Technology

Time: 3 Hours   **M. Marks: 75**
Theory Marks: 56
Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks**.

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.

Interacting with the Computer

Input Devices: Keyboard, mouse, light pen, 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.

Word Processor: 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

UNIT-II

Data Storage Devices and Media: Primary storage (Storage addresses and capacity, type of memory), Secondary storage, Magnetic storage devices and Optical Storage Devices

Presentation Software: Presentation overview, entering information, Presentation creation, opening and saving presentation, inserting audio and video

Spreadsheet: Spreadsheet overview, Editing, Formatting, Creating formulas, Graphs.

Any Open Source Software like Apache Open Office, Libre Office, Google Docs or Microsoft Office may be used.

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.
6. Ebooks at OpenOffice.org
7. A Conceptual guide to OpenOffice.org3, 2nd Edition, R. Gabriel Gurley

Bachelor of Computer Applications (Semester – I)
Paper III: Applied & Discrete Mathematics

Time: 3 Hours   **M. Marks: 75**
Theory Marks: 56
Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus with answer to each question up to 10 lines in length. Students will attempt 6 questions. Each question will carry two mark; the total weightage being 12 marks.

Section B: It will consist of essay type/numerical questions up to five pages in length.
Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The candidates will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be 22 marks.

Section C: It will consist of essay type/numerical questions up to five pages in length.
Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The candidates will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be 22 marks.

Unit-I

Sets and Relations: Definition of sets, subsets, complement of a set, universal set, intersection and union of sets, De-Morgan's laws, Cartesian products, Equivalent sets, Countable and uncountable sets, minset, Partitions of sets, Relations: Basic definitions, graphs of relations, properties of relations

Logic and Propositional Calculus: Proposition and Compound Propositions, basic Logical Operations, Propositions and Truth Tables, Tautologies and Contradictions, Logical Equivalence, Duality law, Algebra of propositions, Conditional and Bi conditional Statements, Arguments, Logical Implication, Propositional Functions, Predicates and Quantifiers, Negation of Quantified Statements, Inference theory of the predicates calculus.

Boolean Algebra: Boolean algebra and its duality, Duality, Boolean Algebra as Lattices, Boolean identities, sub-algebra, Representation Theorem, Sum-of-Products Form for Sets, Sum of-Products Form for Boolean Algebra, Minimal Boolean Expressions, Prime Implicants, Boolean Functions, Karnaugh Maps.

Unit-II

Matrices: Introduction of a Matrix, its different kinds, matrix addition and scalar multiplication, multiplication of matrices, transpose etc. Square matrices, inverse and rank of a square matrix, Matrix Inversion method.

Graph Theory: A general introduction, simple and multi graphs, directed and undirected graphs, Eulerian and Hamiltonian Graphs, Shortest path algorithms, Chromatic number, Bi partite graph, graph coloring.

References:

1. Lipschutz, S. and Lipson, M.: Discrete Mathematics (Schaum's outlines Series).
2. Kolman and Busby "Discrete Mathematical structures for Computer Sciences" PHI.
3. Alan Doerr,"Applied Discrete Structures for Computer Science", Galgotia Publications.
4. Trambley, J.P. and Manohar,R: Discrete Mathematical Structures with Applications to Computer Science.

Bachelor of Computer Applications (Semester – I)

COMMUNICATION SKILLS IN ENGLISH

Time: 3 Hours   **Max. Marks: 50**
Theory Marks: 37
Internal assessment: 13

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) Reading newspaper, articles, editorials etc.
   c) Short questions based on content and development of ideas of a given paragraph.
2. Writing Skills: Guidelines for effective writing; writing styles for application, resume, personal letter, official/ business letter, memo, notices etc.
Activities:
   a) Personal and business letters.
   b) Converting a biographical note into a sequenced resume.
   c) Writing notices for circulation/ boards.
   d) Making notes of given passage with headings and sub-headings
   e) Writing newspaper reports based on given heading.

Suggested Pattern of Question Paper:
The question paper will consist of Seven skill–oriented questions from Reading and Writing Skills. The first 6 Questions carry 5 marks each. The 7ᵗʰ Question carries 7 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.
   i)   Comprehension questions of an unseen passage.
   ii)   Personal letter Official/Business letters.
   iii) Writing notices/agenda/resolution/ minutes for public circulation on topics of professional interest
   iv)   Writing resume or converting a biographical note into resume
   v)   Writing news report based on a given heading
   vi)   Do as directed
         Articles Units 69-81
         Conjunctions Units 113-120
   (6X5=30 Marks)

   vii) Translation from English to Vernacular (Punjabi/ Hindi) (Isolated Sentences)
                                                                                  (1X7=7 Marks)
Prescribed Book:
   Murphy's English Grammar (by Raymond Murphy) CUP

Recommended Books:
   1. *Oxford Guide to Effective Writing and Speaking* by John Seely.
   2. *The Written Word* by Vandana R Singh, Oxford University Press

Bachelor of Computer Applications (Semester – I)
Paper-V

SEMESTER-I
ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

ਸਮਾਂ : 3 ਘੰਟੇ

ਥਿਉਰੀ ਅੰਕ : 37
ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13

ਕੁੱਲ ਅੰਕ : 50

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਸਾਹਿਤ ਦੇ ਰੰਗ (ਭਾਗ ਪਹਿਲਾ –ਕਵਿਤਾ ਅਤੇ ਕਹਾਣੀ)
ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
(ਲੇਖਕ ਦਾ ਜੀਵਨ ਅਤੇ ਰਚਨਾ/ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ)

ਭਾਗ-ਦੂਜਾ

ਇਤਿਹਾਸਿਕ ਯਾਦਾਂ
ਸ. ਸ. ਅਮੋਲ (ਸੰਪਾ.), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
(ਨਿਬੰਧ 1 ਤੋਂ 6 ਤਕ ਸਾਰ/ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸ਼ੈਲੀ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਪੈਰ੍ਹਾ ਰਚਨਾ (ਤਿੰਨਾਂ ਵਿਚੋਂ ਇੱਕ)
(ਅ) ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ

ਭਾਗ-ਚੌਥਾ

(ੳ) ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ : ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ-ਭਾਸ਼ਾ ਵਿਚਲਾ ਅੰਤਰ, ਪੰਜਾਬੀ
ਉਪ-ਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ-ਚਿੰਨ੍ਹ
(ਅ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ – ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ।
2. ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅੰਕ ਹੋਣਗੇ।
3. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅੰਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਨੋਟ : ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਇਨ੍ਹਾਂ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 37+13 = 50 ਹਨ।

Bachelor of Computer Applications (Semester – I)
Paper-V
ਮੁੱਢਲੀ ਪੰਜਾਬੀ
(ਇਨ ਲਿਊ ਆਫ ਕੰਪਲਸਰੀ ਪੰਜਾਬੀ)

ਸਮਾਂ : 3 ਘੰਟੇ

ਥਿਊਰੀ ਅੰਕ : 37
ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13
ਕੁਲ ਅੰਕ: 50

1. ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ

ੳ) ਨਾਮਕਰਣ ਤੇ ਸੰਖੇਪ ਜਾਣ-ਪਛਾਣ : ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ, ਅੱਖਰ ਕ੍ਰਮ, ਸਵਰ ਵਾਹਕ (ੳ ਅ ੲ),ਲਗਾਂ-ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ।

ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ   12 ਅੰਕ

2. ਗੁਰਮੁਖੀ ਆਰਥੋਗ੍ਰਾਫੀ ਅਤੇ ਉਚਾਰਨ : ਸਵਰ, ਵਿਅੰਜਨ : ਮੁੱਢਲੀ ਜਾਣ-ਪਛਾਣ ਅਤੇ ਉਚਾਰਨ, ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ ਦੀ ਪਛਾਣ ।   10 ਅੰਕ

3. ਪੰਜਾਬੀ ਸ਼ਬਦ ਜੋੜ : ਮੁਕਤਾ (ਦੋ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਤਿੰਨ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ), ਸਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਬਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਔਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲੈਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਲਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲਾਵਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਹੋੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਕਨੌੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) ਵਾਲੇ ਸ਼ਬਦ, ਸ਼ੁਧ-ਅਸ਼ੁੱਧ।

15 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1.ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਵਰਣਨਾਤਮਕ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ। ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੈ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਚਾਰ-ਚਾਰ ਅੰਕ ਹਨ।   (4+4+4)=12 ਅੰਕ

2.ਭਾਗ ਦੂਸਰਾ ਵਿਚੋਂ ਦੋ-ਦੋ ਨੰਬਰ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ।

10 ਅੰਕ

3.ਭਾਗ ਤੀਸਰਾ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿਨ੍ਹਾਂ ਦੇ ਪੰਜ-ਪੰਜ ਅੰਕ ਹਨ।   15 ਅੰਕ

ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਇਨ੍ਹਾਂ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

Bachelor of Computer Applications (Semester –I)

Paper-VI: Practical –I

(MS Office 2010/Open Office & Basic C Programming)

M. Marks: 75
Practical Marks: 56
Practical Internal Assessment Marks: 19

Practical- MS Office 2010/Open Office & Basic C Programming

Bachelor of Computer Applications (Semester –I)

Paper VII: Drug Abuse: Problem, Management and Prevention

(Compulsory Paper)

PROBLEM OF DRUG ABUSE

Time: 3 Hours   **Max. Marks: 50**
Theory Marks: 37
Internal assessment: 13

Instructions for the Paper Setters:
Section–A: (09 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying 03 marks. Answer to any of the questions should not exceed two pages.
Section–B: (16 Marks) It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying 08 marks. Answer to any of the questions should not exceed four pages.
Section–C: (12 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

UNIT–I

- **Meaning of Drug Abuse**

Meaning, Nature and Extent of Drug Abuse in India and Punjab.

UNIT-II

- **Consequences of Drug Abuse for:**

Individual : Education, Employment, Income.

Family   : Violence.

Society   : Crime.

Nation   : Law and Order problem.

UNIT-III

- **Management of Drug Abuse**

Medical Management: Medication for treatment and to reduce withdrawal effects.

UNIT-IV

- Psychiatric Management: Counseling, Behavioral and Cognitive therapy.

- Social Management: Family, Group therapy and Environmental Intervention.

References:

1. Ahuja, Ram (2003), Social Problems in India, Rawat Publication, Jaipur.

2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.

3. Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications. 23

4. Kapoor. T. (1985) Drug epidemic among Indian Youth, New Delhi: Mittal Pub.

5. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.

6. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.

7. Randhawa, J.K. and Randhawa, Samreet 2018. Drug Abuse-Management and Prevention. Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.

8. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.

9. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar: Guru Nanak Dev University.

10. Singh, Chandra Paul 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra.

11. Sussman, S and Ames, S.L. (2008). Drug Abuse: Concepts, Prevention and Cessation, Cambridge University Press.

12. World Drug Report 2010, United Nations office of Drug and Crime.

13. World Drug Report 2011, United Nations office of Drug and Crime.

1. Jasjit Kaur Randhawa & Samreet Randhawa, "Drug Abuse Problem, Management & Prevention", KLS, ISBN No. 978-81-936570-8-9, (2019).
2. Jasjit Kaur Randhawa, "Drug Abuse -Management & Prevention", KLS, ISBN No. 978-93-81278-80-2, (2018).
3. Rama Gandotra & Jasjit Kaur Randhawa, "voZrI d[otos'A^(BPky'oh) gqpzXB ns/ o'eEkw", KLS, ISBN No. 978-93-81278-87-1, (2018).
4. Jasjit Kaur Randhawa & Samreet Randhawa, "Drug Abuse-Problem, Management & Prevention", KLS, ISBN No. 978-81-936570-6-5, (2018).
5. **Jasjit Kaur Randhawa & Samreet Randhawa, "voZrI d[otos'A^(BPky'oh) ;wZf;nk, gqpzXB ns/ o'eEkw", KLS, ISBN No. 978-81-936570-7-1, (2018).**

Bachelor of Computer Applications

Semester – II

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Practical	Internal Assessment	Total	
1	Paper–I	Introduction to Programming–C++	56	-	19	75	84
2	Paper–II	Principles of Digital Electronics	56	-	19	75	85-86
3	Paper–III	Numerical Methods &Statistical Techniques	56	-	19	75	87-88
4	Paper–IV	Communication Skills in English	37	-	13	50	89
5	Paper–V	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory)	37	-	13	50	90-91
6	Paper–VI	Practical–C++ Programming Language	-	56	19	75	92
7	Paper–VII	*Drug Abuse: Problem, Management and Prevention (Compulsory Paper)	37		13	50	93-94

- **Marks of Paper VII will not be included in the Total Marks**

Bachelor of Computer Applications (Semester – II)
Paper–I: Introduction to Programming - C++

Time: 3 Hours   **M. Marks: 75**
Theory Marks: 56
Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks**.

UNIT-I

Programming Paradigms: Introduction to the object oriented approach towards programmingby discussing Traditional, Structured Programming methodology.

Objects & Classes: Object Definition, Instance, Encapsulation, Data Hiding, Abstraction,Inheritance, Messages, Method, Polymorphism, Classes, Candidate & Abstract Classes to beexamples of the Design process.

Object Oriented Programming using C++: Characteristics of OOP, Overview of C++, I/Ousing cout and cin, Objects and Classes, Member functions and data, private & public,constructor & destructor, Constructor Overloading, Types of Constructors.

UNIT-II

Function Overloading: Function Overloading, Default Arguments, Ambiguity in Function Overloading.

Operator Overloading: Overloading unary and binary operators, Type Conversion usingOperator Overloading

Inheritance: Concept of inheritance, Base & derived classes, Access Specifiers, ClassHierarchies, Types of Inheritance with examples.

Virtual Functions and Polymorphism: Virtual functions, friend functions, static function, thispointer, polymorphism, Types of Polymorphism with examples, templates, class templates.

References*:*
1. Teach yourself C++, Herbert Schildth, Tata McGraw Hill.
2. Designing Object Oriented Software Rebacca Wirfs - Brock Brian Wilerson, PHI.
3. Object Oriented Programming in Turbo C++, Robert Lafore, Galgotia Publication.
4. Designing Object Oriented Applications using C++ & Booch Method, Robert C. Martin.

Bachelor of Computer Applications (Semester – II)
Paper–II: Principles of Digital Electronics

Time: 3 Hours   **Total Marks: 75**
                                                     Theory M: 56
                                     Theory Internal Assessment M: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.The total weightage of this section shall be **22 marks**.

UNIT-I

1. Number Systems
Introduction to & Subtraction), Binary Codes:(BCD,Excess-3,Gray codes, ASCII), Binary Storage and Registers Decimal, Binary, Octal and Hexadecimal Numbers. Complements. Signed Binary Numbers(Arithmetic Addition.

2. Boolean Algebra and Logic Gates
Basic Definitions: Postulates and theorems of Boolean Algebra, Boolean Functions,
Canonical and Standard Forms, De-Morgan's Theorem Reducing Boolean expressions,
Digital Logic Gates: (AND, OR NOT ,NAND, NOR, EX-OR, EX- NOR), Implementations using Basic Gates, Universal Gates

3. Minimization Techniques
Canonical and Standard forms SOP and POS of Boolean functions , K-Maps simplifications up to Five-Variable Map, Sum of Product and Product of Sums Simplification, Don't-Care Conditions.

UNIT-II

4. Combinational Logic
Half Adder and Full Adder , Binary Adder- Subtractor, Decimal Adder,   Comparator, Decoders, Encoders, Multiplexers.

5. Synchronous Sequential Logic
Sequential Circuits, Latches, Flip-Flops(SR,JK,JK Master Slave D and T-type). Negative edge and Positive edge triggered clocks

6. Registers and Counters
Shift Registers:(Serial-in Serial-out, Serial-in Parallel-out, Parallel-in Serial-out, Parallel-in Parallel-out), Ripple Counters, Synchronous and Asynchronous Counters, Mod counters up/down counters

7. Memory and Programmable Logic
Introduction, Random-Access Memory, Memory Decoding, Error Detection and Correction, Read-Only Memory, Programmable Array Logic.

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.
7. Digital Electronics by R.K Gaur.

Bachelor of Computer Applications (Semester – II)
Paper–III: Numerical Methods & Statistical Techniques

Time: 3 Hours

Total Marks: 75
Theory Marks: 56
Theory Internal Assessment M: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks**.

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 exercisesrather 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.

5. Numerical Integration and different method Trapezoidal Rule, Simpson's 3/8 Rule.
UNIT- III

6 Interpolation and Curve Fitting, Lagrangian Polynomials, Newton's Methods: ForwardDifference Method, Backward Difference Method Divided Difference Method.
7 Least square fit linear trend Y = a+bx, Non–linear trend.
$Y = ax^b$
$Y = ab^x$
$Y = ae^x$
Polynomial fit: $Y = a+bx+cx^2$

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 for Bivariate data,Types of Correlation,Karl Pearson's Correlation and rank correlation.

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
7. Electronics by R.K Gaur

Bachelor of Computer Applications (Semester – II)

COMMUNICATION SKILLS IN ENGLISH

Time: 3 Hours   **Max. Marks: 50**
                                          Theory Marks: 37InternalAssessment: 13

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, speech/ lecture and taking notes.
 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, situation based Conversation in English; essentials of Spoken English
    Activities:
 a) Conversation; dialogue and speech
 b) Oral description or explanation of a common object, situation or concept.
 c) Interviews and group discussion

Suggested Pattern of Question Paper:
The question paper will consist of Seven skill–oriented questions from Listening and Speaking Skills. The first 6 Questions carry 5 marks each. The 7th Question carries 7 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.

  i)   Making summary/ précis or paraphrasing of an idea of a given passage.
  ii)   Writing a paragraph of expository or argumentative nature of a given topic.
  iii) Interpretation of a given data, chart, diagram etc and making a brief report.
  iv)   Transcoding (given dialogue to a prose or given prose to dialogue).
  v)   Draft an Advertisement for a given Product and E-mail Writing.
  vi)   Do as directed Change of voice Units 42-46
         (6X5= 30Marks)
  vii) Translation from Vernacular (Punjabi/ Hindi) to English (Isolated Sentences)
                                                                        (1X7
         = 7Marks)

Prescribed Book:
 Murphy's English Grammar (by Raymond Murphy) CUP

Recommended Books:
   1. *Oxford Guide to Effective Writing and Speaking* by John Seely.
   2. *The Written Word* by Vandana R Singh, Oxford University Press

Bachelor of Computer Applications (Semester – II)

SEMESTER-II
ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

ਸਮਾਂ : 3 ਘੰਟੇ

ਥਿਊਰੀ ਅੰਕ : 37
ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ:13
ਕੁੱਲ ਅੰਕ : 50

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਸਾਹਿਤ ਦੇ ਰੰਗ (ਭਾਗ ਦੂਜਾ – ਵਾਰਤਕ ਅਤੇ ਰੇਖਾ-ਚਿੱਤਰ)
ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
(ਕਿਸੇ ਲੇਖ ਅਤੇ ਰੇਖਾ-ਚਿੱਤਰ ਦਾ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ/ਨਾਇਕ ਬਿੰਬ)

ਭਾਗ-ਦੂਜਾ

ਇਤਿਹਾਸਕ ਯਾਦਾਂ
ਸ. ਸ. ਅਮੋਲ (ਸੰਪਾ.), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
(ਨਿਬੰਧ 7 ਤੋਂ 12 ਤਕ ਸਾਰ/ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸ਼ੈਲੀ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ-ਰਚਨਾ – ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਮੁੱਢਲੇ ਸੰਕਲਪ
(ਅ) ਸ਼ਬਦ-ਸ਼੍ਰੇਣੀਆਂ

ਭਾਗ-ਚੌਥਾ

(ੳ) ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ
(ਅ) ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ।
2. ਪਹਿਲੇ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ (08) ਅੰਕ ਹੋਣਗੇ।
3. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਪੰਜਵੇਂ ਭਾਗ ਵਿਚ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ 01-01 ਅੰਕ ਦੇ ਛੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 05 ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਨੋਟ : ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਇਨ੍ਹਾਂ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 37+13 = 50 ਹਨ।

Bachelor of Computer Applications (Semester – II)

ਮੁੱਢਲੀ ਪੰਜਾਬੀ (In Lieu of Compulsory Punjab)

ਸਮਾਂ : 3 ਘੰਟੇ

ਥਿਊਰੀ ਅੰਕ : 37
ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ : 13
ਕੁਲ ਅੰਕ : 50

ਪਾਠ-ਕ੍ਰਮ ਅਤੇ ਪਾਠ-ਪੁਸਤਕਾਂ

1. **ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ** : ਧਾਤੂ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਮਧੇਤਰ, ਪਿਛੇਤਰ), ਪੰਜਾਬੀ ਕੋਸ਼ਗਤ ਸ਼ਬਦ ਅਤੇ ਵਿਆਕਰਣਿਕ ਸ਼ਬਦ **12 ਅੰਕ**

2. **ਪੰਜਾਬੀ ਸ਼ਬਦ ਪ੍ਰਕਾਰ** :

   ੳ) ਸੰਯੁਕਤ ਸ਼ਬਦ, ਸਮਾਸੀ ਸ਼ਬਦ, ਦੋਜਾਤੀ ਸ਼ਬਦ, ਦੋਹਰੇ/ਦੁਹਰੁਕਤੀ ਸ਼ਬਦ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ

   ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ **10 ਅੰਕ**

3. **ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ** :

   ੳ) ਇੱਕ-ਵਚਨ ਬਹੁ-ਵਚਨ, ਲਿੰਗ-ਪੁਲਿੰਗ, ਬਹੁ-ਅਰਥਕ ਸ਼ਬਦ, ਸਮਾਨ-ਅਰਥਕ ਸ਼ਬਦ, ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਲਈ ਇੱਕ ਸ਼ਬਦ, ਸ਼ਬਦ ਜੋੜ, ਵਿਰੋਧਆਰਥਕ ਸ਼ਬਦ।

   ਅ) ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ : ਖਾਣ-ਪੀਣ, ਸਾਕਾਦਾਰੀ, ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਗਿਣਤੀ, ਮੌਸਮ, ਮਾਰਕੀਟ/ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਧੰਦਿਆਂ ਆਦਿ ਨਾਲ ਸੰਬੰਧਿਤ

   10+5=15 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਭਾਗ ਪਹਿਲਾਂ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ ਦੇਣੇ ਲਾਜ਼ਮੀ ਹਨ। ਹਰਪ੍ਰਸ਼ਨ ਦੇ ਚਾਰ-ਚਾਰ ਨੰਬਰ ਹਨ । **(4+4+4)=12 ਅੰਕ**

2. ਭਾਗ ਦੂਸਰਾ ਵਿਚੋਂ ਦੋ-ਦੋ ਨੰਬਰ ਦੇ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ।

   10 ਅੰਕ

3. ਭਾਗ ਤੀਸਰਾ ਦੇ (ੳ) ਭਾਗ ਵਿਚੋਂ ਦੋ ਸਵਾਲ ਅਤੇ (ਅ) ਭਾਗ ਵਿਚੋਂ ਇੱਕ ਸਵਾਲ ਪੁੱਛਿਆ ਜਾਵੇਗਾ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ ਪੰਜ-ਪੰਜ ਅੰਕ ਹਨ। **10+5=15 ਅੰਕ**

   ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 13 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਇਨ੍ਹਾਂ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁਲ ਅੰਕ 37+13 = 50 ਹਨ।

Bachelor of Computer Applications (Semester – II)

Paper – VI: Practical–I(C++ Programming Language)

Total Marks: 75
Practical Marks: 56

Practical Internal Assessment M: 19

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

Bachelor of Computer Applications (Semester – II)

Paper VII: DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION
DRUG ABUSE: MANAGEMENT AND PREVENTION
(Compulsory Paper)

Time: 3 Hours

Max. Marks: 50
Theory Marks: 37
Internal assessment: 13

Instructions for the Paper Setters:
Section–A: (09 Marks): It will consist of five short answer type questions. Candidates will be required to attempt three questions, each question carrying 03 marks. Answer to any of the questions should not exceed two pages.
Section–B: (16 Marks) It will consist of four essay type questions. Candidates will be required to attempt two questions, each question carrying 08 marks. Answer to any of the questions should not exceed four pages.
Section–C: (12 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.

UNIT-I

- **Prevention of Drug abuse**

  Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active Scrutiny.

UNIT-II

- School: Counseling, Teacher as role-model. Parent-teacher-Health Professional Coordination, Random testing on students.

UNIT-III

- **Controlling Drug Abuse**

  Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and awareness program

UNIT-IV

- Legislation: NDPs act, Statutory warnings, Policing of Borders, Checking Supply/Smuggling of Drugs, Strict enforcement of laws, Time bound trials.

References:

1. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.

2. Gandotra, R. and Randhawa, J.K. 2018. voZrI d[otos'A (BPky'oh) gqpzXB ns o'eEkw. Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.

3. Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications.

4. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat
   Publication.

5. Randhawa, J.K. and Randhawa, Samreet 2018. Drug Abuse-Management and Prevention.
   Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.

6. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal
   Publications.

7. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study.
   Amritsar: Guru Nanak Dev University.

8. Singh, Chandra Paul 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra.

9. World Drug Report 2011, United Nations office of Drug and Crime.

10. World Drug Report 2010, United Nations office of Drug and Crime

Bachelor of Computer Applications

Semester – III

Sr. No.	Paper Code	Paper Name	Marks				Page. No.
			Theory	Internal Assessment	Practical	Total	
1	Paper–I	Computer Architecture	56	19	-	75	96
2	Paper–II	Database Management System	56	19	-	75	97
3	Paper–III	Computational Problem Solving Using Python	56	19	-	75	98
4	Paper–IV	*Environmental Studies – I (Compulsory)	37	13	-	50	99-100
5	Paper–V	Programming Lab – Python	-	13	37	50	101
6	Paper–VI	Programming Lab – Oracle	-	07	18	25	102

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

Bachelor of Computer Applications (Semester – III)

Paper – I: Computer Architecture

Time: 3 Hours   **M. Marks: 75**
Theory Marks: 56
Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.The total weightage of this section shall be **22 marks**.

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.

CPU Design Stack Organized CPU, Instruction Formats, Addressing Modes.

UNIT-II

CPU Design Program Control,Hardwired & Microprogrammed (Wilhe's Design) Control Unit.

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

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

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

References:

1.Computer System Architecture: M.M. Mano (PHI).
2.Computer Architecture: J.P. Hayes.
3.Computer Architecture: Patterson & Hemessy.
4.Computer Organization and Architecture by William Stallings.
5. Computer Systems Design and Architecture "by Vincent P Heuring and Harry F Jordan.

Bachelor of Computer Applications (Semester – III)

Paper – II: Database Management System

Time: 3 Hours   **M. Marks: 75**
Theory Marks: 56
Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.The total weightage of this section shall be **22 marks**.

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.
DBA, responsibilities of DBA, Relational form like INF, 2NF, 3NF, BCNF, 4th NF, 5th NF, DBTG.

UNIT-II

Concurrency control and its management, protection, security, recovery of database.
SQL: Introduction to SQL–DDL, DML, DCL, Join methods & sub query, Union Intersection, Minus, Tree Walking, Built in Functions, Views, Security amongst users, Sequences, Indexing Cursors– Implicit & Explicit, Procedures, Functions & Packages Database Triggers.
Big Data:Introduction to Big Data and Analytics, Introduction to NoSQL
Introductory knowledge and classification of NoSQL databases based upon Column (HBase), Document (MongoDB), Keyvalue (Oracle NoSQL database), Graph, Multimodel and their query languages.

References:

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.
7. https://www.mongodb.com/nosql-explained
8. Introduction to NoSQL (Ebook), NoSQL Seminar 2012 @ TUT, Arto Salminen

Bachelor of Computer Applications (Semester – III)
Paper III: Computational Problem Solving Using Python

Time: 3 Hours   **M. Marks: 75**
                                                       Theory Marks: 56
                                  Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.The total weightage of this section shall be **22 marks**.

UNIT-I

Introduction to Python: Process of Computational Problem Solving, Python Programming Language

Data and Expressions: Literals, Variables and Identifiers, Operators, Expressions, Statements and Data Types

Control Structures: Boolean Expressions (Conditions), Logical Operators, Selection Control, Nested conditions, Debugging

Lists: List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python

Functions: Fundamental Concepts, Program Routines, Flow of Execution, Parameters & Arguments

Iteration: While statement, Definite loops using For, Loop Patterns, Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion

UNIT-II

Dictionaries: Dictionaries and Files, Looping and dictionaries, Advanced text parsing

Files: Opening Files, Using Text Files, String Processing, Exception Handling

Objects and Their Use: Introduction to Object Oriented Programming

Modular Design: Modules, Top-Down Design, Python Modules

Using Databases and SQL: Database Concepts, SQLite Manager Firefox Add-on, SQL basic summary, Basic Data modeling, Programming with multiple tables

References:

1. Python for Informatics, Charles Severance, version 0.0.7
2. Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Charles Dierbach, Wiley Publications, 2012, ISBN : 978-0-470-91204-1

3. Introduction To Computation And Programming Using Python, GUTTAG JOHN V, PHI, 2014, ISBN-13: 978-8120348660
4. Introduction to Computating& Problem Solving Through Python, Jeeva Jose andSojan P. Lal,Khanna Publishers, 2015, ISBN-13: 978-9382609810
5. Introduction to Computing and Programming in Python, Mark J. Guzdial, Pearson Education, 2015, ISBN-13: 978-9332556591
6. Fundamentals of Python by Kenneth Lambert, Course Technology, Cengage Learning , 2015
7. Learning Python by Mark Lutz, 5th Edition, O'Reilly Media, 2013

Bachelor of Computer Applications (Semester – III)
ESL–221: ENVIRONMENTAL STUDIES–I (COMPULSORY)

Time: 3 Hrs.   **Max. Marks: 50**
Theory Lectures: 1½ Hours/ Week   **Theory Marks: 37**
                                   Theory Internal Assessment Marks: 13

Instructions for Paper Setters: The question paper will consist of three sections. Candidate will be required to attempt all the sections. Each unit of the syllabus should be given equal weightage of marks. Paper to be set in English, Punjabi and Hindi.

Section–A: (16 Marks): It will consist of five short answer type questions. Candidates will be required to attempt four questions, each question carrying four marks. Answer to any of the questions should not exceed two pages.

Section–B: (24 Marks): It will consist of five questions. Candidates will be required to attempt four questions, each question carrying six marks. Answer to any of the questions should not exceed four pages.

Section–C: (10 Marks): It will consist of two questions. Candidate will be required to attempt one question (carrying ten marks) only. Answer to the question should not exceed 5 pages.

Unit-I
The Multidisciplinary Nature of Environmental Studies:
- Definition, scope & its importance.
- Need for public awareness.

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.

Unit-II

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:

Forest ecosystem

b. Grassland ecosystem

c. Desert ecosystem

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

Unit-III

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 warming, 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.

Unit-IV

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.

Bachelor of Computer Applications (Semester - III)

Paper – V

Programming Lab –Python

M. Marks: 50
Practical Marks: 37
Practical Internal Assessment Marks: 13

Lab – I: Based on Python

Bachelor of Computer Applications (Semester - III)

Paper – VI

Programming Lab- Oracle

Lab – II: Practical in Oracle

M. Marks: 25
Practical Marks: 18
Practical Internal Assessment Marks: 07

Bachelor of Computer Applications
Semester System

Semester – IV

Sr. No.	Paper No.	Paper	Marks				Page No.
			Theory	Internal Assessment	Practical	Total	
1	Paper–I	Data Structure & File Processing	56	19	-	75	104
2	Paper–II	Information Technology	56	19	-	75	105
3	Paper–III	Distributed Computing	56	19	-	75	106
4	Paper–IV	System Software	56	19	-	75	107
5	Paper–V	* Environmental Studies – II (Compulsory)	37	13	-	50	108-109
6	Paper–VI	Lab I– (Data Structures implementation using C++)	-	13	37	50	110
7	Paper-VII	Lab II– (Distributing Computing)	-	13	37	50	111

Note:
1. All the students are required to undergo 'Industrial Training' for 6 weeks in IT Companies after 4th semester final examinations. Final degree to the students will be awarded subject to their successfully completing the 'Industrial Training'.
2. 'Industrial Training' will be evaluated as satisfactory / unsatisfactory internally by the department.
3. Last date for submission of training Report within 1 Week after coming from training.
4. Marks of Paper EVS will not be included in Grand Total.

Bachelor of Computer Applications (Semester - IV)

Paper – I: Data Structures and File Processing

Time: 3 Hours   **M. Marks: 75**
Theory Marks: 56
Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.The total weightage of this section shall be **22 marks**.

UNIT-I

Basic Data Structure: Introduction to elementary Data Organization, Common Operation on Data Structures, Algorithm Complexity, Big O Notation, Time – Space tradeoff between Algorithms.

Arrays: Array Defined, Representing Arrays in Memory, Various Operations on Linear Arrays, Multidimensional Arrays.

Searching Techniques: Linear and Binary Search.

Linked Lists: Types of Linked Lists, Representing Linked Lists in Memory, Advantages of using Linked Lists over Arrays, Various Operations on Linked Lists.

Stacks: Description of STACK structure, Implementation of Stack using Arrays and Linked Lists, Applications of Stacks – Converting Arithmetic expression from infix notation to polish and their subsequent evaluation, Quick sort Technique to sort an array.

UNIT-II

Queues: Description of queue structure, Implementation of queue using arrays and linked lists, Description of priorities of queues, Dequeues.

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

Trees: Description of Tree Structure and its Terminology, Binary Trees and Binary Search Trees and their representation in Memory, Heap Sort.

Graphs: Description of Graph Structure, Implement Graphs in Memory using Adjacency Matrix, Path Matrix.

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.

References:

1. Seymour Lipschutz, Theory and Problems of Data Structures, Schaum's Outline Series,McGraw Hill Company.
2. Tanenbaum, Data Structure using C.
3. Data Structure and Algorithms by Alfred V. John E. Hopcroft, Jeffery D. Ullman Pearson.
4. Sorenson and Trembley, "An Introduction to Data Structure with Applications, McGraw Hill, 2006 edition.

Bachelor of Computer Applications (Semester - IV)

Paper – II: Information Technology

Time: 3 Hours   **M. Marks: 75**
Theory Marks: 56
Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.The total weightage of this section shall be **22 marks**.

UNIT-I

Information Systems

Introduction to IT & its components, What is Information systems, Computer based information systems, Management Information System, Decision Support System, Expert System, Functional Information System, Open Information System, Transaction Processing System, System Development Process & System development Tools. Internet basics, Its uses and Applications.

Various types of information systems: Transaction processing systems, office Automation systems, MIS and decision support system. About internet and its working, business use of internet, services offered byinternet, evaluation of internet, internet service provider (ISP), windows environment for dial up networking (connecting to internet), audio on internet, Internet Addressing (DNS and IPaddresses).

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 TCP/IP.

WWW: Introduction, working of WWW, Web browsing (opening, viewing, saving and printing a web page and bookmark), web designing using HTML, DHTML with programmingtechniques.

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 Peter Norton, Introduction to Computers, Glencoe, Macmillan/McGraw Hill. Kroenke, Business
  Computer System, McGraw Hill.

2 Patric, G.Mckeown, Living with the Computers, 2nd edition, HBT Publishers, USA.

3 Hussain & Hussain, Computer Technology, Applications & Social Implications, PHI.

4.“Internet Technologies”, S. K. Bansal, APH Publishing Corporation (April 1, 2002).

Bachelor of Computer Applications (Semester - IV)

Paper – III: Distributed Computing

Time: 3 Hours   **M. Marks: 75**
Theory Marks: 56
Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

UNIT I

Basic Concepts - Characterization of Distributed Systems, Examples, Resource Sharing, Web Challenges, System Models–,Architectural and Fundamental Models, Networking and Internetworking, Types of Networks, Network Principles , Internet Protocols

Processes and Distributed Objects - Inter–process Communication ,The API for the Internet Protocols ,External Data Representation and Marshalling , Client –Server Communication , Group Communication , Distributed Objects and Remote Invocation – Communication Between Distributed Objects , Remote Procedure Call , Events and Notifications .

UNIT II

Operating System Issues - The OS Layer, Protection ,Processes and Threads, Communication and Invocation, OS Architecture, Security Overview, Cryptographic Algorithms, Digital Signatures .

Distributed Transaction Processing - Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Recovery.

References

1.George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", 3rd Edition, Pearson Education, 2002.
2.Andrew S. Tanenbaum, Maartenvan Steen, Distibuted Systems, "Principles and Pardigms", Pearson Education, 2002.
3.Jennifer Welch Hagit Attiya,"Distributed Computing :Fundamentals, Simulations and Advanced Topics",2nd edition, Wiley,2006.
4.M.L. Liu, "Distributed Computing: Principles and Applications",1st edition, Pearson Education,2004.

Bachelor of Computer Applications (Semester - IV)

Paper – IV: SYSTEM SOFTWARE

Time: 3 Hours   **M. Marks: 75**
                                                         Theory Marks: 56
                                    Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks. The total weightage of this section shall be **22 marks**.

UNIT-I

Introduction to System Software

Introduction to System Software and its components

Translators, loaders, interpreters, compiler, assemblers

Assemblers

Overview of assembly process, design of one pass and two assemblers

Macroprocessors

Macro definition and expansion, concatenation of macro parameters, generations of uniquelabels , conditional macro expansion, Recursive macro expansion

UNIT-II

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, AddisonWesley.
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 CompatibleComputers, John Wiley, 1991.

Bachelor of Computer Applications (Semester - IV)
ESL–222: ENVIRONMENTAL STUDIES–II (COMPULSORY)

Time: 3 Hrs.   **Max. Marks: 50**
Theory Lectures: 1½ Hours/ Week   **Theory Marks: 37**
                                                    Theory Internal Assessment Marks.: 13

Instructions for Paper Setters: The question paper will consist of three sections. Candidate will be required to attempt all the sections. Each unit of the syllabus should be given equal weightage of marks. Paper to be set in English, Punjabi and Hindi.

Section–A: (16 Marks): It will consist of five short answer type questions. Candidates will be required to attempt four questions, each question carrying four marks. Answer to any of the questions should not exceed two pages.

Section–B: (24 Marks): It will consist of five questions. Candidates will be required to attempt four questions, each question carrying six marks. Answer to any of the questions should not exceed four pages.

Section–C: (10 Marks): It will consist of two questions. Candidate will be required to attempt one question (carrying ten marks) only. Answer to the question should not exceed 5 pages.

Unit-I

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.

Unit-II

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.

Unit-III

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.

Unit-IV

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.

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/vi11age 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.

Bachelor of Computer Applications (Semester - IV)

Paper – VI: Lab I– (Data Structures implementation using C++)

Time: 3 Hours   **Total Marks: 50**
Practical Marks: 37
Practical Internal Assessment Marks: 13

Lab – Data Structure implementation using C++

Bachelor of Computer Applications (Semester - IV)

Paper – VII Lab II– (Distributing Computing)

Time: 3 Hours   **Total Marks: 50**
Practical Marks: 37
Practical Internal Assessment Marks: 13

Lab II – Distributing Computing (Client Server, Distributed Objects and operating system issues)

Bachelor of Computer Applications

Semester – V

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Practical	Internal Assessment	Total	
1	Paper–I	Computer Networks	56	-	19	75	113
2	Paper–II	Programming in Java	56	-	19	75	114-115
3	Paper–III	Software Engineering	56	-	19	75	116-117
4	Paper–IV	Advanced Web Technologies (ASP.NET)	56	-	19	75	118
5	Paper–V	Lab I: Programming and Web Development in ASP.NET	-	37	13	50	119
6	Paper–VI	Lab II :Programming in Java Lab	-	37	13	50	120

Bachelor of Computer Applications (Semester – V)

Paper – I: Computer Networks

Time: 3 Hours
M. Marks: 75
Theory Marks: 56
Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks**.

UNIT – I

Introduction: Network Definition, Basic components of a network, network types andtopologies, Uses of computer networks, network architecture.

Transmission Media: Coaxial cable, twisted pair cable, fiber optics & satellites. OSI reference model, TCP/IP reference model, comparison of OSI and TCP reference model.

Introduction to Analog and Digital Transmission: Telephone system, Modems, Types ofmodems, pulse code modulation. Transmission & Switching: Multiplexing, circuit switching packet switching, hybrid switching, ISDN service transmission.

Local Area Network Protocols: CSMA Protocols, BRAP, MLMA, IEEE standards 802,Token Bus, Token Ring, FDDI.

UNIT – II

Data Link Layer Design Issues: Services provided to Network layer framing, error control, flow control, link management. Error detection & correction, Elementary Datalink Protocols.

Design Issues of Network Layer: Services provided to transport layer, routing, connection, internet & World Wide Web.

Network Security and Privacy: Brief Introduction to Cryptography.
Network Services: File transfer, Access & Management, Electronic Mail, Remote login.

References:

1. Tanenbaum A.S. 'Computer Network', PHI.
2. Stalings W., 'Data and Computer Communications', PHI.
3. Data Communication and Networking by Behrouz A Forouzan.
4. Stallings W. , Local Network: An Introduction Macmillan Publishing Co.

Bachelor of Computer Applications (Semester – V)

Paper – II: Programming in Java

Time: 3 Hours **M. Marks: 75**
Theory Marks: 56
Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.

The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.

The total weightage of this section shall be **22 marks**.

Unit -I

Basic concepts of Java Programming and applications of Java programming. Introduction to Java, JVM, Features of java, JDK Environment & tools like (java, javac, applet viewer, javadoc, jdb)

Object Oriented Programming Concepts: Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++ and JAVA.

Java Programming Fundamentals : Structure of java program , Data types ,Variables, Operators , Keywords ,Naming Convention ,Decision Making (if,switch) ,Looping(for, while),Type Casting.

Classes and Objects : Creating Classes and objects, Memory allocation for objects, Constructor ,Implementation of Inheritance (Simple, Multilevel, Hierarchical), Implementation of Polymorphism (Method Overloading , Method Overriding), Nested and Inner classes

Unit-II

Arrays String and Vector: Arrays, Creating an array, Types of Array (One Dimensional arrays, Two Dimensional array), Strings, String – Arrays, String Methods, String Buffer class, Vectors, Wrapper classes.

Abstract Class, Interface and Packages, Modifiers and Access Control (Default, public private protected), Abstract classes and methods, Interfaces, Packages (Packages Concept, Creating user defined packages, Java Built in packages, Java.lang->math,Java.util->Random, Date, Hash Table)

Multithreading: Creating Threads using Different methods, Thread Priorities, Thread Synchronization, Inter process thread Communication.

Exception Handling: Exception types, using try catch and Multiple catch, Nested try, throw, throws and finally, Creating User defined Exceptions. File Handling: Byte Stream, character stream , file IO Basics , File Operations (Creating file, Reading, file(Character, byte), Writing File (Character, byte).

Applet Programming: Introduction, Types of applet, Applet Life cycle, Creating applet, Applet tag

References:
1. "Java–The Complete Reference", Herbert Schildt, Tata MacGraw Hill.
2. "Introduction to Java Programming", Y. Daniel Mliang, Pearsons Publications.
3. Programming with JAVA - E Balgurusamy
4. JAVA:How to Programm- Paul Deital and Harvey Deital.

Bachelor of Computer Applications (Semester – V)

Paper – III: Software Engineering

Time: 3 Hours

M. Marks: 75
Theory Marks: 56
Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.
Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.
Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks.**
Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks**.

UNIT – I

Introduction to Software: Definition, Software characteristics, Software components, Software Applications.
Introduction to Software Engineering: Definition, Software Engineering Paradigms, waterfall method, prototyping, interactive Enhancement, The Spiral model, Fourth Generation Technique.
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.
Software Requirement Specification (SRS): Problem analysis, structuring information, Data flow diagram and data dictionary, structured analysis, Characteristics and component of (SRS).

UNIT – II

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.
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.

Detailed Design: Module specification, Specifying functional module, specifying data abstraction, PDL and Logic/Algorithm Design.
Coding: Coding by Top–down and Bottom–up, Structured Programming, Information Hiding, Programming style, Internal Documentation.
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
3. Software Engineering by Rajib Mall.
4. Software Engineering by Ian Sommerville.

Bachelor of Computer Applications (Semester – V)

Paper-IV: Advanced Web Technologies (ASP.NET)

Time: 3 Hours   **M. Marks: 75**
Theory Marks: 56
Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks**.

Unit-I

Standard Controls : Display information, Accepting user input, Submitting form data, Displaying images, Using the panel control, Using the hyperlink control.

Validation Controls : Using the required field validator control, Using the range validator control using the compare validator control, Using the regular expression validator control, Using the custom validator control, Using the validation summary controls.

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

Designing Website With Master Pages : Creating master pages, Modifying master page content, Loading master page dynamically.

Unit-II

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.

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

Grid View Controls : Grid view control fundamentals, Using field with the grid view control, Working with grid view control events.

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.

References:
ASP.NET 3.5: Stephen Walther, Pearson Education, 2005
ASP.NET 4.0: In Simple Steps by Kogent Learning Solutions Inc.
ASP.NET 4.5: Black Book by Kogent Learning Solution Inc.

Bachelor of Computer Applications (Semester – V)

Paper-V

Time: 3 Hours   **Total Marks: 50**
Practical Marks: 37
Practical Internal Assessment Marks: 13

Lab I: Programming and Web Development in ASP.NET

Bachelor of Computer Applications (Semester – V)

Paper-VI

Time: 3 Hours   **Total Marks: 50**
Practical Marks: 37
Practical Internal Assessment Marks: 13

Lab II: Programming in JAVA Lab

Bachelor of Computer Applications

Semester – VI

Sr. No.	Paper Code	Paper Name	Marks				Page No.
			Theory	Practical	Internal Assessment	Total	
1	Paper–I	Computer Graphics	56	-	19	75	122
2	Paper–II	Operating System	56	-	19	75	123
3	Paper–III	Lab. Implementation of Applications of Computer Graphics in C++/C	-	37	13	50	124
4	Paper–IV	Project	-	150	50	200	125

Bachelor of Computer Applications (Semester – VI)

Paper – I: Computer Graphics

Time: 3 Hours   **M. Marks: 75**
Theory Marks: 56
Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks**.

UNIT – I

Overview of Graphics System: Computer Graphics and their applications
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. Circle generating algorithms, Algorithms for other objects like ellipses, arcs, section spirals.

UNIT – II

Two Dimensional Transformations: Basic Transformations, Scaling, Translation, Rotation, Reflection, Shear, Matrix representation of Basic transformations and homogenous coordinates.
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.
Implementation in C: C programming for drawing 2 D objects – line rectangle, arc, circle andellipse. 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 Schaum's outlines by Tata McGraw Hill.
3. Computer Graphics by Roy A. Plastock and Gordon Kalley – Schaum's Series.
4. Computer Graphics by Marc Berger.

Bachelor of Computer Applications (Semester – VI)

Paper – II: Operating System

Time: 3 Hours

M. Marks: 75
Theory Marks: 56
Theory Internal Assessment Marks: 19

Note: The question paper covering the entire course shall be divided into three sections.

Section A: It will have question No.1 consisting of 10 very short answer questions from the entire syllabus. Students will attempt 6 questions. Each question will carry two marks with answer to each question up to 10 lines in length. The total weightage being **12 marks**.

Section B: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 2, 3, 4 and 5 will be set by the examiner from Unit-I of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks.**

Section C: It will consist of essay type/numerical questions up to five pages in length. Four questions numbering 6, 7, 8 and 9 will be set by the examiner from Unit-II of the syllabus. The students will be required to attempt any two questions. Each question will carry 11 marks.
The total weightage of this section shall be **22 marks**.

UNIT – I

Introduction: Definition, Early Systems, Simple Batch system, Multi programmed Batch. Time Sharing Systems, Personal Computer System, Parallel Systems, Distributed Systems, Real–time Systems.

Processes: Process concepts, Process Scheduling, Threads.

CPU–Scheduling: Basic concepts, scheduling criteria, scheduling algorithms, algorithm evaluation.

Process Synchronization: Critical – section problem, semaphores, classical problem of synchronization.

Deadlocks: System Model, Deadlock characterization, methods for handing deadlocks, Deadlocks Prevention, Deadlock avoidance, Deadlock Detection and Recovery from deadlock, Combined approach to deadlock handling.

UNIT – II

Memory Management: Background, Logical v/s Physical address space, swapping, continuous allocation, paging, segmentation.

Virtual Memory: Background, demand paging, Performance of Demand Paging, Page Replacement, Page Replacement Algorithms, Allocation of Frames, Thrashing.

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

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.
4. Madnick & Donovan: Operating System, McGraw Hill
5. A.C. Shaw:Logic Design of Operating Sytem, Prentice Hall.

Bachelor of Computer Applications (Semester – VI)
Paper-III

Time: 3 Hours   **Total Marks: 50**
                                                         Practical Marks: 37
                                    Practical Internal Assessment Marks: 13

Lab I   **(Programming Lab of Computer Graphics in C++/C)**

Bachelor of Computer Applications (Semester – VI)

Paper – IV
PROJECT

Max. Marks: 200
Project Marks: 150
Project Internal Assessment: 50

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.

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.

6. Training certificate of industrial training should be submitted to the College and also attached in the project.