



**PANJAB UNIVERSITY, CHANDIGARH-160014 (INDIA)**

(Estd. under the Panjab University Act VII of 1947 — enacted by the Govt. of India)

**FACULTY OF SCIENCE**

**SYLLABI**

*FOR*

**Bachelor of Computer Applications**

**First, Second & Third Year**

**Examinations, 2013**

--: 0 :--

**GUIDELINES REGARDING CONTINUOUS ASSESSMENT FOR REGULAR STUDENTS OF  
B.A./B.SC./B.COM. /B.C.A. COURSES**

**IMPORTANT NOTE**

- (i) In order to incorporate an element of continuous assessment of students, the Colleges will conduct two mandatory House Tests in theory papers – one in the month of September/October and the other in December/January every year.
- (ii) (a) For September Test, there will be only one paper of one hour's duration in each subject, and for December Test, there will be paper/s on the pattern of annual examination conducted by the University.

There will be a Special Test for those students who could not fulfil the conditions of eligibility. It will not be held to provide an opportunity to all students to improve their earlier score. Those students who are exempted by the Principal of the College from appearing in the House Test/s in September and/or December/January will also be allowed to appear in the Special Test; this Test will determine their eligibility for admission to the examination as well as their score for Internal Assessment.

- (b) With a view to meet the grievance of students, if any, on account of scores obtained by them, the answer-books will be shown to them. Difference of opinion on the issue, if any, will be sorted out with the help of respective Heads of departments as well as the Principal of the College.
- (iii) Whereas the September House Test will carry weightage of 40 per cent, the December House Test will have weightage of 60 per cent in each subject/paper. The total weightage for both the Tests taken together shall be 10 per cent of the total marks in each theory subject/paper. The weightage of 10 per cent marks shall be added to each paper of B.A./B.Sc./B.Com./B.C.A. I, II and III Year which will, henceforth, carry weightage of only 90% marks as against 100% marks at present. A candidate will have to pass in theory and practical/s separately. For private candidates and students of the University School of Open Learning, the question paper shall, as usual, have weightage of 100% marks each.
- (iv) The record of marks secured by the students in the two House Tests will be sent by the respective Colleges so as to reach the office of Controller of Examinations latest by 15<sup>th</sup> March, failing which the result of the students shall be shown as 'RLA' and the entire responsibility for this would lie with the Principal/s of the College/s.
- (v) The Colleges will continue to forward the internal assessment of the students for Practicals. Projects and similar other activities, wherever applicable, to the Controller of Examinations, as usual, so as to reach this office latest by 15<sup>th</sup> March.

(i)

**SPECIAL NOTE :**

- (i) Each theory question paper will be set out of the marks allotted to each theory paper and 10% marks of the maximum marks of each paper will be internal assessment.
- (ii) For private candidates, who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will proportionately be increased to maximum marks of the paper in lieu of internal assessment.
- (iii) It will not be mandatory for the students to separately pass in the internal assessment.

**OUTLINES OF TESTS, SYLLABI AND COURSES OF READING FOR BACHELOR OF  
COMPUTER APPLICATIONS FOR THE EXAMINATIONS OF 2013**

**Scheme of Examination, 2013**

	<i>LT/Week</i>	<i>Theory Marks</i>	<i>Internal Assessment</i>	<i>Exam. Hours</i>	<i>Paper Code</i>
<b>FIRST YEAR</b>					
1. English (C)	4	90	10	3	BCA-01
2. Panjabi/History & Culture of Punjab	4	90	10	3	BCA-02
3. *Environment & Road Safety Education		70		1	
(based on Class Tests and Field Work/Report)					
4. Mathematics	5	90	10	3	BCA-03
5. Personal Computing Software	5	90	10	3	BCA-04
6. Computer Organisation & System Maintenance	5	90	10	3	BCA-05
7.. Computer Programming & Problem Solving Through "C"	5	90	10	3	BCA-06
8. Computer Lab.1: Based on BCA-04	6	90	10	4	BCA-07
9. Computer Lab.2: Based on BCA-06	6	90	10	4	BCA-08
<b>SECOND YEAR</b>					
1. Project Management & System Development	4	90	10	3	BCA-09
2. Computer Based Numerical & Statistical Methods (Using C)	4	90	10	3	BCA-10
3. Data Structure Using C	5	90	10	3	BCA-25
4. Client Server Computing using ORACLE	5	90	10	3	BCA-12
5. Object Oriented Programming (Using C++)	5	90	10	3	BCA-13
6. Unix Operating System	5	90	10	3	BCA-14
7. Computer Lab.1: Based on BCA-12 and BCA-14	6	90	10	4	BCA-15
8. Computer Lab.2: Based on BCA-13 and BCA-25	6	90	10	4	BCA-16

\* This is a compulsory qualifying paper, which the students have to study in the B.A./B.Sc./B.Com./B.C.A.1<sup>st</sup> year. The students are required to qualify this paper either in the first year, second year and third year of the course. The examination will be conducted by the University.



**THIRD YEAR**

1.	Entrepreneurship Development Programme	4	90	10	3	BCA-17
2.	Data Communication & Networks	5	90	10	3	BCA-18
3.	Computer Graphics & Multimedia Applications	5	90	10	3	BCA-19
4.	Internet Programming	5	90	10	3	BCA-20
5.	Discrete Mathematics	5	90	10	3	BCA-27
6.	Project and Seminar	6	85	15		BCA-21
7.	Computer Lab.1: Based on BCA-19	5	90	10	4	BCA-23
8.	Computer Lab.2: Based on BCA-20	5	90	10	4	BCA-24

**FIRST YEAR****BCA-01 : ENGLISH (Compulsory)****Outlines of Tests, Syllabi and Courses of Reading**

Max. Marks	:	100
Theory	:	90 marks
Internal Assessment	:	10 marks
Time	:	3 Hours

Book Prescribed : *Colour of Expression* by Harbhajan Singh, Published by Publication Bureau, Panjab University, Chandigarh.

**SECTION-A**

- |       |   |                                       |            |
|-------|---|---------------------------------------|------------|
| (i)   | <i>Story</i> :  |                                       | 15 marks   |
|       | One essay type question on Summary/Character/Incident (one out of two with internal choice) |                                       |            |
| (ii)  | <i>Prose</i> :  |                                       | 15 marks   |
|       | Long essay type question on Summary/Theme (one out of two with internal choice)             |                                       |            |
| (iii) | <i>Poetry</i> :   |                                       | 15 marks   |
|       | Summary   | (one out of two with internal choice) | : 05 marks |
|       | Central Idea  | --do--                                | : 05 marks |
|       | Reference to the Context  | --do--                                | : 05 marks |

**SECTION-B**

- |       |   |            |
|-------|---|------------|
| (i)   | Word formation from Prose and Stories and their use in sentences (5 out of 8) | 10 marks   |
| (ii)  | Use of textual words and idioms in sentences (5 out of 8)                     | 05 marks   |
| (iii) | Translation from English to M.I.L.  | } 10 marks |
|       | <b>OR</b><br>FOR FOREIGN STUDENTS<br>(Paraphrase of poetry passage)           |            |
| (iv)  | Official, business and letters to the editors.                                | 10 marks   |
| (v)   | Transformation of all types (10 out of 10)                                    | 10 marks   |

*Note* : Minimum six periods a week for the study of the subject.  
For composition, there should be Groups of 25-30 students.

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## ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ - ਬੀ.ਸੀ.ਏ. - ●2

ਬੀ.ਸੀ.ਏ. ਭਾਗ ਪਹਿਲਾ (2013) ਦੇ ਇਮਤਿਹਾਨ ਲਈ

ਪੇਪਰ-ਏ

ਕੁੱਲ ਅੰਕ: 50

ਬਿਊਰੀ: 45

ਇੰਟਰਨਲ ਅਸੈਸਮੈਂਟ: 5

ਸਮਾਂ: 3 ਘੰਟੇ

### ਸਿਲੇਬਸ

1. ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵੀਆਂ ਦੀਆਂ ਚੋਣਵੀਆਂ ਕਵਿਤਾਵਾਂ ਦਾ ਅਧਿਐਨ
2. ਚੋਣਵੀਆਂ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ ਦਾ ਅਧਿਐਨ
3. ਚੋਣਵੇਂ ਪੰਜਾਬੀ ਲੇਖਕਾਂ ਦਾ ਸੰਖੇਪ ਜੀਵਨ ਤੇ ਰਚਨਾ / ਯੋਗਦਾਨ

### ਕੋਰਸ

1. ਆਧੁਨਿਕ ਕਾਵਿ ਸੰਗਮ, ਸੰਪ: ਡਾ. ਐਸ.ਐਸ. ਨੂਰ, ਪ੍ਰਕਾਸ਼ਕ: ਪੰਜਾਬ ਯੂਨੀਵਰਸਿਟੀ ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ, ਚੰਡੀਗੜ੍ਹ
2. ਕਥਾ ਬੋਧ (In Katha Bodh only 12 Chapters 1, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 17 will be in the syllabus while Chapter Nos. 2, 4, 5, 15, 16 & 18 be considered deleted), ਪ੍ਰਕਾਸ਼ਕ: ਪੰਜਾਬ ਯੂਨੀਵਰਸਿਟੀ ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ, ਚੰਡੀਗੜ੍ਹ

### ਯੂਨਿਟ ਅਤੇ ਥੀਮ

- |    |  |            |
|----|--|------------|
| 1. | ਆਧੁਨਿਕ ਕਾਵਿ ਸੰਗਮ ਪੁਸਤਕ ਵਿੱਚੋਂ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ (ਚਾਰ ਵਿਚੋਂ ਦੋ)    | 5+5=10 ਅੰਕ |
| 2. | ਦੋ ਕਵਿਤਾਵਾਂ ਦਾ ਸਾਰ ਅਤੇ ਕੇਂਦਰੀ ਭਾਵ (ਚਾਰ ਵਿਚੋਂ ਦੋ)                   | 5+5=10 ਅੰਕ |
| 3. | ਕਥਾ ਬੋਧ ਵਿੱਚੋਂ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ (ਚਾਰ ਵਿਚੋਂ ਦੋ)                   | 5+5=10 ਅੰਕ |
| 4. | ਇਕ ਕਹਾਣੀ ਦਾ ਸਾਰ (ਕਥਾ ਬੋਧ ਵਿਚੋਂ)                                    | 5 ਅੰਕ      |
| 5. | ਇਕ ਲੇਖਕ ਦਾ ਜੀਵਨ, ਰਚਨਾ ਅਤੇ ਯੋਗਦਾਨ (ਦੋ-ਇਕ ਕਵੀ, ਇਕ ਕਹਾਣੀਕਾਰ ਵਿਚੋਂ ਇਕ) | 10 ਅੰਕ     |

ਪੰਜਵੇਂ ਯੂਨਿਟ ਲਈ ਦੋਹਾਂ ਪੁਸਤਕਾਂ ਵਿਚੋਂ ਹੇਠ ਲਿਖੇ ਲੇਖਕ ਨਿਰਧਾਰਤ ਹਨ:

ਭਾਈ ਵੀਰ ਸਿੰਘ, ਪੂਰਨ ਸਿੰਘ, ਪ੍ਰੋ. ਮੋਹਨ ਸਿੰਘ, ਅੰਮ੍ਰਿਤਾ ਪ੍ਰੀਤਮ, ਸ਼ਿਵ ਕੁਮਾਰ, ਸੰਤ ਸਿੰਘ ਸੇਖੋਂ, ਕੁਲਵੰਤ ਸਿੰਘ ਵਿਰਕ ਅਤੇ ਸੰਤੋਖ ਸਿੰਘ ਧੀਰ।



**ਪੇਪਰ-ਬੀ**

ਕੁੱਲ ਅੰਕ: 50  
 ਬਿਊਰੀ: 45  
 ਇੰਟਰਨਲ ਅਸੈਸਮੈਂਟ: 5  
 ਸਮਾਂ: 3 ਘੰਟੇ

**ਸਿਲੇਬਸ**

- |    |                                    |        |
|----|------------------------------------|--------|
| 1. | ਲੇਖ                                | 15 ਅੰਕ |
| 2. | ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ | 10 ਅੰਕ |
| 3. | ਸ਼ਬਦ ਰਚਨਾ ਤੇ ਵਾਕ ਰਚਨਾ              | 15 ਅੰਕ |
| 4. | ਮੁਹਾਵਰੇ                            | 5 ਅੰਕ  |

**ਯੂਨਿਟ ਅਤੇ ਥੀਮ**

1. ਲੇਖ (500-600 ਸ਼ਬਦ)  
(ਸਮਾਜਕ, ਸਭਿਆਚਾਰਕ ਅਤੇ ਆਮ ਵਾਕਫੀ ਵਾਲੇ)
2. ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ  
(ਇਸ ਵਿੱਚ 3 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ - ਪੈਰੇ ਦਾ ਸਿਰਲੇਖ, ਚਾਰ ਉਲੀਕੇ ਸ਼ਬਦਾਂ ਦੇ ਅਰਥ ਬਾਰੇ ਪ੍ਰਸ਼ਨ ਅਤੇ ਪੈਰੇ ਨਾਲ ਸੰਬੰਧਤ ਦੋ ਹੋਰ ਪ੍ਰਸ਼ਨ)
3. (ੳ) ਸ਼ਬਦ ਸ਼ੁੱਧੀ  
(ਅ) ਵਾਕ ਸ਼ੁੱਧੀ
4. ਮੁਹਾਵਰੇ

**ਸੁਝਾਈਆਂ ਪੁਸਤਕਾਂ:**

- 1 ਪੰਜਾਬੀ ਸੰਚਾਰ ਯੋਗਤਾ ਅਭਿਆਸ, ਪੰਜਾਬ ਸਟੇਟ ਯੂਨੀਵਰਸਿਟੀ ਟੈਕਸਟ ਬੁੱਕ ਬੋਰਡ, ਚੰਡੀਗੜ੍ਹ।
- 2 ਕਾਲਜ ਪੰਜਾਬੀ ਵਿਆਕਰਣ, ਹਰਕੀਰਤ ਸਿੰਘ, ਪੰਜਾਬ ਸਟੇਟ ਯੂਨੀਵਰਸਿਟੀ ਟੈਕਸਟ ਬੁੱਕ ਬੋਰਡ, ਚੰਡੀਗੜ੍ਹ।

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**OR**

**BCA-02 : HISTORY AND CULTURE OF PUNJAB**

Max. Marks	:	100
Theory	:	90 marks
Internal Assessment	:	10 marks
Time	:	3 hours

*General Instructions :*

1. In all, nine questions will be set. Each question will carry 18 marks.
2. First question shall be Short Answer type containing 15 short questions spread over the whole syllabus. Candidates will attempt *nine* out of the fifteen questions in about 25 to 30 words each. Each short question will carry 2 marks totalling  $9 \times 2 = 18$  marks. The first question is **compulsory**.
3. Rest of the paper shall contain 4 units. Each unit shall have two essay type questions and the candidates shall attempt one question from each unit-4 in all.
4. For private candidates, who have not been assessed earlier for internal assessment, the marks secured by them in theory paper will proportionately be increased to maximum marks of the paper in lieu of internal assessment.

**The paper-setter must put note (4) in the question paper.**

**HISTORY AND CULTURE OF PUNJAB 1200-1849 A. D.**

**Unit-I**

1. Society in the Punjab during the Afghan rule.
2. The Punjab under the Great Mughals.
3. Salient features of the Bhakti movement and Sufism in the Punjab.

**Unit-II**

4. Guru Nanak : His teachings; concept of Langar and Sangat.
5. Development of Sikhism (1539-1581) : Contributions of Guru Angad Dev, Guru Amar Das and Guru Ram Das for the development of Sikhism.
6. Transformation of Sikhism : Compilation of Adi-Granth; Martyrdom of Guru Arjan Dev; Guru Hargobind's New Policy.

**Unit-III**

7. Martyrdom of Guru Tegh Bahadur; foundation of the Khalsa by Guru Gobind Singh.
8. Banda Bahadur and his achievements; Sikh struggle for sovereignty from 1716 to 1765; role of Dal Khalsa, Rakhi, Gurmata and Misl.
9. Ranjit Singh's rise to power; civil and military administration; relations with the British.

**Unit-IV**

10. Social change with special reference to the position of women.
11. New developments in language, literature, architecture in the Punjab during the Medieval period.
12. Famous Folk tales of Medieval Punjab.

**Suggested Readings :**

1. Singh, Kirpal, History and Culture of the Punjab, Part II (Medieval period), Publication Bureau, Punjabi University, Patiala, 1990 (3<sup>rd</sup> edn.).  
N.B. : The required detail and depth would conform to the treatment of the subject in the above survey. (This book will also form the basis of the short answer questions).
2. Grewal, J.S., The Sikhs of the Punjab, The New Cambridge University History of India, Orient Longman, Hyderabad, 1990.
3. Singh, Khushwant, A History of the Sikhs, Vol. I: 1469-1839, Oxford University Press, Delhi, 1991.
4. Singh, Fauja (ed.), History of the Punjab, Vol.III, Punjabi University, Patiala, 1972.
5. Chopra, P.N., Puri, B.N., and Das, M.N., A Social, Cultural & Economic History of India, Vol.II, Macmillan, Delhi, 1947.

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*Note :* The following categories of the students shall be entitled to take the option of History & Culture of Punjab in lieu of Punjabi as compulsory subject :

- (a) That the students who have not studied Punjabi upto class 10<sup>th</sup>.
  - (b) Ward of/and Defence Personnel and Central Government employee/employees who are transferable on all India basis.
  - (c) Foreigners.
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**ENVIRONMENT & ROAD SAFETY EDUCATION****(25 hr. course)****UNIT I (ENVIRONMENT)**

1. **Environment Concept :**  
Introduction, concept of biosphere—lithosphere, hydrosphere, atmosphere; Natural resources—their need and types; principles and scope of Ecology; concepts of ecosystem, population, community, biotic interactions, biomes, ecological succession.
2. **Atmosphere :**  
Parts of atmosphere, components of air; pollution, pollutants, their sources, permissible limits, risks and possible control measures.
3. **Hydrosphere :**  
Types of aquatic systems. Major sources (including ground water) and uses of water, problems of the hydrosphere, fresh water shortage; pollution and pollutants of water, permissible limits, risks and possible control measures.
4. **Lithosphere :**  
Earth crust, Soil—a life support system, its texture, types, components, pollution and pollutants, reasons of soil erosion and possible control measures.
5. **Forests :**  
Concept of forests and plantations, types of vegetation and forests, factors governing vegetation, role of trees and forests in environment, various forestry programmes of the Govt. of India, Urban forests, Chipko Andolan.
6. **Conservation of Environment :**  
The concepts of conservation and sustainable development, why to conserve, aims and objectives of conservation, policies of conservation; conservation of life support systems—soil, water, air, wildlife, forests.
7. **Management of Solid Waste :**  
Merits and demerits of different ways of solid waste management—open, dumping, landfill, incineration, resource reduction, recycling and reuse, vermicomposting and vermiculture, organic farming.
8. **Indoor Environment :**  
Pollutants and contaminants of the in-house environment; problems of the environment linked to urban and rural lifestyles; possible adulterants of the food; uses and harms of plastics and polythene; hazardous chemicals, solvents and cosmetics.
9. **Global Environmental Issues :**  
Global concern, creation of UNEP; Conventions on climate change, Convention on biodiversity; Stratospheric ozone depletion, dangers associated and possible solutions.
10. **Indian Laws on Environment :**  
Indian laws pertaining to Environmental protection : Environment (Protection) Act, 1986; General information about Laws relating to control of air, water and noise pollution. What to do to seek redressal.
11. **Biodiversity :**  
What is biodiversity, levels and types of biodiversity, importance of biodiversity, causes of its loss, how to check its loss; Hotspot zones of the world and India, Biodiversity Act, 2002.
12. **Noise and Microbial Pollution :**  
Pollution due to noise and microbes and their effects.
13. **Human Population and Environment :**  
Population growth and family welfare programme, Human Health, HIV/AIDS, Human rights.
14. **Social Issues :**  
Environmental Ethics : Issues and possible solutions, problems related to lifestyle, sustainable development; Consumerisms and waste generation.
15. **Local Environmental Issues :**  
Environmental problems in rural and urban areas, Problem of Congress grass & other weeds, problems arising from the use of pesticides and weedicides, smoking etc.

**Practicals :**

Depending on the available facility in the college, a visit to vermicomposting units or any other such non-polluting eco-friendly site or planting/caring of vegetation/trees could be taken.

*Note : Above 15 topics to be covered in 25 hour lectures in total, with 2 lectures in each topics from 2 to 11 and one each for the topics 1 and 12 to 15.*

**UNIT II (ROAD SAFETY)**

1. Concept and Significance of Road Safety.
2. Role of Traffic Police in Road Safety.
3. Traffic Rules.
4. Traffic Signs.
5. How to obtain Driving License.
6. Traffic Offences, Penalties and Procedures.
7. Common Driving mistakes.
8. Significance of First-aid in Road Safety.
9. Role of Civil Society in Road Safety.
10. Traffic Police-Public Relationship.

**Examination Pattern :**

- Seventy multiple choice questions (with one correct and three incorrect alternatives and no deduction for wrong or un-attempted question).
- The paper shall have two units: **Unit I (Environment) and Unit II (Road Safety)**.
- Unit I shall comprise of 50 questions with minimum of 2 questions from each topics 1, and 12 to 15 and minimum of 4 questions from topics 2 to 11.
- Unit II shall comprise of 20 questions with minimum of 1 question from each topics 1 to 10.
- The entire syllabus of Unit I is to be covered in 25 hours and that of Unit II is to be covered in 10 hours.
- All questions are to be attempted.
- Qualifying Marks 33 per cent i.e. 23 marks out of 70.
- Duration of examination : 90 minutes.
- The paper setters are requested to set the questions strictly according to the syllabus.

**Suggested Readings**

1. The Motor Vehicle Act, 1988 (2010), Universal Law Publishing Co. Pvt. Ltd., New Delhi.
2. Road Safety Signage and Signs (2011), Ministry of Road Transport and Highways, Government of India.

**Websites:**

- (a) [www.chandigarhpolice.nic.in](http://www.chandigarhpolice.nic.in)
  - (b) [www.punjabpolice.gov.in](http://www.punjabpolice.gov.in)
  - (c) [www.haryanapolice.gov.in](http://www.haryanapolice.gov.in)
  - (d) [www.hppolice.nic.in](http://www.hppolice.nic.in)
-

Paper Code : BCA-03

Paper Title : Mathematics

Theory Marks : 90

Number of Lectures : 100  
(45 minutes duration)

**Objectives :** To provide basic mathematical foundation required for various computer science courses.

- Note :*
- (i) The syllabus of this paper has been divided into four sections.
  - (ii) Examiner will set total *nine* questions comprising *two* questions from each Section and *one* compulsory question of short answer type covering whole syllabi.
  - (iii) The students are required to attempt *one* question from each Section and the entire Compulsory question.
  - (iv) All questions carry equal marks, unless specified.

#### SECTION-A

1. **Fundamental Principles of Counting :**

Permutation as an arrangement, meaning of  $P(n, r)$  and  $c(n, r)$ , simple applications. **Binomial Theorem:** Statement of principle of Mathematical Induction, Proof of the Binomial Theorem of positive index using the principle of induction, general and middle terms. Binomial Theorem for any index (Without Proof) applications of Binomial Theorem for approximation and properties of Binomial Coefficients.

2. **Trigonometry-I :**

Trigonometric Ratios of allied angles, Trigonometric ratios of Compound angles or addition and subtraction formulae.

(No. of Periods : 25)

#### SECTION-B

3. **Trigonometry-II :**

Transformation Formulae, Trigonometric ratios of multiple and sub-multiple angles, Inverse Trigonometric functions.

4. **Limit and Continuity :**

Rules for finding Limits, Infinite Limits, Continuity at a point, Rules of continuity, Continuity on an Interval.

(No. of Periods : 25)

**SECTION-C**

5. **Derivatives :**  
The derivative of a function, Calculating derivatives from the definition, Differentiability on an interval, Differentiation Rules, Rates of Change, Derivatives of Trigonometric Functions, The Chain Rule, Derivative of Implicit, Rational, and Exponential Functions.  
**Application of Derivatives :** Rolle's theorem, Lagrange Mean Value Theorem and their applications, Extreme values of Functions, the first derivative test for Local Extreme Values.
6. **Integration-I :**  
Indefinite Integrals, Integration by substitution, Integration of Transcendental Functions: Inverse Functions, Natural Logarithm, The Exponential Function.  
(No. of Periods : 25)

**SECTION-D**

7. **Integration-II :**  
Inverse Trigonometric functions, Integration by parts, Partial fractions, Trigonometric substitutions, Definite Integrals, Properties, Area under the curve.
8. **Matrix Operations :**  
Introduction and definition of matrix, types of matrices, Matrix addition, Subtraction and scalar multiplication, Matrix multiplication, Transpose of a matrix, adjoint of a matrix and inverse of a matrix, solution of system of linear equations, definition and properties of a determinant.  
(No. of Periods : 25)

*References :*

1. Schaum Series, 1982 : Theory & Problem of Essential Computer Mathematics, McGraw Hill, New York.
2. Grimaldi, Ralph P., 2003 : Discrete and Combinational Mathematics, Pearson Education, Singapore.
3. Rao, G. Shanker, 1999 : Mathematics for Computer Science, Kalyani Publishers, New Delhi.

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Paper Code	:	BCA-04	
Paper Title	:	Personal Computing Software	
Theory Marks	:	90	Number of Lectures : 100 (45 minutes duration)

**Objectives :** The objective of this course is to familiarize students with concepts of Fundamentals of it and its applications.

- Note :*
- (i) The syllabus of this paper has been divided into four sections.
  - (ii) Examiner will set total **nine** questions comprising **two** questions from each Section and **one** compulsory question of short answer type covering whole syllabi.
  - (iii) The students are required to attempt **one** question from each Section and the entire Compulsory question.
  - (iv) All questions carry equal marks, unless specified.

#### SECTION-A

- Computer Appreciation : Introduction, characteristics of computer; History of computers; classification of computers on size, architecture and chronology; Applications of computers; commonly used terms–Hardware, Software, Firmware; Computer Architecture and organisation; Input, Process and Output; Representation of information; BIT, BYTE, Memory, Memory size; Units of measurement of storage; Input/Output devices; Secondary storage devices; Networking concepts - LAN, WAN and Topologies:  
Types of software; system and application software; functions of an operating system; Popular Operating systems; Generation of Languages; Translators - Interpreters, Compilers, Assemblers and their comparison.
- DOS and Advanced DOS : Profiling an Operating system; Booting sequence; Operating System files and command Processor file; Definition of a file; File naming; Booting from floppy and HDD; Warm and Cold reboot; Types of DOS commands; Internal and External; Introduction to AUTOEXEC.BAT; Versions of DOS; Directory commands: Copy, XCOPY, DEL, RENAME, ATTRIB, BACKUP, RESTORE, FIND, SYS; General commands; TYPE, DATE, TIME, PROMPT; Disk organisation and Disk storage.

(No. of Periods : 25)

#### SECTION-B

- Disk Management Commands: FORMAT, CHKDSK, DISKCOPY, LABEL, VOL, DISKCOMP, COMP, RECOVER; Redirecting command input and output pipes, study of a line editor and screen editor; Using COPY CON to build a file; Introduction to simple batch files; configuring the system: CONFIG.SYS and AUTOEXEC.BAT files; Setting the Environment; SET Command; System Configuration: FILES, BUFFERS, COUNTRY, DEVICE, SHELL, LASTDRIVE; Batch files commands: ECHO, PAUSE, REM; Batch files with command line arguments; Single and multiple command line parameters; Loop structures in Batch files : IF ERRORLEVEL condition == condition EXISTS and NOT conditions. GOTO, CALL; Nested Batch Files; preparing Batch files; preparing Batch File Menu Shell; DOS Utility commands: MEMMAKER, MSAV, DBLSPACE, MOVE, DEFRAG, DELTREE, MSBACKUP, SCANDISK, SETVER, UNDELETE, UNFORMAT, XCOPY.



4. Using Windows : Windows Basics; Start Windows; Using different windows simultaneously; Moving through windows and mouse; Maximize/Minimize windows; Use of help feature; Exit windows; Starting an application; Run and Manage multiple applications; Close applications; File Management through windows: Copy, Move, Delete files/Directories, Creating Directories. Renaming files and directories; Disk operation Using File Manager, Using Essential Accessories: Starting and using Notepad, Type and Edit text in a document in Notepad/Wordpad, Insert pictures in a document in Notepad /Wordpad, Format text in Notepad/Wordpad document, Save and Print a document file in Notepad/Wordpad, Starting and Using Paint, Printing a drawing; OLE Concepts.

(No. of Periods : 25)

### SECTION-C

5. Word Processing Package : Basics of Word Processing; Text Selection, Opening Documents and Creating Documents, Saving Documents/Quitting Documents, Cursor Control, Printing Documents, Using the Interface (Menu Toolbars), Editing Text (Copy, Delete, Move etc.), Finding and Replacing Text, Spell Check Feature/Autocorrect feature, Grammar facility, Retrieving often used text; Autotext character formatting, Page formatting; Document Enhancement: Adding Borders and shading, Adding Headers and Footers, Setting up Multiple columns, Sorting blocks, Adjusting Margins and Hyphenating Documents, Creating Master Document, Creating Data Source, Merging Documents, Using Mailmerge feature for labels and envelopes; Graphics and Using Templates and wizards.
6. Presentation Packages : Basics, General Features, Creating a presentation.

(No. of Periods : 25)

### SECTION-D

7. Spreadsheet Package : Worksheet Basics, Data Entry in Cells : Entry of numbers, text and formulae, Moving data in a worksheet, Moving around in a worksheet, Selecting Data Range, Using the interface (Toolbars, Menus), Editing Basics, Working with workbooks, Saving and Quitting, Cell referencing; Formatting and Calculations : Calculations and worksheets - using Autofill, Working with Formulae, Efficient Data Display with Data formatting (number formatting, date formatting etc.), Working with Ranges, Worksheet Printing; Working with Graphs and Charts : Adding/Formatting Text Data with Autoformat, Creating Embedded Chart using charwizard, sizing and moving parts, updating charts, Changing chart types, Creating separate charts, Chart wizard, Adding Titles, Legends and Gridlines, Printing Charts; Database Management; Finding records with Data form, Adding/Deleting Records, Filtering Records in a worksheet; Functions and Macros: Worksheet with worksheet function using function-wizard, Creating Macros, Record Macros, Running Macros, Assigning Macros to Buttons, Defining Macros from Scratch. Multiple worksheets and scanners.

8. Internet and www : Evolution of Internet services provided on Internet, Access Methods, Future of Internet, Evolution of www. Fundamentals of www. FrontPage : Installing FrontPage, components of FrontPage, Creating websites.

(No. of Periods : 25)

*References :*

1. Mathur Rajiv, 1995 : DOS 6.2 Quick Reference, Galgotia.
2. Mathur Rajiv, 1996 : Learning Word 6 for Windows Step-by-Step, Galgotia.
3. Mathur Rajiv, 1996 : Learning Excel 5 for Windows Step-by-Step, Galgotia.
4. Jamsa, Kris A, 1993 : Rescued by Windows 3.1, Galgotia.
5. Basandra, S.K. 1995 : Computers Today, Galgotia
6. Kasser, Barbara, 1998 : Using the Internet, PHI, 4<sup>th</sup> ed., New Delhi.
7. Wall, David A. & Others, 1996 : Using the World Wide Web, PHI, 2<sup>nd</sup> ed., New Delhi.

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Paper Code	:	BCA-05	
Paper Title	:	Computer Organisation and System Maintenance	
Theory Marks	:	90	Number of Lectures : 100 (45 minutes duration)

**Objectives :** This course will enable the student to understand the basic organization of computer system and system maintenance.

- Note :*
- (i) The syllabus of this paper has been divided into four sections.
  - (ii) Examiner will set total **nine** questions comprising **two** questions from each Section and **one** compulsory question of short answer type covering whole syllabi.
  - (iii) The students are required to attempt **one** question from each Section and the entire Compulsory question.
  - (iv) All questions carry equal marks, unless specified.

#### SECTION-A

1. Computer Organisation : Evolution of Computers, Stored program concept and Von Neumann Architecture, Information representation and codes, Arithmetic algorithms : Addition and subtraction for sign magnitude and 2's complement numbers, Building blocks of computer; Combinatorial Blocks : Gates, Multiplexers, Decoders, Encoders etc. Sequential Building blocks : Flip Flop, Registers, Counters, Random access memory; Register Transfer Language and micro-operations; Concept of Bus, data movement among registers, Language to represent conditional data transfer, data movement from/to memory, Arithmetic and logical operations along with register transfer.

(No. of Periods : 25)

#### SECTION-B

2. Architecture of a Simple Processor : A simple computer organisation and instruction set, Instruction execution in terms of Microinstructions, Concept of interrupt and simple I/O organisation, I/O organization : Strobe based and Handshake based communication, Vector and priority interrupts, DMA based data transfer; Implementation of the processor using building blocks; CPU organisation : Addressing Modes, Instruction formats, CPU organisation with large registers, Stacks and handling of interrupts and subroutines, Instruction pipelining (Stages, Hazards and methods to remove hazards).

(No. of Periods : 25)

**SECTION-C**

3. Memory Organisation : Basic cell of static and dynamic RAM, Building large memories using chips, Associative memory, Cache memory organisation, Virtual memory organisation.
4. Assembly Language Programming : Machine and assembly language, Pseudo operations, subroutines in assembly language, interrupt and I/O programming, integer multiplication using shift and add, Booth's algorithms, integer division, floating representation and arithmetic algorithm.

(No. of Periods : 25)

**SECTION-D**

5. System Maintenance : Introduction to Various Physical components of a Computer, Physical Inspection of a PC and internal cards, Diagnostics on a PC, Functional description of various modules and cards. Various types of display and other peripherals used in a PC. Installing a software, Detection of viruses and protection on a PC.

(No. of Periods : 25)

*References :*

1. M. Morris Mano, 1993. : Computer System Architecture, Prentice Hall International, 3<sup>rd</sup> Ed.
2. P. Pal Choudhri, 1994. : Computer Organisation and Design, Prentice Hall of India.
3. Biswal, Sadasiva, : Basic Electronics, Pub-Atlantic, New Delhi. 2001
4. B. Govindarajalu, : IBM-PC and Clones - Hardware Troubleshooting and Maintenance, 1994. Tata-McGraw-Hill.

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Paper Code	:	BCA-06	
Paper Title	:	Computer Programming & Problem Solving Through “C”	
Theory Marks	:	90	Number of Lectures : 100 (45 minutes duration)

**Objectives :** The objective of this course is to make the student understand programming language concepts, mainly control structures, reading a set of data, stepwise refinement, function, control structure and arrays. After completion of this course, the student is expected to analyze the real life problem and write a program in ‘C’ language to solve problem. The main emphasis of the course is on problem solving aspect that is, developing proper algorithms.

- Note :*
- (i) The syllabus of this paper has been divided into four sections.
  - (ii) Examiner will set total **nine** questions comprising **two** questions from each Section and **one** compulsory question of short answer type covering whole syllabi.
  - (iii) The students are required to attempt **one** question from each Section and the entire Compulsory question.
  - (iv) All questions carry equal marks, unless specified.

#### SECTION-A

##### 1. Algorithm and Programming Development

- 1.1 Steps in development of a program
- 1.2 Flow charts, Algorithm Development
- 1.3 Program Debugging

##### 2. Fundamentals of ‘C’

- 2.1 I/O statements, assignment statements
- 2.2 Constants, variables and data types
- 2.3 Operators and Expressions
- 2.4 Standards and Formatted statements
- 2.5 Key word, Data Types and Identifiers

(No. of Periods : 25)

#### SECTION-B

##### 3. Control Structures

- 3.1 Introduction
- 3.2 Decision making with IF – statement
- 3.3 IF – Else and Nested IF
- 3.4 While and do-while, for loop
- 3.5 Jump statements, break, continue, goto
- 3.6 Switch Statement

**4. Functions**

- 4.1 Introduction to functions
- 4.2 Global and Local Variables
- 4.3 Function Declaration
- 4.4 Standard functions
- 4.5 Parameters and Parameter Passing
- 4.6 Call – by value/reference
- 4.7 Recursion

(No. of Periods : 25)

**SECTION-C****5. Preprocessor Directives**

- 5.1 Introduction and Use
- 5.2 Macros
- 5.3 Conditional Preprocessors
- 5.4 Header Files

**6. Arrays**

- 6.1 Introduction to Arrays
- 6.2 Array Declaration
- 6.3 Single and Multidimensional Array
- 6.4 Arrays of characters

**7. Pointers**

- 7.1 Introduction to Pointers
- 7.2 Address operator and pointers
- 7.3 Declaring and Initializing pointers
- 7.4 Assignment through pointers
- 7.5 Pointers and Arrays

(No. of Periods : 25)

**SECTION-D****8. Structures and Unions**

- 8.1 Declaration of structures
- 8.2 Accessing structure members
- 8.3 Structure Initialization
- 8.4 Arrays of structure, nested structures, structure with pointers
- 8.5 Unions

**9. Strings**

- 9.1 Introduction
- 9.2 Declaring and Initializing string variables
- 9.3 Reading and writing strings
- 9.4 String handling functions

**10. Files**

- 10.1 Introduction
- 10.2 Creating a data file opening and closing a data file, processing a data file

(No. of Periods : 25)

*References :*

- 1. Byron S. Gottfried, 1996 : Programming in C, McGraw Hills Publishers, New York.
- 2. Salaria, R. S. : Test Your Skills in C, Khanna Book Publishing Co. (P.) Ltd., New Delhi.
- 3. Kanetkar Yashwant, 2010 : Let us Exploring C, BPB Publications, New Delhi.
- 4. Balaguruswami C., 2008 : Programming with C Language, Tata McGraw Hill, New Delhi.
- 5. Somashekara, M.T. , 2008 : Programming in C, Prentice Hall of India.

Paper Code : BCA-07  
Paper Title : Computer Lab.-1 Based on BCA-04  
Theory Marks : 90

Paper Code : BCA-08  
Paper Title : Computer Lab.-2 Based on BCA-06  
Theory Marks : 90

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**SYLLABI AND COURSES OF READING FOR BACHELOR OF COMPUTER APPLICATIONS  
FOR THE EXAMINATION OF 2013**

**SECOND YEAR**

Paper Code	:	BCA-09	
Paper Title	:	Project Management and System Development	
Theory Marks	:	90	Number of Lectures : 100 (45 minutes duration)

**Objectives :**

- Define the characteristics of a project.
- Explain the need for project management.
- Compare and contrast the roles of project managers in organizational environments.
- Describe the systems development cycle.
- Explain the roles of systems analysis and systems management in the life cycle of a project.

- Note :*
- (i) The syllabus of this paper has been divided into four sections.
  - (ii) Examiner will set total **nine** questions comprising **two** questions from each Section and **one** compulsory question of short answer type covering whole syllabi.
  - (iii) The students are required to attempt **one** question from each Section and the entire Compulsory question.
  - (iv) All questions carry equal marks, unless specified.

**SECTION-A**

1. **Concepts of Project Management :**  
Concept of a project, Categories of project life cycle phases, Project Management Concepts, Tools and Techniques for Project Management, Roles and Responsibilities of a Project Manager.  
(No. of Periods : 07)
2. **Establishing the Project :**  
Feasibility Report, Financing Arrangements, Preparation of Cost Estimates, Project Implementation Schedule, Evaluation of the Project Profitability.  
(No. of Periods : 07)
3. **Organizing the Project :**  
Working of Systems, Design of Systems, Project Work System Design, Work Breakdown Structure, Project Execution Plan, Project Procedure Manual, Project Control System, Planning, Scheduling and Monitoring.  
(No. of Periods : 06)
4. **Project Directions, Coordination :**  
Project Direction, Communications in a Project, Project Coordination.  
(No. of Periods : 05)

**SECTION-B**

5. **Project Control :**  
Project Control, Scope/Progress Control, Performance Control, Schedule Control, and Cost Control.  
(No. of Periods : 05)

6. **Project Management Performance :**  
Performance Indicators, Performance Improvement, Project Management Environment.  
(No. of Periods : 10)
7. **Report Writing :**  
Characteristics of Reports, Importance of Reports, Types of Reports, Structure of Reports.  
Preparatory Steps to Writing Reports, Elements of Style, Use of Illustrations, Writing the Report,  
Specimen Reports.  
(No. of Periods : 10)

### SECTION-C

8. **System Analysis and Design :**
- (a) Software Specifications and Requirement Analysis :  
Introduction and Objectives, Software requirement specification, Classification and analysis,  
Software specification documents and attributes.
  - (b) Software Specification Tools :  
Data Dictionary, Decision Support Tools, Data Flow Diagrams, Finite State Machine, Petri Nets,  
Mathematical Logic, Operational Timelines.
  - (c) Software Development Environment :  
Operating System, Programming Languages, Compilers, Editors, Linkers, Code-generators,  
debuggers, Program Design Languages, Workbenches, Integrated CASE tools, Ideal Software  
Development platform.  
(No. of Periods : 25)

### SECTION-D

- (d) Software Design :  
Design Process, Design levels and their objectives, Various approaches to design, Design tools,  
Preparing software design specifications, Components of design of an information system.
- (e) Software Implementation and Maintenance :  
Fundamentals of Coding, Programming languages, their features and selection, Programming  
style and Program quality.
- (f) Software Testing :  
Module level testing methods, System level testing methods, Debugging.
- (g) Software Maintenance and Maintainability.

### *References :*

1. Choudhary, S., 1988 : Project Management, Tata McGraw-Hill Publishing Company  
Limited, 1988 (Recommended as a text-book for the syllabus  
contents-6).

2. Sharma, R.C., and Krishna : Business Correspondence and Report Writing, Second Edition, Mohan, 1996  
Tata McGraw-Hill Publishing Company Ltd., 1978, Reprinted in 1996 (Pages 129-230).
3. Gopalakrishnan, P. & Rama : Text Book of Project Management, Mac Million India Ltd.  
Moorthy, V.E., 1993.
4. Harrison, F.L., 1992. : Advanced Project Management, A Structured Approach (Third Edition), Metropolitan.
5. Srinath, I. S., 1989. : PERT & CPM, Principles and Applications, Third Edition, Affiliated East-West Press Pvt. Ltd.
6. Rodrigues, M.V., 1992 : Effective Business Communication, Concept Publishing Company, 1992 (Pages 411-436).
7. Krishna Mohan & Banerji : Develop Communication Skills, MacMillian India Ltd.  
Meera, 1990.
8. Behforooz, Ali and Hudson : Software Engineering Fundamentals, Oxford University  
Frederick, 1996. Press.
9. Kanter, J., 1984 : Management Information Systems, PHI.
10. Gill, Nasib Singh : Software Engineering, Khanna.
11. Rajib Mall, 2004 : Fundamentals of Software Engineering, PHI.
12. Pressman, Roger S., 2010 : Software Engineering, Tata McGraw Hill.
13. Jagdeep Singh : System Analysis and Design, Kalyani.
14. Awad, Elias M., 1993 : System Analysis and Design, Galgotia.
15. Kaur, Kirandeep : Project Management and Technical Report Writing, Kalyani.

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Paper Code : BCA-10

Paper Title : Computer Based Numerical and Statistical Methods (Using C)

Theory Marks : 90

Number of Lectures : 100  
(45 minutes duration)

**Objectives** : To Teach implementation numerical and statistical methods.

- Note* :
- (i) The syllabus of this paper has been divided into four sections.
  - (ii) Examiner will set total **nine** questions comprising **two** questions from each Section and **one** compulsory question of short answer type covering whole syllabi.
  - (iii) The students are required to attempt **one** question from each Section and the entire Compulsory question.
  - (iv) All questions carry equal marks, unless specified.

#### SECTION-A

##### Numerical Methods :

- (a) Computer Arithmetic :  
Floating Point Numbers, operations, normalizations and their consequences.
- (b) Iterative Methods :  
Bisection, False-Position, Newton - Raphson Methods, Zeros of a polynomial using Birge - Vieta Method.  
Development of Programs for above Numerical Methods using C.

(No. of Periods : 25)

#### SECTION-B

- (c) Simultaneous Linear Equations :  
Solution of Simultaneous Linear Equations Using Gauss - Elimination, Gauss-Jordan and Gauss-Seidal Methods, Concept of Pivoting.
- (d) Interpolation, Numerical Integration and Runge-Kutta Methods.
- (e) Development of Programs for above Numerical Methods using C.

(No. of Periods : 25)

**SECTION-C****Statistical Methods :**

- (a) Measures of Central Tendency :  
Preparing Frequency distribution table, Arithmetic mean, Geometric mean, Harmonic mean, Median and Mode.
- (b) Measures of Dispersion, Skewness and Kurtosis, Range :  
Mean deviation, Standard deviation, Coefficient of variation, Moments, Skewness and Kurtosis.  
Development of Programs for above Statistical Methods using C.

(No. of Periods : 25)

**SECTION-D**

- (c) Correlation and Regression Analysis :  
Least square fit; Polynomial and curve fittings; Linear regression and non linear regression algorithms.
- (d) Development of Programs for above Statistical Methods using C.

(No. of Periods : 25)

*References :*

- 1 Salaria, R.S. : Computer Oriented Numerical Methods, Khanna Book Publishing Co. (P.) Ltd., New Delhi.
- 2 Rajaraman, V., 2004 : Computer Programming in C, Prentice Hall of India.
- 3 Krishnanmurthy, E.V. & Sen, S. K. 1984 : Computer Based Numerical Algorithms, East West Press.
- 4 Rajaraman, V., 1980. : Computer Oriented Numerical Methods, 3rd Ed., Prentice Hall, India.
- 5 Balaguruswami, E., 2000 : Computer Oriented Statistical and Numerical Methods, Mac Million.
- 6 Gupta, M. K., Goon, A.M., Dasgupta, B., 1978 : Fundamentals of Statistics, Pub. Calcutta, World Press Kolkatta.
- 7 Affi, A.A., 1979 : Statistical Analysis : A Computer Oriented Approach, Academic Press, Inc
- 8 Salaria, R.S. : Simplified Text-cum-Workbook on Computer Oriented Numerical Methods : A Programming Approach, Khanna.
- 9 Gupta, S.P., 2003 : Statistical Methods, S. Chand.

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Paper Code : BCA-25

Paper Title : Data Structure Using C

Theory Marks : 90

Number of Lectures : 100  
(45 minutes duration)

**Objectives :** The basic algorithms related to handling data like stack, lists, queue, trees and graphs are introduced in this subject. The implementation of these algorithms will be taught using previously learned C programming language.

- Note :*
- (i) The syllabus of this paper has been divided into four sections.
  - (ii) Examiner will set total **nine** questions comprising **two** questions from each Section and **one** compulsory question of short answer type covering whole syllabi.
  - (iii) The students are required to attempt **one** question from each Section and the entire Compulsory question.
  - (iv) All questions carry equal marks, unless specified.

#### SECTION-A

1. Basic Concepts and Notations, Data Structure and Data Structure operations.  
(No. of Periods : 05)
2. Basic data Structures and Operations on them : Arrays, Stacks, Queue, Linked List and its representation. Applications of these data structures.  
(No. of Periods : 20)

#### SECTION-B

3. Trees–Definition and Basic concepts, Linked Tree Representation, Representation in Contiguous Storage, Binary Tree, Binary Tree Traversal, Searching, Insertion and deletion in Binary trees, Binary search tree, AVL trees.  
(No. of Periods : 25)

#### SECTION-C

4. Graphs and their application, Sequential and Linked representation of Graph-adjacency, Matrix, Operations on Graph, Traversing a graph.  
(No. of Periods : 25)

**SECTION-D**

5. Searching and Sorting : Binary and Linear Search, Bubble sort, Insertion sort, Selection sort, Merge sort, Radix sort, Quick sort, Shell sort.

(No. of Periods : 25)

*References :*

1. Lipschultz L. Seymour, : Data Structure, Schaum Outline Series, TMH, New Delhi.  
2001
2. Tannenbaum, Aaro M., : Data Structure Using C, Pearson.  
1990
3. Salaria, R. S. : Data Structures & Algorithm Using C, Khanna Book Publishing  
Co. (P.) Ltd., New Delhi.
4. Salaria, R. S. : Test Your Skills in Data Structures; Khanna Book Publishing Co.  
(P.) Ltd., New Delhi.
5. Sofat Sanjeev : Data Structure with C and C++, Khanna Book Publishing Co.
6. Patel, R.B. : Expert Data Structure in C, Khanna Book Publishing Co.

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Paper Code : BCA-12

Paper Title : Client Server Computing Using ORACLE

Theory Marks : 90

Number of Lectures : 100  
(45 minutes duration)

**Objectives :** This course aims at giving the students the insight of Client Server computing and Creating Applications using the Oracle Web Server.

- Note :*
- (i) The syllabus of this paper has been divided into four sections.
  - (ii) Examiner will set total **nine** questions comprising **two** questions from each Section and **one** compulsory question of short answer type covering whole syllabi.
  - (iii) The students are required to attempt **one** question from each Section and the entire Compulsory question.
  - (iv) All questions carry equal marks, unless specified.

#### SECTION-A

1. Introduction to Client-Server Computing.
2. Introduction to RDBMS :  
Approaches to Data Management, Database Management - An Evolutionary Phenomenon, Introduction to DBMS, The 12 Rules (Codd's Rule) for an RDBMS, Relational Database Management System (RDBMS), Oracle Server and Oracle Database, Oracle Products.  
(No. of Periods : 10)
3. Introduction to SQL \*Plus :  
Introduction to SQL, Oracle Data types, Starting SQL \*Plus, Querying database tables, Conditional retrieval of rows, Working with Null Values, Matching a pattern from a table, Ordering the Result of a Query, Aggregate Functions, Grouping the Result of a Query, ROLLUP Operation: Getting Sub Totals, CUBE Operation : Getting Cross Tabs, Command Summary of SQL \*Plus Editor.  
(No. of Periods : 10)
4. Querying Multiple Tables :  
Collating Information: Equi Joins, Cartesian Joins, Outer Joins, Self Joins.  
(No. of Periods : 05)

#### SECTION-B

5. SET Operators : Union, Intersect, Minus; Nested Queries.  
(No. of Periods : 05)
6. Functions :  
Functions, Column Functions : Arithmetic Functions, Character Functions, Date Functions, General Functions; Group Functions.  
(No. of Periods : 10)



7. Data Manipulation and Control-I :  
Data Definition Language (DDL), Creating Tables, Creating a Table with data from another table, Inserting Values into a Table, Updating Column(s) of a Table, Deleting Row(s) from a Table, Dropping a Column, Introduction to VIEWS, Manipulating the Base table(s) through VIEWS, Rules of DML Statements on Join Views, Dropping a VIEW, Inline Views, Materialized Views.

(No. of Periods : 10)

#### SECTION-C

8. Data Manipulation and Control-II :  
Database Security and Privileges, GRANT Command, REVOKE Command, Application Privileges Management, Enhancing Performance, Sequences, Maintaining Database Objects, COMMIT and ROLLBACK.

(No. of Periods : 10)

9. PL/SQL-I :  
Introduction to PL/SQL, The Advantage of PL/SQL, PL/SQL Block Structure, PL/SQL Architecture, Fundamentals of PL/SQL, PL/SQL Data Types, Variables and Constants, Scope and Visibility of a Variable, Assignments and Expressions, Operator Precedence, Referencing Non-PL/SQL Variables, Built-in-Functions, Conditional and Iterative Control, SQL Within PL/SQL, Writing PL/SQL Code, Composite Datatypes.

(No. of Periods : 15)

#### SECTION-D

10. PL/SQL-II :  
Cursor Management in PL/SQL, Cursor Manipulation, Implicit Cursor Attributes, Exception Handling in PL/SQL; Predefined Exceptions, User Defined Exceptions.

(No. of Periods : 10)

11. Advanced PL/SQL :  
Subprograms in PL/SQL, Advantages of Subprograms, Procedure, Functions, Actual versus Formal Parameters, Argument Modes, Stored Packages, Advantages of Packages, Dropping a Procedure, Dropping a Function, Dropping a Package, Using Stored Function in SQL Statements, Database Trigger, Types of Triggers, Dropping Triggers, Storage for Triggers.

(No. of Periods : 15)

#### *References :*

1. James T. Perry, Joseph, : Understanding ORACLE, BPB Publications, B-14, Connaught G. Lateer, 1989 Place, New Delhi - 110001.
2. Mukhi Vijay, 1992 : Mastering Oracle 6.0, BPB Publications.

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Paper Code : BCA-13

Paper Title : Object Oriented Programming (Using C++)

Theory Marks : 90

Number of Lectures : 100  
(45 minutes duration)

**Objectives :** By the end of the course students will be able to write C++ programs using the more esoteric language features, utilize OO techniques to design C++ programs, use the standard C++ library, exploit advanced C++ techniques

- Note :*
- (i) The syllabus of this paper has been divided into four sections.
  - (ii) Examiner will set total **nine** questions comprising **two** questions from each Section and **one** compulsory question of short answer type covering whole syllabi.
  - (iii) The students are required to attempt **one** question from each Section and the entire Compulsory question.
  - (iv) All questions carry equal marks, unless specified.

#### SECTION-A

1. Concepts of Object Oriented Programming : Object, Class, and Encapsulation. Data hiding, Inheritance, Polymorphism. Analysis and design of system using object oriented approach.  
(No. of Periods : 10)
2. Structure of a C++ Program : Include files, Declaration of an object, main function, and I/O streams.  
(No. of Periods : 05)
3. Classes and Objects Class Declaration : Data Members, Member Functions, Private and Public members, Data hiding and encapsulation, Arrays within a class.  
Class Function Definition: Member Function definition inside the class declaration and outside the class declaration, friend function, inline function, static function,  
(No. of Periods : 10)

#### SECTION-B

4. Scope resolution operator, Private and Public member function, Nesting of member functions.  
Creating Objects, Accessing class data members, Accessing member functions, Arrays of Objects, Objects as function arguments : Pass by value, Pass by reference, Pointers to Objects.  
(No. of Periods : 15)
5. Constructors and Destructors : Declaration and Definition, Default Constructors, Parameterized Constructors, Copy Constructors. Destructors: Definition and use.  
(No. of Periods : 10)

#### SECTION-C

6. Function Overloading & Operator Overloading.  
(No. of Periods : 10)

7. Inheritance - Extending Classes Concept of inheritance, Base class, Derived class, Defining derived classes, Visibility modes : Private, public, protected; Single inheritance : Privately derived, Publicly derived; Making a protected member inheritable, Access Control to private and protected members by member functions of a derived class, Multilevel inheritance, Nesting of classes.

(No. of Periods : 15)

#### SECTION-D

8. Polymorphism : Definition, early Binding, Polymorphism with pointers, Virtual Functions, late binding, pure virtual functions.

(No. of Periods : 10)

9. File Processing : Opening and closing of file, stream state member functions, Binary file operations, structures and file operations, classes and file operations, Random file processing.

(No. of Periods : 15)

#### *References :*

1. Bjarna Stroustrup, 2009 : The C++ Programming Language, Addison-Wesley Publishing Company.
2. Robert Lafore, 2003 : Object Oriented Programming in Turbo C++, Galgotia Pub.
3. E. Balaguruswamy, 2008 : Object Oriented Programming with C++, TMH.
4. Salaria, R. S. : Object Oriented Programming Using C++, Khanna Book Publishing Co. (P.) Ltd., New Delhi.

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Paper Code	:	BCA-14	
Paper Title	:	Unix Operating System	
Theory Marks	:	90	Number of Lectures : 100 (45 minutes duration)

**Objectives :** Work comfortably in the UNIX environment, Edit and manage files and user-level security for UNIX development, - Use standard UNIX development tools for C or C++.

- Note :*
- (i) The syllabus of this paper has been divided into four sections.
  - (ii) Examiner will set total **nine** questions comprising **two** questions from each Section and **one** compulsory question of short answer type covering whole syllabi.
  - (iii) The students are required to attempt **one** question from each Section and the entire Compulsory question.
  - (iv) All questions carry equal marks, unless specified.

#### SECTION-A

1. Introduction to Operating Systems, its needs and services, Simple batch Systems, Multi-programmed batched systems, Time sharing systems, Parallel systems, Distributed systems and Real-time systems.  
(No. of Periods : 15)
2. Overview of UNIX : History, Features of UNIX, Comparison between UNIX and Windows.  
(No. of Periods : 05)
3. Structure of UNIX Kernel, Shell, Command execution.  
(No. of Periods : 05)

#### SECTION-B

4. UNIX directory system.  
UNIX Commands : User Access and User ID Commands, Directory commands, Editors Commands, File Manipulation Commands, Security and Protection Commands, Inter-User and Inter-Machine Communication, Process Management Commands I/O Redirection and Piping Commands, Shell Commands and Shell Programming, System Administration Commands, Vi editor, File Handling commands, and grep.  
(No. of Periods : 25)

#### SECTION-C

5. Administering UNIX Systems : Introduction to System Administration, Functional activities of System Administration - Starting up the system, Maintaining the Super User Login, Shutting down the system, recovering from system crash, Taking backups, Managing disk space, Mounting and Un-mounting file system, Adding and removing users, Changing groups and password, Maintaining security, Monitoring system activity, Accounting of system usage and billing, Setting up remote communication, Installing printers and peripheral devices.  
(No. of Periods : 25)

**SECTION-D**

6. Shell Programming : Executing a shell program, Study of shell programming as a Language; Wild card characters, Type of statements and Reserved Words, Special Shell parameters.  
(No. of Periods : 10)
7. The AWK pattern scanning and processing language.  
(No. of Periods : 05)
8. UNIX and Networking : Setting up of DNS, Mail, WWW servers under UNIX.  
(No. of Periods : 10)

*References :*

1. Srengan, K., 1999. : Understanding UNIX, Prentice-Hall of India.
2. Kernighan, B.W. & Rob Pike, 1997. : The UNIX Programming Environment, Prentice-Hall of India.

Paper Code : BCA-15  
Paper Title : Computer Lab.-1 : Based on BCA-12 and BCA-14  
Theory Marks : 90

Paper Code : BCA-16  
Paper Title : Computer Lab.-2 : Based on BCA-13 and BCA-25  
Theory Marks : 90

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**SYLLABI AND COURSES OF READING FOR BACHELOR OF COMPUTER APPLICATIONS  
FOR THE EXAMINATION OF 2013**

**THIRD YEAR**

Paper Code	:	BCA-17	
Paper Title	:	Enterpreneurship Development Programme	
Theory Marks	:	90	Number of Lectures : 100 (45 minutes duration)

**Objectives** : EDPs aim at training various target groups in entrepreneurial traits so that they obtain adequate information, motivation and guidance in setting up their own enterprises. In order to maintain a homogeneous nature of participating groups, EDPs focus on rural entrepreneurs, women, SC/ST, minority communities etc.

- Note* :
- (i) The syllabus of this paper has been divided into four sections.
  - (ii) Examiner will set total *nine* questions comprising *two* questions from each Section and *one* compulsory question of short answer type covering whole syllabi.
  - (iii) The students are required to attempt *one* question from each Section and the entire Compulsory question.
  - (iv) All questions carry equal marks, unless specified.

**SECTION-A**

1. Project Formulation : Need, Scope and approaches for project formulation; structure of project report; study and analysis of sample project report; preparation of a project report; Techno-economic feasibility of the project.  
(No. of Periods : 25)

**SECTION-B**

2. Finance & Accounting : Working capital assessment, its management & exercise thereon; Assessment of fixed capital and exercise thereon; Capital budgeting; Product costing and cost consciousness. Financial ratios and their significance; Break-even analysis; Credit institutions and financing procedures; Books of accounts, financial statements & fund flow analysis.  
(No. of Periods : 25)

**SECTION-C**

3. Managing the Enterprise : Resource management – men, material, money and machines; Personnel management, Office management.  
(No. of Periods : 25)

**SECTION-D**

4. Rules & Regulations : Licensing and Registration procedure; Appreciation of important provisions of Factory Act, Shops & Commercial Establishment Act; Sales of Goods Act, Partnership Act; Contract Act; Income Tax, Sales Tax and Excise rules; Insurance.  
(No. of Periods : 25)

*References :*

1. Sinha, A.K, 1983. : Project Engineering & Management, Vikas Publishing House Pvt. Ltd., 1983.
2. Srivastava, U. K., 1981 : Project Planning, Financing, Implementation & Evaluation, Indian Institute of Management, Ahmedabad,1981.
3. Kuchhal, S. C., 1982 : Financial Management - An Analytical and Conceptual Approach, Chaitanya Pub. House, 1982.
4. Mohan, 1982 : Principles of Management Accounting, Mohan & Goyal, Agra Sahitya Bhavan, 1982.
5. Saroja, 1979 : Management of Small Scale Industries, Seth Publishers, Bombay, 1979.
6. Vepa Ram K., 1984 : How to Succeed in Small Industry, Vikas Publishing House, New Delhi, 1984.
7. Bare Acts : Central Sales Tax Act, State Sales Tax Act, Central Excise Act and Customs Act.
8. Bhagwati Prasad, 1972 : Law and Practice of Income Tax in India, Navman Prakashan.
9. Gulshan, S. S., 1979 : A Text Book of Commercial Law, S. Chand & Co.
10. Gupta, B. P., 1986 : Industrial Relations, (PHD Chamber of Commerce & Inds.).

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Paper Code : BCA-18

Paper Title : Data Communication & Networks

Theory Marks : 90

Number of Lectures : 100  
(45 minutes duration)

**Objectives :** As part of this course, students will be introduced to computer networks and data communication paradigms, about network models and standards, network protocols and their use, wireless technologies.

- Note :*
- (i) The syllabus of this paper has been divided into four sections.
  - (ii) Examiner will set total **nine** questions comprising **two** questions from each Section and **one** compulsory question of short answer type covering whole syllabi.
  - (iii) The students are required to attempt **one** question from each Section and the entire Compulsory question.
  - (iv) All questions carry equal marks, unless specified.

#### SECTION-A

1. Introduction : Network definition, Network Hardware and Software, Network Topologies, Uses of Computer Networks, OSI reference model, TCP/IP Reference Model. Comparison of OSI & TCP/IP reference model.
2. Physical Layer : Transmission Media, Switching, ISDN & its service. Multiplexing, Modems.  
(No. of Periods : 25)

#### SECTION-B

3. Data Link Layer : Design Issue, Error Detection & Correction Codes, Elementary Data Link Protocols, Static & Dynamic Channel Allocation, Introduction to IEEE standards, Sliding Window Protocol.  
(No. of Periods : 25)

#### SECTION-C

4. Network Layer : Design issues, Routing Algorithms, Shortest path routing, Flooding, Broadcast & Multicast routing congestion, Control & internetworking.  
(No. of Periods : 25)

#### SECTION-D

5. Application Layer : Network Security & Privacy, Data Compression & Cryptography. Electronic Mail, The WWW, Multimedia, Audio, Video, Remote Login, File Transfer.  
(No. of Periods : 25)



*References :*

1. Tannenbaum, A.S., 2003 : Computer Networks, Prentice Hall.
2. Stallings, William, 2008 : Local and Metropolis Area Networks : An Introduction, Macmillan Publishing Co.
3. Black : Data Network, Prentice Hall of India.

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Paper Code	:	BCA-19	
Paper Title	:	Computer Graphics and Multimedia Applications	
Theory Marks	:	90	Number of Lectures : 100 (45 minutes duration)

**Objectives :**

- To study the graphics techniques and algorithms.
- To study the multimedia concepts and various I/O technologies.
- To enable the students to develop their creativity.

- Note :*
- (i) The syllabus of this paper has been divided into four sections.
  - (ii) Examiner will set total **nine** questions comprising **two** questions from each Section and **one** compulsory question of short answer type covering whole syllabi.
  - (iii) The students are required to attempt **one** question from each Section and the entire Compulsory question.
  - (iv) All questions carry equal marks, unless specified.

**SECTION-A****Computer Graphics :**

1. A Survey of Computer Graphics :  
Computer Aided Design, Presentation Graphics, Computer art, Entertainment, Education and Training, Visualization, Image Pressing, Graphical User Interfaces.  
(No. of Periods : 15)
2. Overview of Graphics Systems :  
Video Display Devices, Raster Scan Systems, Random Scan Systems. Graphics Monitors and Workstations, Input Devices, Hard-copy devices, Graphics Software.  
(No. of Periods : 10)

**SECTION-B**

3. Studying the Features and Developing Computer Graphics Using Standard Graphics packages like Auto CAD and Paint Brush.  
(No. of Periods : 10)
4. Developing Computer Graphics Using 'C' : Input-output primitives, Setting character and text attributes, Changing line styles, Using fill styles to fill images.  
Use the above primitives to develop programs like drawing concentric circles, Ellipses, Sine curves, Histograms, Pie charts and human face.  
(No. of Periods : 15)

**SECTION-C****Multimedia Applications :**

5. Multimedia in use Introducing multimedia, What is multimedia ? using multimedia.

6. Technology System Components, Multimedia Platforms, Development Tools, Image, Audio, Video, Storage for multimedia, Communications.  
(No. of Periods : 25)

#### SECTION-D

7. Applications :  
Multimedia in the Real World, Training and Education, Image Processing.
8. Studying features and use of Multimedia Image Processing authoring tools like photoshop, Macromedia Director.  
(No. of Periods : 25)

#### *References :*

1. Hearn and Backe, 1997 : Computer Graphics, Second Edition, PHI, New Delhi.
2. Kanetkar Yashwant, 2003 : Graphics Under 'C', BPB Publications.
3. Judith Jeffcoate, 2007 : Multimedia in Practice, Technology and Applications, PHI.
4. Foley, Vandom, Fenier, Hughes, 1996 : Computer Graphics, Principles and Practice, IV Edition in 'C'; Addison Wesley Publishers.
5. Ian R. Sinclair, 1994 : Multimedia on the PC (with CDROM), BPB Publications.
6. Hillman, David, 1998 : Multimedia Technology and Applications, ITP.
7. Vaughan, Tay, 2008 : Multimedia Making it Work, Osborne Publishers.
8. Kelly & Bootle, 1989 : Turbo 'C', BPB Publications.

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Paper Code : BCA-20

Paper Title : Internet Programming

Theory Marks : 90

Number of Lectures : 100  
(45 minutes duration)

**Objectives :**

- To describe basic Internet Protocols.
- Explain JAVA and HTML tools for Internet programming.
- Describe scripting languages – Java Script.
- Explain dynamic HTML programming.
- Explain Server Side Programming tools.

- Note :*
- (i) The syllabus of this paper has been divided into four sections.
  - (ii) Examiner will set total **nine** questions comprising **two** questions from each Section and **one** compulsory question of short answer type covering whole syllabi.
  - (iii) The students are required to attempt **one** question from each Section and the entire Compulsory question.
  - (iv) All questions carry equal marks, unless specified.

**SECTION-A**

1. HTML : Introduction to HTML, Building blocks of HTML, lists, links, images, tables, frames, layers forms, Introduction to cascading style sheets (CSS) defining and applying CSS.
2. Java Script : Features, tokens, data types, variables, operations, control structs strings arrays, functions, core language objects, client side objects, event handling. Applications related to client side form validation.

(No. of Periods : 25)

**SECTION-B**

3. Fundamentals of Java : Java Vs. C++, Byte lode, Java virtual machine, constants, variables, data types, operators, expressions, control structures, defining class, creating objects, accessing class members, constructions, method overloading.

(No. of Periods : 25)

**SECTION-C**

4. Inheritance : Basics, member access, using super to call super class constructors, creating a multi level hierarchy, method overriding, dynamic method dispatch, using abstract classes, using Final.
5. Packages and Interfaces : Defining a package, understanding CLASSPATH, Access protection : Importing packages, Interfaces, Defining an Interface, Implementing. Interfaces, Applying, Interfaces, Variables in Interfaces.

6. Exception Handling : Fundamentals, Exception types, Using Try and Catch, Multiple Try and Catch clauses, Nested Try statements, Built-in exceptions.

(No. of Periods : 25)

#### SECTION-D

7. Multi-threaded Programming : The Java Thread model, Thread priorities, Synchronizations, Messaging. The thread class and run able interface, The Main Thread : Creating a Thread, Implementing Run able, Extending Thread, Creating Multiple Threads, Thread Priorities; Synchronizations : Methods, Statements, Inter Thread Communication, Deadlock, Suspending, Resuming and Stopping Threads.
8. I/O Applets : I/O Basics : Streams, The predefined streams; Reading console I/P, Writing console O/P. The print writer class; Reading and Writing files, Applet fundamentals, Using AWT controls, Layout Managers and Menus, String handling and event handling.

(No. of Periods : 25)

#### *References :*

1. Phillips LEE and Darmell : Computer Graphics, Second Edition, PHI, New Delhi.  
Rick
2. Daniel Dang, 2010 : An Introduction to Java Programming, PHI, New Delhi.
3. Balaguruswamy, E., 1998 : Programming with Java, A Primer, TMH, New Delhi.
4. Wanger & Wyke, 2000 : Java Script Unleashed, Techmedia, New Delhi, 2000.

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Paper Code	:	BCA-27	
Paper Title	:	Discrete Mathematics	
Theory Marks	:	90	Number of Lectures : 100 (45 minutes duration)

**Objectives :** This is first mathematics subject. Student will learn and revise his knowledge acquired previously. Logic, Relations and Functions, Algebraic Functions and Graph Theory will be introduced in this course.

- Note :*
- The syllabus of this paper has been divided into four sections.
  - Examiner will set total *nine* questions comprising *two* questions from each Section and *one* compulsory question of short answer type covering whole syllabi.
  - The students are required to attempt *one* question from each Section and the entire Compulsory question.
  - All questions carry equal marks, unless specified.

#### SECTION-A

- Set Theory : Relations and Functions : Set Notation and Description, subset, basic set operations, Venn Diagrams, laws of set theory, partitions of sets, min sets, duality principle, basic definitions of relations and functions, graphics of relations, properties of relations: injective, surjective and bijective functions, compositions.
- Recurrence : Recurrence Relations and Recursive Algorithms – Linear-Recurrence Relations with Constant Coefficients; Homogeneous Solutions : Particular Solution, Total Solution, Solution by the Method of Generating functions.

(No. of Periods : 25)

#### SECTION-B

- Graph Theory : Graph and planar graphs – Basic Terminology, Multi-graphs, Weighted Graphs, Paths and Circuits, Shortest Paths, Eulerian Paths and Circuits. Travelling Salesman Problem, Planar Graphs.

(No. of Periods : 25)

#### SECTION-C

- Automata Theory : Finite State Machines–Equivalent Machines, Finite State Machines as language Recognizers; Analysis of Algorithms - Time Complexity, Complexity of Problems.
- Boolean Algebra : Lattices and Algebraic Structures; Duality. Distributive and Complemented Lattices, Boolean Lattices and Boolean Algebra.

(No. of Periods : 25)

#### SECTION-D

- Boolean Functions and Expressions, Propositional Calculus, Design and Implementation of Digital Networks, Switching Circuits.

(No. of Periods : 10)

7. Algebra of Logic : Proposition of logic operations, truth tables and propositions generated by set, equivalence and implication laws of logic, mathematical system, propositions over a universe, mathematical induction, quantifiers.

(No. of Periods : 15)

*References :*

1. Doerr, A. and Kenneth, L., : Applied Discrete Structures for Computer Science, 1989  
Galgotia Publications Pvt. Ltd.
2. Liu, C. L., 1985 : Elements of Discrete Mathematics, McGraw Hill.
3. Seymour Lipschutz and Lipson, : 2000 Solved Problems in Discrete Mathematics, McGraw-Hill.  
1992

**BCA : 21 PROJECT and SEMINAR**

Project and Seminar must be taken up from the real life problems. Marks for these are to be given on the basis of Programming Style, User friendly I/O, on-line help and documentation (user Manual). This work will carry 100 marks, (85 Marks for Project and Seminar Viva; and 15 Marks for Internal Assessment).

Paper Code : BCA-23  
Paper Title : Computer Lab.-1 : Based on BCA-19  
Theory Marks : 90

Paper Code : BCA-24  
Paper Title : Computer Lab.-2 : Based on BCA-20  
Theory Marks : 90

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***Published by : Professor A.K. Bhandari, Registrar, Panjab University, Chandigarh.***