



**Swami Vivekanand University, Sagar(M.P.)**



**As per model syllabus of U.G.C. New Delhi, drafted by  
Central Board of Studies and Approved by Higher  
Education and the Governor of M.P.**



**विज्ञान संकाय**

**Faculty of Science**

**Syllabus & Prescribed Books**

**Subject – Computer Science**

**B.Sc. Yearly Examination**

**2017-20**

**I, II & III Year**

**कुलसचिव**

**स्वामी विवेकानंद विश्वविद्यालय, सिरोंजा सागर (म.प्र.)**



# Swami Vivekanand University, Sagar(M.P.)



Department of Higher Education, Government of Madhya Pradesh

Yearly Syllabus for Undergraduates

As recommended by Central Board of studies of computer science and

Approved by H E the Governor of M.P.

Session 2017-18

कक्षा बी.एस.सी. कम्प्यूटर विज्ञान नियमित छात्रों हेतु

प्रथम वर्ष	आन्तरिक		योग	सैद्धांतिक	योग	प्रायोगिक	कुल योग
	Three Months	Six Months					
Fundamentals of Computers	10	10	20	40	80	50	150
Programming in C				40			
द्वितीय वर्ष							
Object Oriented Programming Concept using C++	10	10	20	40	80	50	150
Data Structures				40			
तृतीय वर्ष							
Database Management System	10	10	20	40	80	50	150
Operating system Concepts				40			
कुल योग							450

Remark : (i) Each theory paper will contain five objective type question of 1 mark and

(ii) Two short answer type question of 2.5 marks and

(iii) Five long answer type question of 6 marks , with internal choice in (ii) and (iii)



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बी.एस.सी. प्रथम कम्प्यूटर विज्ञान

प्रथम प्रश्न पत्र

फंडामेंटल ऑफ कम्प्यूटर्स

### **इकाई प्रथम**

कम्प्यूटर का ब्लॉक डायग्राम : इनपुट इकाई, आउटपुट इकाई, सी.पी.यू. मेमोरी यूनिट, कम्प्यूटर के चरण, कम्प्यूटर के प्रकार : डेस्कटॉप, लेपटॉप, पॉमटाप, वर्कस्टेशन्स एवं सुपर कम्प्यूटर, सभी प्रकार की इनपुट एवं आउटपुट डिवाइस, हार्डवेयर, साफ्टवेयर एवं फर्मवेयर की अवधारणा

विन्डोज : विन्डोज के गुणधर्म – डेस्कटॉप, स्टार्ट मेन्यू, कन्ट्रोल पेनल, माय कम्प्यूटर, विन्डोज एक्सप्लोरर, एसेसरीज, मैनेजिंग मल्टीपल विन्डोज, डेस्कटॉप में आईकोन व्यवस्थित करना, फोल्डर को बनाना एवं व्यवस्थित करना, फाईल एवं ड्राईव को व्यवस्थित करना, लॉगिंग ऑफ एवं विन्डोज शटडाउन

### **इकाई द्वितीय**

वर्ड : वर्ड प्रोसेसिंग क्या है, एम.एस. वर्ड में डाक्यूमेन्ट बनाना, एम.एस. वर्ड के फॉर्मेटिंग फीचर्स, स्टेण्डर्ड टूलबार, ड्राईंग टूलबार, टेबल्स एवं अन्य फीचर्स, मेलमर्ज, फाईल्स का इन्सर्शन, पिक्चर, क्लिप बोर्ड, ग्राफ, प्रिंट फॉर्मेटिंग, पेज नम्बरिंग एवं प्रिंटिंग डाक्यूमेन्ट्स।

एक्सेल : वर्कशीट एवं एक्सेल का परिचय, वर्कशीट में जानकारी को प्रविष्ट करना, नंबरर्स, फार्मूला इत्यादि। वर्कबुक को सेव करना, एडिटिंग सेल्स, कमाण्ड एवं फंक्शन का उपयोग, मूविंग एवं कापिंग, रोज एवं कालम्स को इन्सर्ट एवं डीलिट करना, चार्ट बनाना, पेज सेटअप : मार्जिन, हेडर एवं फुटर को प्रिंटिंग से पहले जोड़ना, वर्कशीट का प्रिंट प्रिव्यू, प्रिंटआउट से ग्रिडलाईन अलग करना, टाईटल रो को प्रिन्ट करना।

### **इकाई तृतीय**

संख्या पद्धति डेसिमल, वायनरी, ऑक्टेल, हेक्साडेसिमल, संख्या पद्धति में एक आधार से दूसरे आधार में परिवर्तन करना।



कोड्स : ASCII कोड, EBCDIC कोड, ग्रे कोड, बूलियन एल्जेब्रा, डी मार्गन प्रमेय, वायनरी एर्थमेटिक : एडीशन, सब्सट्रैक्शन, मल्टीप्लीकेशन एवं डिवीजन, अनसाईन्ड बायनरी संख्याओं, साईन्ड मेग्नीट्यूड संख्यायें, संख्याओं का  $1^s$  काम्प्लीमेन्ट एवं  $2^s$  काम्प्लीमेन्ट में प्रदर्शन,  $2^s$  काम्प्लीमेन्ट अर्थमेटिक, बूलियन फण्शन एवं सत्यता सारणी, SOP, POS From minterms / maxterms, बूलियन एलजेब्रा एवं karnaugh map के उपयोग से लाजिक सर्किट का सरलीकरण करना।

Logic Gates : AND, OR, NOT, NAND, NOR, X-OR एवं X-NOR gates व उनके चिन्ह एवं truth tables, gates से सर्किट डिजाइन : एडर/सबट्रैक्टर।

## इकाई – चतुर्थ

मेमोरी सेल, प्राईमरी मेमोरी : RAM, स्टेटिक एवं डायनामिक RAM, ROM, PROM, EPROM, EEPROM Cache मेमोरी, सेकेण्ड्री मेमोरी एवं उनके प्रकार, वर्चुअल मेमोरी की संधारणा, मेमोरी एक्सेसिंग मेथर्ड : सीरियल एवं रेन्डस एक्सेस।

डेटाबस, कन्ट्रोल बस एवं एड्रेस बस, कम्प्यूटर की वर्ड लेन्थ, एक सीपीयू की मेमोरी एड्रेसिंग क्षमता, एक कम्प्यूटर की प्रोसेसिंग स्पीड, माईक्रो प्रोसेसर, सिंगलचिप माईक्रो कम्प्यूटर (माईक्रो कन्ट्रोलर)

## इकाई – पंचम

सीपीयू की सामान्य संरचना, इन्सट्रक्शन फार्मेट एवं डेटा ट्रान्सफर इन्सट्रक्शन, डेटा मेनीप्यूलेशन

इन्सट्रक्शन्स एवं प्रोग्राम कन्ट्रोल इन्सट्रक्शन। प्रोसेसर के प्रकार : अक्यूम्लेटर आधारित मशीन, स्टेक आधारित मशीन एवं जनरल परपज रजिस्टर आधारित मशीन। एड्रेसिंग मोड्स।

डाटा ट्रान्सफर स्कीन्स : (1) प्रोग्राम्स डाटा ट्रान्सफर : synchronous, asynchronous एवं interrupt driven data transfer : (2) Direct memory access Data transfer : Cycle stealing block transfer and burst mode of data transfer.



**Text Book**

1. Digital logic and computer Design by Malvino leach
2. Computer System Architecture by M Morris Mano
3. PC Software for Windows by R.K. Taxali
4. Fundamentals of Computers by P.K. Sinha
5. Computer Organization and Architecture by Stallings.
6. Computer today by Suresh K. Basandra
7. Computers Fundamentals and Architecture by B. Ram

**Suggested list of practical in MS – Word & Excel :**

1. Create a banner of college using MS – Word
2. Design a greeting card using WORD ART
3. Create your biodata and use page borders and shading in MS-Word.
4. Create a document, insert header, footer, page title, page number using MS-Word
5. Implement Mail-Merge
6. Insert table in MS-Word document
7. Create a marksheet using MS-Excel
8. Creation and Printing of types of graphs in Excel
9. Built-in functions in Excel
10. Create Faculty Time table



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द्वितीय प्रश्न पत्र

प्रोग्रामिंग इन सी

## इकाई प्रथम

प्रोग्राम लेग्वेज का वर्गीकरण : प्रोसीजरल लेग्वेज, प्रोवलम ओरियन्टेड लेग्वेज, नान प्रोसीजरल लेग्वेज। स्ट्रेक्चर्स प्रोग्रामिंग की अवधारणा – माड्यूलर प्रोग्राम : टाप डाऊन विश्लेषण, बॉटम अप विश्लेषण स्ट्रेक्चर प्रोग्रामिंग। कम्प्यूटर के द्वारा प्रोवलम को हल करना – प्रोवलम की परिभाषा एवं विश्लेषण, प्रोवलम डिजाईन, कोडिंग, कम्पाईलेशन, डीबगिंग एवं टेस्टिंग, डाक्यूमेन्टेशन, इम्प्लीमेन्टेशन एवं प्रोवलम डिजाईन, कोडिंग, कम्पाईलेशन, डीबगिंग एवं टेस्टिंग, डाक्यूमेन्टेशन, इम्प्लीमेन्टेशन एवं रखरखाव।

## इकाई द्वितीय

सी लेग्वेज का परिचय – कान्सटेन्ट, वेरियेबल्स, कीवर्ड्स, डाटा टाईप्स, ऑपरेटर्स एक्सप्रेसन्स, ऑपरेटर प्रेसीडेन्स एवं एसोसिएटिविटी। सी प्रोग्राम का प्रारूप – वेरिवल को परिभाषित करना एवं वेरिवल को स्थिरांक के रूप में परिभाषित करना।

## इकाई तृतीय

इनपुट आउटपुट आपरेटर्स का रखरखाव – फार्मेटेड एवं अन फार्मेटेड, कन्ट्रोल स्टेटमेन्ट्स, ब्रान्चिंग, जम्पिंग एवं लूपिंग, स्कोप के नियम, स्टोरेज क्लास।

## इकाई – चतुर्थ

एरै (सिंगल एवं डबल डार्ईमेन्शनल), फंक्शन – यूजा द्वारा परिभाषित फंक्शन, स्टैन्डर्ड फंक्शन, फंक्शन के प्रकार। फंक्शन में अरग्यूमेन्ट पास करना, रिकर्शन, पाईन्टर : आपरेटर्स डिक्लेरेशन, पाईन्टर अर्थमैटिक, एरै आफ पाईन्टर। स्ट्रेक्चर्स –डिक्लरिंग, एक्सेसिंग, इनिशियललाईजिंग, एरै आफ स्ट्रेक्चर्स।



इकाई – पंचम

सी में फाईल हेण्डलिंग : डाटा फाईल को ओपन एवं क्लोज करना, डाटा फाईल में डाटा प्रविष्ट करना, ग्राफिक्स प्रोग्रामिंग – परिचय, फंक्शन्स, स्टायलिस लाईन्स, ड्राइंग एवं फिलिंग इमेजस, पैलेट्स एवं कलर, जस्टीफाईंग टेक्स, बिट आफ एनीमेशन।

**Text Books –**

Let us C by YashwantKanetkar IV Edition

ANSI C by E. Balagurusamy

Programming in C by S.S. Bhatia

**Reference Books –**

How to design Programs –An Introduction to programming and computing – Felleisen, et, al.  
PHI Publication

Introduction to Algorithms by Cormen. PHI

Programming in C : Denis Ritchie

**Suggested list of programs for practical**

1. Write a program to print digits of entered number in reverse order.
2. Write a program to print sum of two matrices.
3. Write a program to print subtraction of two matrices.
4. Write a program to print multiplication of two matrices
5. Write a program to demonstrate concept of structure.
6. Write a program for finding the root of a Quadratic Equation.
7. Write a program for Mark sheet.
8. Write a programme for finding the sum of given matrices of order m x n
9. Write a programme for finding the multiplication of given matrices of order m x n
10. Write a program to generate even/odd series from 1 to 100.
11. Write a program to find area of a circle, rectangle, square using case.
12. Write a program to check whether a given number is even or odd.
13. Write a program whether a given number is prime or not.
14. Write a program for call by value and call by reference.
15. Write a recursive program to calculate factorial of a given number.
16. Write a program to generate a series  
 $1+1/1!+2/2!+3/3!+-----+n/n!$



17. Write a program to create a pyramid structure

```
*  
**  
***  
****
```

18. Write a program to create a pyramid structure

```
1  
12  
123  
1234
```

19. Write a program to create a pyramid structure

```
1  
22  
333  
4444
```

20. Write a program to reverse a string.

21. Write a program to find whether a given string is PALINDROME or not.

22. Write a program to input 10 numbers add it and find it's average.

23. Write a program to generate series

$1+1/2!+1/3!+-----+1/n!$

24. WAP to print table of any number.

25. WAP to print Fibonacci series.

26. WAP to find length of string without using function.

27. WAP to perform all arithmetic operations using case statement.

28. WAP to check entered number is Armstrong or not.





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ऑब्जेक्ट ओरियन्टेड प्रोग्रामिंग कन्सेप्ट यूजिंग C++

## इकाई प्रथम

C++ का परिचय : प्रोग्रामिंग पैराडिग, ऑब्जेक्ट ओरियन्टेड प्रोग्रामिंग के मूल अवधारणा, ऑब्जेक्ट ओरियन्टेड प्रोग्रामिंग के लाभ। C++ में इनपुट एवं आउटपुट : प्री डिफाईन्ड स्ट्रीम, अन फार्मेटेड कन्सोल इनपुट/आउटपुट संक्रियाएँ, फार्मेटेड कन्सोल इनपुट/आउटपुट संक्रियाएँ

## इकाई द्वितीय

C++ के डिक्लेरेशन्स : C++ प्रोग्राम के घटक, टोकन के प्रकार, कीवर्ड्स, आईडेन्टीफायर, डाटा टाईप्स, कान्सटेन्ट, आपरेटर, आपरेटर की प्राथमिकता, रिफ्रेंशिंग एवं डीरिफ्रेंशिंग आपरेटर्स, स्कोप एक्सेस आपरेटर। कन्ट्रोल स्ट्रक्चर : डिसिजन मेकिंग स्टेटमेन्ट, लूपिंग स्टेटमेन्ट।

## इकाई तृतीय

फंक्शन main(), फंक्शन के घटक, पासिंग आर्गुमेन्ट (वैल्यू, एड्रेस, रिफरेन्स), इन लाईन फंक्शन्स, फंक्शन ओवर लोडिंग (सावधानी, सिद्धांत), लायब्रेरी फंक्शन।

## इकाई – चतुर्थ

कन्सट्रक्टर्स एवं डिस्ट्रक्टर्स : गुणधर्म, अनुप्रयोग, कन्सट्रक्टर्स आर्गुमेन्ट के साथ, ओवर लोडिंग कन्सट्रक्टर, कन्सट्रक्टर के प्रकार।

आपरेटर ओवरलोडिंग : ओवरलोडिंग यूनरी आपरेटर, वायनरी आपरेटर।

इनहेरीटेन्स : एक्सेस स्पेसीफायर, पब्लिक इनहेरीटेन्स, प्राईवेट इनहेरीटेन्स, प्रोटेक्टेड डाटा प्राईवेट इनहेरीटेन्स के साथ, इनहेरीटेन्स के प्रकार (सिंगल, मल्टीपल, हिरारचिकल, मल्टीलेवल, हाईब्रिड, मल्टीपाथ) वर्चुअल वेस क्लास।



इकाई – पंचम

पाइन्टर एवं एरै : पाइन्टर डिक्लेरेशन पाइन्टर टू क्लास एवं आव्जेक्ट ।

एरै : डिक्लेरेशन एवं इनीसिलार्इजेशन, एरै आफ क्लासेस ।

पालीमोरफिंजग : स्टेटिक (अली) बाईडिंग, डायनामिक (लेट) बाईडिंग, वर्चुअल फंक्शन, प्योर वर्चुअल फंक्शन ।

**Text Books :**

Object – Oriented Programming with ANSI & Turbo C++ Ashok N. Kamthane.

E. Balagurusamy : Object oriented Programming in C++

**Reference Books :**

Herbert Schildt : C++ the complete Reference – TMH publication.

Robert Lafore : Object Oriented Programming in C++.

**Suggested list of programs for practical**

1. Write a program to find average of 3 numbers.
2. Write a program to find biggest among 3 numbers.
3. Write a menu driven program (Switch case) to perform arithmetic operations.
4. Write a program to check whether entered number is prime or not.
5. Write a program to check whether entered number is even or odd.
6. Write a program for addition of two matrixes.
7. Write a program for multiplication of two matrixes.
8. Write a program to find transpose of a matrix
9. Write a program to print :

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10. Write a program to print :

1

22

333

11. Write a program to print :

1

23

456

12. Write a program to check whether entered string is palindrome or not.

13. Write a program to print Fibonacci series.

14. Write a program to find factorial of a given number.

15. Write a program to demonstrate use of static data member.

16. Write a program to demonstrate use of a static member function.

17. Write a program to create array of objects.

18. Write a program to demonstrate use of friend function.

19. Write a program to illustrate use of copy constructor.

20. Write a program to demonstrate constructor overloading.

21. Write a program to illustrate use of destructor.

22. Write a program to overload a unary operator.

23. Write a program to overload a binary operator.

24. Write a program to demonstrate single Inheritance.

25. Write a program to demonstrate multiple Inheritance.

26. Write a program to demonstrate multi level Inheritance.

27. Write a program to demonstrate hierarchical Inheritance.

28. Write a program to demonstrate hybrid Inheritance.

29. Write a program to demonstrate the use of function overloading.

30. Write a program to demonstrate the use of inline member function.

31. Write a program to demonstrate the use of parameterized constructor.



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बी.एस.सी. द्वितीय कम्प्यूटर विज्ञान

द्वितीय प्रश्न पत्र

डाटा स्ट्रक्चर्स

## इकाई प्रथम

डाटा स्ट्रक्चर की अवधारणा एवं एल्गोरिथम, एब्स्ट्रेक्ट डाटा स्ट्रक्चर, स्टेक से परिचय एवं स्टेक पर प्राथमिक संक्रिया, स्टेक एक एब्स्ट्रेक्ट डाटा टाईप, स्टेक का अनुप्रयोग (infix, prefix, postfix & recursion) Queue से परिचय, Queue पर प्राथमिक संक्रिया, circular Queue, De Queue, Priority Queue & Queue के अनुप्रयोग।

## इकाई द्वितीय

linked list का परिचय, linked list पर प्राथमिक संक्रिया, linked list के प्रयोग से स्टेक एवं Queue का निर्माण, Doubly linked list एवं सरक्यूलर लिंक लिस्ट, लिंक लिस्ट का अनुप्रयोजन।

## इकाई तृतीय

Tree : प्राथमिक शब्दावली, बायनरी ट्री, ट्री को एरै एवं लिंकड लिस्ट में प्रदर्शित करना, बायनरी ट्री में प्राथमिक संक्रियाएँ, बायनरी ट्री ट्रवर्सल : इनऑर्डर, प्रीऑर्डर, पोस्टऑर्डर, बायनरी ट्री के अनुप्रयोग, Threaded Binary Tree, AVL Tree, ट्री का बायनरी ट्री के रूप में प्रदर्शन।

## इकाई – चतुर्थ

सीक्वेन्शियल सर्च, वार्डनरी सर्च, इन्सर्शन सार्ट, सिलेक्शन सार्ट, क्विकसार्ट, बबल सार्ट, हीप सार्ट, सॉर्टिंग विधियों में तुलना।



**इकाई – पंचम**

हेश टेबल, कॉलीजन रिसाल्यूशन तकनीक, ग्राफ का परिचय, परिभाषा, शब्दावली, डायरेक्टेड, अनडायरेक्टेड एवं वेटेडग्राफ, ग्राफ का प्रस्तुतीकरण, ग्राफ ट्रवर्सल – डेप्थ फर्स्ट, ब्रेडथ फर्स्ट सर्च, स्पेनिंग ट्री, न्यूनतम स्पेनिंग ट्री, सार्टेस्ट पाथ एलगोरिथम।

**Text Books –**

Data Structure through C (A Practical Approach) G.S. Baluja

Data Structure : By Lipschuists (Schaum's Outline Series)

Data Structure : By Trembley & Sorrenson

**Reference Books –**

Fundamental of Data Structure By S. Sawhney & E. Horowitz

**Suggested list of Programs for practical**

1. Write a program to find the factorial of a given no using recursion.
2. Write a program for bubble sorting.
3. Write a program for linear search.
4. Write a program for binary search.
5. Write a program for selection sorting
6. Write a program for quick sorting
7. Write a program for insertion sorting.
8. Write a program to print Fibonacci series using recursion.
9. Write a program to perform insertion and deletion operation in the stack.
10. Write a program to perform insertion and deletion operation in the queue using static implementation.
11. Write a program to perform insertion and deletion operation in the queue using dynamic implementation.
12. Write a program to insert a node at the beginning in singly linked list.
13. Write a program to insert a node at the middle in singly linked list.
14. Write a program to insert a node at the last in singly linked list.



15. Write a program to delete a node from the beginning in singly linked list.
16. Write a program to delete a node from the middle in singly linked list.
17. Write a program to delete a node from the last in the singly linked list.
18. Write a program to traverse all the nodes in singly linked list.
19. Write a program to insert a node in the beginning in the circular linked list.
20. Write a program to insert a node at the last circular linked list.
21. Write a program to perform all the insertion operations in the singly linked list using switch case.
22. Write a program to perform all the deletion operations in the singly linked list using switch case.
23. Write a program to count the number of nodes in binary tree.
24. Write a program to evaluate postfix operation.
25. Write a program to convert infix operation to postfix operation.



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प्रथम प्रश्न पत्र

डाटाबेस मैनेजमेन्ट सिस्टम

### **इकाई प्रथम**

डाटाबेस सिस्टम का उद्देश्य, डाटा के व्यूह, डाटा मॉडल्स : रिलेशनल्स, नेटवर्क, हिराचिकल, इन्शटेन्सेस एवं स्कीमा, डाटा डिक्स्नरी, डाटावेज लेग्वेज के प्रकार : डीडीएल, डीएमएल, डीबीएमएस की संरचना, डीबीएमएस के लाभ एवं हानि, 3 स्तरीय आरकिटेक्चरल संरचना : एक्टनल, कन्सेक्चुअल एवं इन्टर्नल लेवल्स

### **इकाई द्वितीय**

एन्टिटी रिलेशनशिप मॉडल के कन्सेक्चुअल डिजाइन टूल्स के रूप में : एन्टिटी एवं एन्टीटी सेट, रिलेशनशिप एवं रिलेशनशिप सेट, एट्रीव्यूट एवं मेपिंग कन्शट्रेन्ट, कुन्जी, ईआर डायग्राम : स्ट्रॉंग एवं वीक एनट्रीस, जनरलाईजेशन, स्पेसिलाईजेशन एवं एग्रीकेशन, रिड्यूसिंग ईआर डायग्राम टू टेबल्स

### **इकाई तृतीय**

सेट थ्योरेटिक नोटेशन के मूलरूप सिद्धांत : रिलेशन, डोमेन्स, एट्रीव्यूट्स, ट्यूपल्स, कुन्जी की अवधारणा – प्राईमरी कुन्जी, सुपर कुन्जी, आल्टर्नेट कुन्जी, केन्डीडेट कुन्जी, फारेन कुन्जी, समग्रता के मूलभूत नियम – एन्टीटी एवं रेफरेसियल समग्रता, एक्सटेंशन एवं इनटेंशन, रिलेशनल एलजेब्रा : सिलेक्ट, प्रोजेक्ट, कारटीशियन प्रोडक्ट, ज्वाइन के विभिन्न प्रकार : थीटा, इक्व्यू, नेचुरल, आउटर ज्वाइन्स, सेट ऑपरेशन।

### **इकाई – चतुर्थ**

फंक्शन डिपेन्डेंसी, गुड एवं बेड डिक्म्पोजिशन एवं डाटावेज एक एनार्मलाईस जैसा : बेड डिजाइन के प्रभाव, यूनीवर्सल रिलेशन, नार्मलाईजेशन : 1NF, 2NF, 3NF & BCNF नार्मल फार्म, मल्टीवेल्स डिपेन्डेन्सी, ज्वाइन डिपेन्डेन्सी, 4NF, 5NF



**इकाई – पंचम**

मूल अवधारणा : इनडेक्सिंग एवं हेसिंग, बी-ट्री इन्डेक्स फाईल, हेसिंग : स्टेटिक एवं डायनामिक हेस फलन, एसक्यूएल में इन्डेक्स की परिभाषा : मल्टीपल की एक्सेस।

**Text Books –**

Simplified approach to DBMS, Prateek Bhatia, Gurvinder Singh Kalyani Publication

Database System Concepts by Henry Korth and A. Silberschatz.

**Reference Books –**

An Introduction to Database system by Bipin Desai

An Introduction to Database System by C.J. Date.

**Suggested list of programs for practical**

Create the appropriate table and apply the following queries

1. WAQ to insert some new records in emp table.
2. WAQ to list the number of employees whose name is not 'ford', 'jams' or 'jones,
3. WAQ to list the name and salary and sort them in descending order of their salary
4. WAQ to list the details of employees whose name is starts from 'a'
5. WAQ to delete all records from emp table
6. WAQ to insert values in 3 fields.
7. WAQ to list the student name having 'd' as second character.
8. WAQ to list the name and salary and sort them in descending order of their salary
9. WAQ to list the name and salary and sort them in descending order of their salary.
10. WAQ in employee table find all the manager who earns between 1000 and 2000.
11. Display record of employee who have salary between 1000 and 2000.
12. List the name salary and department number of the employee and order them by their salary in descending order.
13. In employee table change the city of employee from existing one to new one.





14. Add a column salary of datatype 'number' & having size '5' with default value 1000.
15. WAQ to find the employee who earns the lowest salary in each department. Display in ascending order of salary.
16. List the employee who earns maximum salary in their department. Find the name of all employee who works for 'first bank corporation' . Display the record of employee whose name start with 's' & age is greater than 18.
17. Find the name, street & city of residence of all employee who works for 'fbc'
18. WAQ to update the salary of employee number 1902 to Rs. 10,000
19. WAQ to find the name. Street and city of all employee who works for 'fbc' and who earn more than 1000.
20. WAQ to increase the salary by 2000 and rename the column as "newsalary"
21. WAQ to find the name. street and city of all employee who works for 'fbc' and who earn more than 1000
22. WAQ to find total of salaries of all employees from emp table
23. WAQ to decrease the salary of emp from 5000 and rename column as 'new salary'
24. List the employee number of employee who belone to department 10,20
25. List the employee no of employees who earn greater than 2000.
26. Insert new field called category in emp table.
27. Display different jobs in departments 20, 30
28. List the names of employees having two 'aa' in the name
29. Print the name, emp no. sal of employees in emp table.
30. List the names of employees who do the job of clerks or salesman.



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द्वितीय प्रश्न पत्र

ऑपरेटिंग सिस्टम कन्सेप्ट्स

## इकाई प्रथम

आपरेटिंग सिस्टम : परिभाषा, इसके अवयव, आपरेटिंग सिस्टम की उत्पत्ति, इसके प्रकार : बैच, मल्टीप्रोग्रामिंग, मल्टीटास्किंग, मल्टी प्रोसेसर, रियल टाइम, क्लाइंट सर्वर, पियर टू पियर, डिस्ट्रीब्यूटेड, क्लस्टर, आपरेटिंग सिस्टम सर्विसेज, सिस्टम कॉल, I/O का प्रोटेक्शन, मेमोरी और सीपीयू।

## इकाई द्वितीय

प्रोसेस सेड्यूलिंग : प्रोसेस के सिद्धांत, प्रोसेस की अवस्था, पीसीबी, प्रोसेस लाइफ सायकल, आपरेशन आन प्रोसेस, कांटेक्स्ट स्विच, शेड्यूलर के प्रकार CPU burst – I/O burst cycles, dispatcher, scheduling criteria, scheduling algorithms – FCFS, SJF, STRN, Round Robin, priority, event driven, multilevel queue, निर्धारण माडलिंग के द्वारा एल्गोरिथम का मूल्यांकन।

## इकाई तृतीय

मेमोरी मैनेजमेन्ट : एड्रेस वाइडिंग, लाजिकल एवं फिजिकल एड्रेस स्पेस, डायनामिक लोडिंग और लिंकिंग। कन्टीन्यूअस मेमोरी एलोकेशन : स्टेटिक और डायनामिक पार्टिशन मेमोरी, फ्रेगमेंटेशन, स्वेपिंग रिलोकेशन, कम्पैक्शन, प्रोटेक्शन। नॉन कन्टीन्यूअस मेमोरी एलोकेशन : पेजिंग, सिग्मेन्टेशन। वर्चुअल मेमोरी : डिमांड पेजिंग, पेज फाल्ट, पेज रिप्लेशमेन्ट एल्गोरिथम्स – FIFO, LRU, Optimal. थ्रासिंग, पेज फाल्ट फ्रिक्वेन्सी।

## इकाई – चतुर्थ

इंटरप्रोसेस कम्यूनिकेशन : सिंक्रोनाइजेशन की आवश्यकता, डेडलॉक – परिभाषा, एवायडेंस, प्रिवेन्शन, डिटेक्शन और रिकवरी, डिस्क आर्गनाइजेशन, डायरेक्ट्री स्ट्रक्चर, डिस्क स्पेस मैनेजमेंट – कंटिग्यूस ओर नॉन कंटिग्यूस एलोकेशन स्ट्रेटजी, डिस्क एड्रेस ट्रांसलेशन, डिस्क कैचिंग, डिस्क सेड्यूलिंग एल्गोरिथम, डिवाइस मैनेजमेंट : डेडीकेटेड डिवाइस, शेयर डिवाइस, सिक्योरिटी और प्रोटेक्शन एक्सेस कंट्रोल।



**इकाई – पंचम**

Linux : Linux का इतिहास और विशेषताएँ Linux संरचना, Linux फाईल सिस्टम, हार्डवेयर आवश्यकता, Linux स्टेण्डर्ड डायरेक्ट्रीज, Linux kernel Linux की क्रिया विधि : KDE एवं Gnome, ग्राफिकल इंटरफेस, Linux में शेल के प्रकार, Vi एडीटर, Linux कमाण्ड्स, Linux में फाईल की सुरक्षा।

**TEXT BOOKS AND REFERENCE BOOKS**

1. Operating system concepts : By silberschatz, Galvin and Gagne.
2. Operating system Design and Concepts, by Milan Milenkovic
3. Operating system by Andrew Tanenbaum
4. Operating system by Peterson
5. Linux Bible by Christopher Negus
6. Linux by Sumitabh Das

**Suggested Practical**

Basic Linux Commands and vi editor.



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**Class : B.Sc (Computer Science) For Regular Student**

I Year				Theory	Total	Practical	Grand Total
	Three Months	Six Months	Total				
Fundamentals of Computers	10	10	20	40	80	50	150
Programming in C				40			
II Year							
Object Oriented Programming Concept using C++	10	10	20	40	80	50	150
Data Structures				40			
III Year							
Database Management System	10	10	20	40	80	50	150
Operating system Concepts				40			
<b>Grand Total</b>							<b>450</b>

Remark : (i) Each theory paper will contain five objective type question of 1 mark and

(ii) Two short answer type question of 2.5 marks and

(iii) Five long answer type question of 6 marks , with internal choice in (ii) and (iii)



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**B.Sc. I YEAR COMPUTER SCIENCE**

**PAPER 1 : FUNDAMENTALS OF COMPUTERS**

### **UNIT – I**

Block diagram of computer : input unit, output unit, CPU, memory unit, generations of computers, types of computers : desktop, palmtop, and workstations & super computers. All types of input and output devices. Hardware, software and firmware.

Windows : features of windows – desktop, start menu, control panel, my computer, windows explorer, accessories. Managing multiple windows, arranging icons on the desktop, creating and managing folders, managing files and drives, logging off and shutting down windows.

### **UNIT – II**

Word : What is word processing, creating documents in MS-Word, formatting features of MS-Word, standard toolbar, drawing toolbar, tables and other features. Mail-merge, insertion of files, pictures, clipboard, graphs, print formatting, page numbering and printing documents.

Excel – Introduction to workbook and worksheet. Entering information in a worksheet – numbers, formula, etc., saving a workbook, editing cells, using commands and functions, moving and copying, inserting and deleting rows and columns, creating charts. Page setup : margins, adding headers & footers before printing, print preview of worksheet, removing grid lines from printing the title rows.



### **UNIT – III**

Number system : decimal, binary, octal, hexadecimal, conversions from one base to another base. Codes : ASCII code, EBCDIC code, Gray code. Boolean algebra, de -morgan's theorem, binary arithmetic ; - addition, subtraction, multiplication & division, unsigned binary numbers, signed magnitude numbers, 1's complement & 2's complement representation of numbers, 2's complement arithmetic. Boolean functions & truth tables, SOP, POS form, minterms/maxterms, simplification of logic circuits using Boolean algebra and karnaugh maps. Logic gates : - AND, OR, NOT, NAND, NOR, X-OR and X-NOR gates, their symbols and truth tables, circuit design with gates : adder/sub tractor circuit.

### **UNIT – IV**

Memory cell, primary memory : RAM, static and dynamic RAM, ROM, PROM, EPROM, EEPROM, cache memory, secondary memory and its types, virtual memory concept, memory accessing methods : serial and random access. Data bus, control bus & address bus. Word length of a computer, memory addressing capability of a cpu, processing speed of a computer, microprocessors, single chip microcomputers (microcontrollers).

### **UNIT –V**

General architecture of a CPU, instruction format, and data transfer instructions, data manipulation instructions and program control instructions. Types of CPU organization : accumulator based machine, stack based machine and general – purpose register based machine, addressing modes, data transfer schemes : (i) programmed data transfer : synchronous, asynchronous and interrupt driver data transfer (ii) direct memory access data transfer : Cycle stealing block transfer and burst mode of data transfer.

#### **Text book :**

1. Digital logic and computer Design by Malvino leach.
2. Computer System Architecture by M Morris Mano
3. PC Software for Windows by R.K. Taxali
4. Fundamentals of computers by P.K. Sinha
5. Computer organization and Architecture by Stallings



6. Computer today by Suresh K. Basandra
7. Computer Fundamentals and Architecture by B.Ram.

**Suggested list of practical in MS-Word & Excel :**

1. Create a banner of college using MS-Word
2. Design a greeting card using WORD ART
3. Create your biodata and use page borders and shading in MS-Word
4. Create a document, insert header, footer, page title, page number using MS- Word
5. Implement Mail-merge
6. Insert table in MS-Word document.
7. Create a marksheet using MS-Excel
8. Creation and printing of types of graphs in Excel
9. Built –in functions in Excel
10. Create Faculty Time table



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**B.Sc. I YEAR COMPUTER SCIENCE**

**PAPER II : PROGRAMMING IN C**

**UNIT – I**

Classification of programming language : procedural languages, problem oriented languages, non-procedural languages. Structured programming concepts : modular programming : top-down analysis, bottom-up analysis, structured programming, Problem solving using computers : Problem definition and analysis, problem design, coding, compilation, debugging and testing, documentation, implementation and maintenance.

**UNIT – II**

Introduction to C language : Constants, variables, keywords, data types, operators, expressions, operator precedence and associativity. Structure of C program : variable declaration, declaration of variable as constant.

**UNIT –III**

Managing input/output operators : formatted and unformatted. Control statements : branching, jumping & looping, scope, rules, storage classes.

**UNIT –IV**

Arrays (one and two dimensional), Functions : user defined function, standard function, categories in functions, passing arguments to a function, recursion. Pointers : operators, declaration, pointer to arithmetic, array of pointers. Structures : declaring, accessing, initializing, array of structures.

**UNIT – V**

File handling in C : opening and closing a data file, inserting data to data file. Graphics programming – introduction, functions, stylish lines, drawing and filling images, palettes and colours, justifying text, bit of animation.





**Text Books –**

How to solve it by Computers by R.G. Dromy, PHI

Let us C By Yashwant Kanetkar

ANSI C By E. Balagurusamy

Programming in C by S.S. Bhatia

**Reference Books –**

How to design programs – An Introduction to programming and computing – Felleisen, et, al,  
PHI Publication Introduction to Algorithms by Cormen, PHI Programming in C : Denis Richie

**Suggested list of programs for practical**

1. Write a program to print digits of entered number in reverse order.
2. Write a program to print sum of two matrices.
3. Write a program to print subtraction of two matrices.
4. Write a program to print multiplication of two matrices
5. Write a program to demonstrate concept of structure.
6. Write a program for finding the root of a Quadratic Equation.
7. Write a program for Mark sheet.
8. Write a programme for finding the sum of given matrices of order m x n
9. Write a programme for finding the multiplication of given matrices of order m x n
10. Write a program to generate even/odd series from 1 to 100.
11. Write a program to find area of a circle, rectangle, square using case.
12. Write a program to check whether a given number is even or odd.
13. Write a program whether a given number is prime or not.
14. Write a program for call by value and call by reference.
15. Write a recursive program to calculate factorial of a given number.
16. Write a program to generate a series  
 $1+1/1!+2/2!+3/3!+-----+n/n!$
17. Write a program to create a pyramid structure

```
*  
**  
***  
****
```



18. Write a program to create a pyramid structure

```
1
12
123
1234
```

19. Write a program to create a pyramid structure

```
1
22
333
4444
```

20. Write a program to reverse a string.

21. Write a program to find whether a given string is PALINDROME or not.

22. Write a program to input 10 numbers add it and find it's average.

23. Write a program to generate series

$1+1/2!+1/3!+-----+1/n!$

24. WAP to print table of any number.

25. WAP to print Fibonacci series.

26. WAP to find length of string without using function.

27. WAP to perform all arithmetic operations using case statement.

28. WAP to check entered number is Armstrong or not.



**Swami Vivekanand University, Sagar(M.P.)**



**Department of Higher Education, Government of Madhya Pradesh**

**Yearly Syllabus for Undergraduates**

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**Session 2017-18**

**B.Sc. II YEAR COMPUTER SCIENCE**

**PAPER I : OBJECT ORIENTED PROGRAMMING CONCEPTS USING C++**

**UNIT – I**

Introduction to C++ : programming paradigms, key concepts of object – oriented programming, advantage of Oop's. Input and output in C++ : Pre-defined streams, unformatted console I/O operations, formatted console I/O operations.

**UNIT – II**

C++ declarations : parts of C++ program, types of tokens, keywords, identifiers, data types, constants, operators, precedence of operators, referencing and dereferencing operators, scope access operator. Control structures : decision making statement, looping statement.

**UNIT – III**

Functions : main(), parts of function, passing arguments : value, address, reference, inline functions, function overloading : principles, precautions, library functions. Classes and objects : declaring classes and objects, accessing class member function outside the class, static member variables and functions, friend function, friend classes, overloading member functions.

**UNIT – IV**

Constructors and Destructors : Characteristics, applications, constructors with arguments, overloading constructors, types of constructors. Operators overloading : overloading unary operator, binary operator. Inheritance : access specifier : public inheritance, private inheritance, protected data with private inheritance, Types of inheritances : single, multiple, hierarchical, multilevel, hybrid, multipath, virtual base class.



UNIT –V

Pointers & arrays : Pointer declaration, pointer to class & object, Array : declarations & initialization, arrays of classes. Polymorphism : Static (Early) binding, Dynamic (Late) Binding, virtual function, pure virtual function.

**Text Books :**

Object – Oriented Programming with ANSI & Turbo C++ Ashok N. Kamthane.

E. Balagurusamy : Object oriented Programming in C++

**Reference Books :**

Herbert Schildt : C++ the complete Reference – TMH publication.

Robert Lafore : Object Oriented Programming in C++.

**Suggested list of programs for practical**

1. Write a program to find average of 3 numbers.
2. Write a program to find biggest among 3 numbers.
3. Write a menu driven program (Switch case) to perform arithmetic operations.
4. Write a program to check whether entered number is prime or not.
5. Write a program to check whether entered number is even or odd.
6. Write a program for addition of two matrixes.
7. Write a program for multiplication of two matrixes.
8. Write a program to find transpose of a matrix
9. Write a program to print :  
\*  
\*\*  
\*\*\*  
\*\*\*\*
10. Write a program to print :  
1  
22  
333



11. Write a program to print :

1

23

456

12. Write a program to check whether entered string is palindrome or not.

13. Write a program to print Fibonacci series.

14. Write a program to find factorial of a given number.

15. Write a program to demonstrate use of static data member.

16. Write a program to demonstrate use of a static member function.

17. Write a program to create array of objects.

18. Write a program to demonstrate use of friend function.

19. Write a program to illustrate use of copy constructor.

20. Write a program to demonstrate constructor overloading.

21. Write a program to illustrate use of destructor.

22. Write a program to overload a unary operator.

23. Write a program to overload a binary operator.

24. Write a program to demonstrate single Inheritance.

25. Write a program to demonstrate multiple Inheritance.

26. Write a program to demonstrate multi level Inheritance.

27. Write a program to demonstrate hierarchical Inheritance.

28. Write a program to demonstrate hybrid Inheritance.

29. Write a program to demonstrate the use of function overloading.

30. Write a program to demonstrate the use of inline member function.

31. Write a program to demonstrate the use of parameterized constructor.



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**B.Sc. II YEAR COMPUTER SCIENCE**

**PAPER II : DATA STRUCTURES**

**UNIT – I**

Concept of data structure and analysis of algorithm, abstract data structure, introduction to stack and primitive operations on stack, stack as an abstract data type, stack application : infix, prefix, postfix and recursion, introduction to queues, primitive operations on queues, circular queue, dequeue, priority queue and applications of queue.

**UNIT –II**

Introduction to linked list, basic operations on linked list, stacks and queues using linked list, doubly linked list, circular linked list, applications of linked list.

**UNIT – III**

Trees-basic terminology, binary trees, tree representations as array and linked list, basic operations on binary tree, traversal of binary trees : - inorder, preorder, postorder. Applications of binary tree, threaded binary tree, AVL tree, binary tree representations of trees.

**UNIT – IV**

Sequential search, binary search, insertion sort, selection sort, quick sort, bubble sort, heap sort, comparison of sorting methods.

**UNIT –V**

Hash Table, Collision resolution technique, Introduction to graphs, Definition, Terminology, Directed, Undirected and Weighted Graph, Representation of Graph, Graph Traversal – Depth first, Breadth first search, Spanning tree, Minimum Spanning tree, Shortest path algorithm.



**Text Books –**

Data Structure : By Lipshultz (Schaums outline series)

Data Structures : Through C (A Practical Approach) by G.S. Baluja

Data Structures : By Trembley & Sorrenson

**Reference Books –**

Fundamental of Data Structure By S. Sawhney & E. Horowitz

**Suggested list of Programs for practical**

1. Write a program to find the factorial of a given no using recursion.
2. Write a program for bubble sorting.
3. Write a program for linear search.
4. Write a program for binary search.
5. Write a program for selection sorting
6. Write a program for quick sorting
7. Write a program for insertion sorting.
8. Write a program to print Fibonacci series using recursion.
9. Write a program to perform insertion and deletion operation in the stack.
10. Write a program to perform insertion and deletion operation in the queue using static implementation.
11. Write a program to perform insertion and deletion operation in the queue using dynamic implementation.
12. Write a program to insert a node at the beginning in singly linked list.
13. Write a program to insert a node at the middle in singly linked list.
14. Write a program to insert a node at the last in singly linked list.
15. Write a program to delete a node from the beginning in singly linked list.
16. Write a program to delete a node from the middle in singly linked list.
17. Write a program to delete a node from the last in the singly linked list.
18. Write a program to traverse all the nodes in singly linked list.
19. Write a program to insert a node in the beginning in the circular linked list.



20. Write a program to insert a node at the last circular linked list.
21. Write a program to perform all the insertion operations in the singly linked list using switch case.
22. Write a program to perform all the deletion operations in the singly linked list using switch case.
23. Write a program to count the number of nodes in binary tree.
24. Write a program to evaluate postfix operation.
25. Write a program to convert infix operation to postfix operation.





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**B.Sc. III YEAR COMPUTER SCIENCE**

**PAPER I : DATABASE MANAGEMENT SYSTEM**

## **UNIT – I**

Purpose of database system, views of data, data models : relation, network, hierarchical, instances and schemas, data dictionary, types of database languages : - DDL, DML, structure of DBMS, advantages and disadvantages of DBMS, 3 – level architecture proposal : - external, conceptual & internal levels.

## **UNIT – II**

Entity relationship model as a tool of conceptual design : entities & entities set, relationship and relationship set, attributes and mapping constraints, keys, ER diagram : - strong and weak entities, generalization, specialization & aggregation, reducing ER diagram to tables

## **UNIT –III**

Fundamentals of set theoretical notations : relations, domains, attributes, tuples, concept of keys : primary key, super key, alternate key, candidate key, foreign key, fundamentals of integrity rules : entity & referential integrity, extension and intention, relational algebra : select, project, Cartesian product, different types of joins : theta, equi, natural, outer joins, set operations.

## **UNIT –IV**

Functional Dependencies, Good & Bad Decomposition and Anomalies as a database : A consequences of bad design, universal relation, Normalization : 1NF, 2NF, 3NF & BCNF normal forms, multivalued dependency, join dependency, 4NF, 5NF.

## **UNIT –V**

Basic concepts : - Indexing and Hashing, B-tree Index files, Hashing : Static & Dynamic hash function, Index definition in SQL : Multiple key accesses.



**Text Books –**

Simplified approach to DBMS, Prateek Bhatia, Gurvinder Singh Kalyani Publication

Database System Concepts by Henry Korth and A. Silberschatz.

**Reference Books –**

An Introduction to Database system by Bipin Desai

An Introduction to Database System by C.J. Date.

**Suggested list of programs for practical**

Create the appropriate table and apply the following queries

1. WAQ to insert some new records in emp table.
2. WAQ to list the number of employees whose name is not 'ford', 'jams' or 'jones,
3. WAQ to list the name and salary and sort them in descending order of their salary
4. WAQ to list the details of employees whose name is starts from 'a'
5. WAQ to delete all records from emp table
6. WAQ to insert values in 3 fields.
7. WAQ to list the student name having 'd' as second character.
8. WAQ to list the name and salary and sort them in descending order of their salary
9. WAQ to list the name and salary and sort them in descending order of their salary.
10. WAQ in employee table find all the manager who earns between 1000 and 2000.
11. Display record of employee who have salary between 1000 and 2000.
12. List the name salary and department number of the employee and order them by their salary in descending order.
13. In employee table change the city of employee from existing one to new one.
14. Add a column salary of datatype 'number' & having size '5' with default value 1000.
15. WAQ to find the employee who earns the lowest salary in each department. Display in ascending order of salary.



16. List the employee who earns maximum salary in their department. Find the name of all employee who works for 'first bank corporation' . Display the record of employee whose name start with 's' & age is greater than 18.
17. Find the name, street & city of residence of all employee who works for 'fbc'
18. WAQ to update the salary of employee number 1902 to Rs. 10,000
19. WAQ to find the name. Street and city of all employee who works for 'fbc' and who earn more than 1000.
20. WAQ to increase the salary by 2000 and rename the column as "newsalary"
21. WAQ to find the name. street and city of all employee who works for 'fbc' and who earn more than 1000
22. WAQ to find total of salaries of all employees from emp table
23. WAQ to decrease the salary of emp from 5000 and rename column as 'new salary'
24. List the employee number of employee who belone to department 10,20
25. List the employee no of employees who earn greater than 2000.
26. Insert new field called category in emp table.
27. Display different jobs in departments 20, 30
28. List the names of employees having two 'aa' in the name
29. Print the name, emp no. sal of employees in emp table.
30. List the names of employees who do the job of clerks or salesman.



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**B.Sc. III YEAR COMPUTER SCIENCE**

**PAPER II : OPERATING SYSTEM CONCEPTS**

### **UNIT – I**

Operating system definitions, its components, evolution of operating system, types of operating systems : batch, multiprogramming, multitasking, multiprocessor, real time, client – server, peer-to-peer, distributed, clustered, operating system services, system calls, protection of I/O, memory and CPU.

### **UNIT –II**

Process scheduling : concept of a process, process states, PCB, process life cycle, operations on processes, context switch, types of schedulers, CPU burst – I/O burst cycles, dispatcher, scheduling criteria, scheduling algorithms – FCFS,SJF, STRN, Round Robin, priority, event driven, multilevel queue. Performance evaluation of algorithms through deterministic modeling.

### **UNIT –III**

Memory Management : address binding, logical and physical address space, dynamic loading and linking. Contiguous memory allocation : Static and dynamic partitioned memory, fragmentation, swapping relocation, compaction, protection. Non-contiguous memory allocation : Paging Segmentation. Virtual Memory : demand paging, page fault, page replacement algorithms – FIFO,LRU, optimal. Thrashing, page fault frequency.

### **UNIT –IV**

Interprocess communication need for synchronization, Deadlocks – definition, avoidance, prevention, detection and recovery. Disk organization, Directory structure, disk space



management – contiguous and non-contiguous allocation strategies, disk address translation, disk caching, disk scheduling algorithms. Device Management : dedicated devices, shared devices. Security and protection : security threats and goals, penetration attempts. Security policies and mechanisms, authentication, protection and access control.

### **UNIT –V**

Linux : History and features of Linux, Linux architecture, file system of Linux, hardware requirements, Linux standard directories, Linux kernel.

Working with Linux : KDE and Gnome graphical interface, various types of shells available in Linux, Vi editor, Linux commands. File security in Linux.

### **TEXT BOOKS AND REFERENCE BOOKS**

1. Operating system concepts : By silberschatz, Galvin and Gagne.
2. Operating system Design and Concepts, by Milan Milenkovic
3. Operating system by Andrew Tanenbaum
4. Operating system by Peterson
5. Linux Bible by Christopher Negus
6. Linux by Sumitabh Das

### **Suggested Practical**

Basic Linux Commands and vi editor.