Detailed Syllabus of 3rd Year

Course Code BCA 301

Course Name: Operating System & Linux Programming

L	T	C
3	1	4

INSTRUCTIONSTOPAPERSETTERS:
1. Question No. 1 should be compulsory and cover the entire syllabus. There should be10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each Question should be of12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:-
1. Working and functionalities of operating system
2. Understand the concept of process scheduling, ,memory management, deadlock and file system
3. Understand basic commands of Linux and shell scripts.

PRE-REQUISITES:
1. Basic understanding of hardware and software of computer organization.

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	MappingtoPO #
CO1	Understand the basic concept of Operating System with the help of Unix and Linux Architecture.	BTL2	PO1, PO4
CO2	Understand the concept of Processes, Process Scheduling, Process Synchronization and applying process commands in Linux environment.	BTL3	PO1, PO2,PO4,PO5
CO3	Understand the concept of memory management and deadlock.	BTL2	PO1, PO2,PO4,PO5
CO4	Understand the concept of file Systems, Types and Access Methods by using Linux commands.	BTL3	PO1, PO2,PO4

UNIT–I

No. of Hours: 12   Chapter/Book Reference: TB1 [Chapter 1]; TB2 [Chapters 1, 2, 3, 4, 5]

Introduction: What is an Operating System, Functions of Operating System, Simple Batch Systems; Multi programmed Batch systems, Time-Sharing Systems, Personal-computer systems, Parallel systems, Distributed Systems, Real-Time Systems.

Introduction to Linux: Architecture of Linux OS**,** Basic directory structure of Linux, Basic commands of Linux:-man,info,help,whatis,apropos, basic directory navigation commands likecat,mkdir,rmdir ,cd, mv, cp, rm, ,file, pwd ,date,cal,echo,bc,ls,who,whoami,hostname,uname,tty,aliase

Vi Editor:vi basics, Three modes of vi Editor, how to write, save, execute a shell script in vi editor

UNIT–II

No. of Hours: 12   Chapter/Book Reference: TB1 [Chapters 3, 5, 6]; TB2 [Chapter 9]

Processes: Process Concept, Process Scheduling, Operation on Processes

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms

Process Synchronization: Background, The Critical-Section Problem, Semaphores solution to critical section problem

Process related commands in Linux: ps, top, pstree, nice, renice and system calls

UNIT–III

No. of Hours: 12   **Chapter/Book Reference: TB1 [Chapters 7, 8, 9]**

Memory Management: Background, Logical versus Physical Address space, swapping, Contiguous allocation, Segmentation**,** Paging

Virtual Memory: Demand Paging, Performance of Demand Paging, Page Replacement, Page-replacement Algorithms, Allocation of Frames, Thrashing

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

UNIT–IV

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapter 10]; TB2 [Chapter 6]

Information Management: Introduction, File Concept, Access methods, Directory and Disk structure, File Protection

Linux File Security: Permission types, Examining permissions, changing permissions (symbolic method numeric method)

TEXT BOOKS:

TB1. Silbersachatz and Galvin, "Operating System Concepts", John Wiley & Sons, 10 th Ed. 2018

TB2. Sumitabha Das, "Unix Concepts and Application", TMH

REFERENCE BOOKS:

RB1. Madnick E., Donovan J., "Operating Systems", Tata McGraw Hill, 2011

RB2. Tannenbaum, "Operating Systems", PHI, 4th Edition, 2015

RB3. Sivaselvan, Gopalan, "A Beginner's Guide to UNIX", PHI Learning

Course Code: BCA 303   **L   T   C**
Course Name: Computer Graphics   **3   1   4**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:
1. Concept of Computer graphics, types of display devices and their techniques.
2. Methods of drawing of graphic objects on the display devices.
3. Concepts of viewport, mapping of real world objects to display device, clipping
4. Knowledge of projection concepts and their types

PRE-REQUISITES:
1. Programming in C/C++

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Develop basic knowledge of computer generated graphics, their applications, display devices and drawing of graphic objects on display devices.	BTL2	PO1, PO6
CO2	To develop knowledge of various graphics 2D transformation operation, their mathematical calculations.	BTL4	PO4, PO8
CO3	To learn about the surfaces and curves, properties of curves and shading of surfaces	BTL2	PO4
CO4	To give basic knowledge of 3D projection and identifying hidden surfaces to be removed.	BTL2	PO1

UNIT – I
No. of Hours: 11   Chapter/Book Reference: TB1, TB2

Introduction: Introduction to computer graphics, Applications of Computer Graphics, Non Interactive and interactive graphics, Conceptual Framework for Interactive Graphics. Introduction to Raster and Random scan display, Characteristics of display devices, Aliasing and Antialiasing, Introduction to latest display technologies (LED, OLED, Curved LED display)
Scan Conversion
Scan Converting Lines using DDA & Bresenham's Algorithm, Scan Converting Circles using Bresenham's algorithm.
UNIT – II
No. of Hours: 11   Chapter/Book Reference: TB1, TB2, RB3

Clipping
Cohen- Sutherland Algorithm, Cyrus-Beck Algorithm
Geometrical Transformations
2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Composition of 2D Transformations, Window-to-Viewport Transformation, Introduction of Matrix Representation of 3D Transformations of translation, scaling and rotation (without derivation).

UNIT – III
No. of Hours: 11   **Chapter/Book Reference: TB1, TB2**

Representing Curves
Introduction to Polygon Meshes and its types, Parametric Cubic Curves: parametric and geometric continuity, Hermite, Bezier & B-Spline.
Surfaces
Surface rendering- Basic Illumination, Effect of ambient lighting and distances, Shading models- Gourard Shading, phong model.

UNIT – IV
No. of Hours: 11   **Chapter/Book Reference: TB1, TB2**

Three Dimensional Viewing: Introduction, Representation of Three-dimensional objects, Projections, Parallel projections: Orthographic Projections, Oblique Projections. Perspective Projection,
Hidden Surface Removal: Depth-Buffer (z-buffer) method, Depth-sorting Method (Painter's algorithm)

TEXT BOOKS:
TB1. Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles & Practice, 2000, Pearson
TB2. Chennakesava R. Alavla "Computer Graphics", PHI Learning Pvt. Limited

REFERENCES BOOKS:
RB1. D. Hearn & Baker: Computer Graphics with OpenGL, Pearson Education, Third Edition, 2009.
RB2. Foley, J.D. & Van Dam, A: Fundamentals of Interactive Computer Graphics.
RB3. Rogers & Adams, "Mathematical Elements for Computer Graphics", McGraw Hill, 1989.

		L	**T**	**C**
Course Code: BCA 305		**3**	**1**	**4**
Course Name: Cloud Computing				

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. Understand current cloud computing technologies, including technologies for different cloud services.
2. Analyze the components of cloud computing
3. Perform Large data processing in the cloud

PRE-REQUISITES:

1. Basics of Computer Network
2. Knowledge of Operating System and Databases.

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Overview of Cloud Computing	BTL1	PO1, PO2, PO3, PO7
CO2	Understanding Cloud Computing Architecture	BTL2	PO1, PO2, PO3, PO4, PO7,
CO3	Working with Parallel and Distributed Computing	BTL3	PO1, PO2, PO3, PO4, PO5
CO4	Understanding the Concept of Virtualization	BTL4	PO1, PO2, PO3, PO6, PO7

UNIT – I

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters - 1, 10], TB2 [Chapters - 1, 2]

Cloud Computing Overview –Services of Internet, Origins of Cloud computing – Cloud components – Essential characteristics – On-demand self-service, The vision of cloud computing – Characteristics, benefits, and Challenges ahead

UNIT – II

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapter - 4], TB2 [Chapters - 5, 6, 17, 18]

Cloud Computing Architecture-Introduction – Internet as a Platform, The cloud reference model - Types of clouds - Economics of the cloud, Computing platforms and technologies, Cloud computing economics, Cloud infrastructure - Economics of private clouds - Software productivity in the cloud - Economies of scale: public vs. private clouds.

UNIT – III

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapter - 2], TB2 [Chapter - 11]

Principles of Parallel and Distributed Computing: Parallel vs. distributed computing - Elements of parallel computing - Hardware architectures for parallel processing, Approaches to parallel programming - Laws of caution.

UNIT – IV

No. of Hours: 11   Chapter/Book Reference: TB1 [Chapter - 3], TB2 [Chapter - 8]

Virtualization: Introduction - Characteristics of virtualized environments - Taxonomy of virtualization techniques - Virtualization and cloud computing - Pros and cons of virtualization - Technology example: VMware: full virtualization, Types of hardware virtualization: Full virtualization - partial virtualization - para virtualization

TEXT BOOKS:
TB1. Rajkumar Buyya, Christian Vecchiola and S. Thamarai Selvi, "Mastering Cloud Computing" - Foundations and Applications Programming, MK publications, 2013.
TB2. Gautam Shroff, "Enterprise Cloud Computing: Technology, Architecture, Applications" by Cambridge University Press, 2010.

REFERENCE BOOKS:
RB1. Michael J.Kavis, "Architecting the Cloud: Design Decisions for Cloud Computing Service Models (SaaS, PaaS, and IaaS)", John Wiley & Sons Inc., Jan 2014.

	L	T/P	C
Course Code: BCA 307			
Course Name: Minor Project	0	8	4

PROJECT REPORT
All the students are required to submit a report based on the project work done by them during the sixth semester.

SYNOPSIS (SUMMARY/ABSTRACT) :
All students must submit a summary/abstract separately with the project report. Summary, preferably, should be of about 3-4 pages. The content should be as brief as is sufficient enough to explain the objective and implementation of the project that the candidate is going to take up. The write up must adhere to the guidelines and should include the following:

- Name / Title of theProject
- Statement about theProblem
- Why is the particular topicchosen?
- Objective and scope of theProject
- Methodology (including a summary of theproject)
- Hardware & Software to beused
- Testing Technologiesused
- What contribution would the projectmake?

TOPIC OF THE PROJECT- This should be explicitly mentioned at the beginning of the Synopsis. Since the topic itself gives a peep into the project to be taken up, candidate is advised to be prudent on naming the project. This being the overall impression on the future work, the topic should corroborate the work.

OBJECTIVE AND SCOPE: This should give a clear picture of the project. Objective should be clearly specified. What the project ends up to and in what way this is going to help the end user has to bementioned.

PROCESS DISCRIPTION: The process of the whole software system proposed, to be developed, should be mentioned in brief. This may be supported by DFDs / Flowcharts to explain the flow of the information.

RESOURCES AND LIMITATIONS: The requirement of the resources for designing and developing the proposed system must be given. The resources might be in form of the hardware/software or the data from the industry. The limitation of the proposed system in respect of a larger and comprehensive system must be given.

CONCLUSION: The write-up must end with the concluding remarks- briefly describing innovation in the approach for implementing the Project, main achievements and also any other important feature that makes the system stand out from the rest.

<u>The following suggested guidelines must be followed in preparing the Minor Project Report:</u>
Good quality white A4 size paper should be used for typing and duplication. Care should be taken to avoid smudging while duplicating the copies.

Page Specification: (Written paper and source code)

- Left margin - 3.0 cms
- Right margin- 2.0cms
- Top margin 2.54cms
- Bottom margin 2.54cms
- Page numbers - All text pages as well as Program source code listing should be

numbered at the bottom center of thepages.

Normal Body Text: Font Size: 12, Times New Roman, Double Spacing, Justified. 6 point above and below paraspacing
Paragraph Heading Font Size: 14, Times New Roman, Underlined, Left Aligned. 12 point above & belowspacing.
Chapter Heading Font Size: 20, Times New Roman, Centre Aligned, 30 point above and below spacing. **Coding Font size :**10, Courier New, Normal
Submission of Project Report to the University : The student will submit his/her project report in the prescribed format. The Project Report should include:

1. One copy of thesummary/abstract.
2. One hard Copy of the ProjectReport.
3. The Project Report may be about 75 pages (excludingcoding).

FORMAT OF THE STUDENT PROJECT REPORT ON COMPLETION OF THE PROJECT
   I.   Cover Page as performat
  II.   Acknowledgement
 III.   Certificate of the project guide
 IV.   Synopsis of theProject
  V.   MainReport
        i.   Objective & Scope of theProject
       ii.   Theoretical Background Definition of Problem
     iii.   System Analysis & Design vis-a-vis UserRequirements
     iv.   System Planning (PERTChart)
      v.   Methodology adopted, System Implementation & Details of Hardware & Software used System Maintenance &Evaluation
     vi.   Detailed Life Cycle of theProject
           a.   ERD, DFD
           b.   Input and Output ScreenDesign
           c.   Processinvolved
           d.   Methodology usedtesting
           e.   Test Report, Printout of the Report & CodeSheet
  VI.   Coding and Screenshots of the project
 VII.   Conclusion and Future Scope
VIII.   References

Formats of various certificates and formatting styles are as:

1. Certificate from theGuide

<div align="center">CERTIFICATE</div>

This is to certify that this project entitled " xxxxxx xxxxx xxxxx xxxx xxxx xxx" submitted in partial fulfillment of the degree of Bachelor of Computer Applications to the "xxxxxxxxxxxxxxxxxxxxxxxxx" through xxxxxx xxxxx doneby Mr./Ms._____,RollNo._____is an is an authentic work carried out by him/herat _____ under my guidance. The matter embodied in this project work has not been submitted earlier for award of any degree to the best of my knowledge andbelief.

Signature ofthestudent   Signature of theGuide

2. Project Report Cover PageFormat:

<div align="center">

Title of the Project/report
(Times New Roman, Italic, Font size = 24)

Submitted in partial fulfilment of the requirements for the award of the degree of
Bachelor of Computer Applications
(Bookman Old Style, 16 point, centre)

</div>

Submitted to: **Submitted by:**
(GuideName)   **(Student'sname)**
                                                                                                    Roll No
                                                                                                    College Name

3. Self-Certificate by the students

SELF CERTIFICATE

This is to certify   that the dissertation/project report entitled "…………………………………" is done by me is an authentic work carried out for the partial fulfilment of the requirements for the award of the degree of Bachelor of Computer Applications under the guidance of__. The matter embodied in this project work has not been submitted earlier for award of any degree or diploma to the best of my knowledge and belief.

Signature of the student
Name of the Student
Roll No.

4. ACKNOWLEDGEMENTS

In the "Acknowledgements" page, the writer recognizes his indebtedness for guidance and assistance of the thesis adviser and other members of the faculty. Courtesy demands that he also recognize specific contributions by other persons or institutions such as libraries and research foundations. Acknowledgements should be expressed simply, tastefully, and tactfully.

Course Code: BCAT 311   **L   T   C**
Course Name: Machine Learning with Python   **4   0   4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.

3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:
1. To make student able to learn mathematical concepts, and algorithms used in machine learning techniques for solving real world problems and developing new applications based on machine learning.
2. To introduce students to the state-of-the-art concepts and techniques of Machine Learning using Python.

PRE-REQUISITES:
1. Basics of Python Programming

COURSE OUTCOMES(COs):
After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO#
CO1	Explain machine learning concepts on real world applications and problems.	BTL2	PO1, PO2, PO8
CO2	Analyze and Implement Regression techniques.	BTL2, BTL3	PO1, PO4, PO5, PO7
CO3	Solve and design solution of Classification problem	BTL3, BTL6	PO2, PO3, PO4,PO8
CO4	Understand and implement Unsupervised learning algorithms	BTL2, BTL3	PO4, PO5, PO6, PO8
CO5	Interpret various machine learning algorithms in a range of real world applications.	BTL3	PO2, PO6, PO7

UNIT–I
No. of Hours: 11 Chapter / Book Reference: TB1 [Chapters - 1, 3, 4, 8, 9], TB2 [Chapters - 1, 4]

Introduction to Machine Learning, Why Machine learning, Types of Machine Learning Problems, Applications of Machine Learning. Supervised Machine Learning- Regression and Classification. Binary Classifier, Multiclass Classification, Multilabel Classification. Performance Measures- Confusion Matrix, Accuracy, Precision & recall, ROC Curve. Advanced Python- NumPy, Pandas. Python Machine Learning Library Scikit-Learn, Linear Regression with one Variable, Linear Regression with Multiple Variables, Logistic Regression.

UNIT-II
No. of Hours: 11 Chapter / Book Reference: TB1 [Chapters - 5, 6, 7], TB2 [Chapter - 6]

Supervised learning Algorithms: Decision Trees, Tree pruning, Rule-base Classification, Naïve Bayes, Bayesian Network. Support Vector Machines, k-Nearest Neighbor, Ensemble Learning and Random Forest algorithm.

UNIT - III
No. of Hours: 11 Chapter / Book Reference: TB1 [Chapter - 10], TB3 [Chapters - 2, 6]

Artificial Neural Networks, HebbNet, Perceptron, Adaline, Multilayer Neural Network, Architecture, Activation Functions, Loss Function, Hyper parameters, Gradient Descent, Backpropagation, Variants of Backpropagation, Avoiding overfitting through Regularization, Applications of Neural Networks.

UNIT – IV
No. of Hours: 11 Chapter/Book Reference: TB1 [Chapter - 8], TB2 [Chapter - 7], TB3 [Chapter - 4]

Unsupervised learning algorithms: Introduction to Clustering, K-means Clustering, Hierarchical Clustering, Kohonen Self-Organizing Maps. Implementation of Unsupervised algorithms. Feature selection and Dimensionality reduction, Principal Component Analysis.

TEXT BOOKS:
TB1. GeronAurelien, "Hands-On Machine Learning with Scikit-Learn & TensorFlow", O'REILLY, First Edition, 2017.
TB2. U Dinesh Kumar and Manaranjan Pradhan, "Machine Learning using Python", Wiley, 2019.
TB3. Fausett Laurence, "Fundamentals of Neural Networks", Pearson, Ninth Edition, 2012.

REFERENCE BOOKS:
RB1. Tom Mitchell, "Machine Learning", First Edition, McGraw- Hill, 1997.
RB2. Budd T A, "Exploring Python", McGraw-Hill Education, 1st Edition, 2011.
RB3. Jake VanderPlas, "Python Data Science Handbook", O'Reilly,1st Edition,2017.

Course Code: BCAP 311	L	T	C
Course Name: Machine Learning with Python Lab	0	2	1

This is the associated practical paper. The learning outcomes are same as the corresponding theory paper.
List of Practical

S.No.	Problem Statement	Mapping to CO#
1.	Extract the data from the database using python.	CO1
2.	Write a program to implement linear and logistic regression	CO2
3.	Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.	CO3
4.	Write a program to implement k-nearest neighbors (KNN) and Support Vector Machine (SVM) Algorithm for classification	CO3
5.	Implement classification of a given dataset using random forest.	CO3
6.	Build an Artificial Neural Network (ANN) by implementing the Back propagation algorithm and test the same using appropriate data sets.	CO3
7.	Apply k-Means algorithm k-Means algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using the k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Python ML library classes in the program.	CO4
8.	Write a program to implement Self - Organizing Map (SOM)	CO4
9.	Write a program for empirical comparison of different supervised learning algorithms	CO4
10.	Write a program for empirical comparison of different unsupervised learning algorithms	CO4
Note: **1. In total 10 practicals to be implemented. 2 additional practical may be given by the course instructor.** **2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.**		

		L	**T**	**C**
Course Code: BCA 331		0	0	2
Course Name: Summer Training Project				

Summer Training Project Guidelines

Objective:

All the students enrolled for BCA Programme, have to undergo compulsory summer training/ Project of minimum 06 weeks in an organization in the IT field. The aim of the project is to give the students an integrated experience in solving a real-life problem by applying knowledge and skills gained on completion of theory papers and in-house practical papers during BCA course. It provides an occasion for students to realize the importance of resource and time management, ownership of task towards deliverables, innovation and efficiency in the task management. It also provides a good opportunity for students to build, enhance and sustain high levels of professional conduct and performance and evolves a problem solver frame of mind in students at early stage. It also prepares students for taking up responsible assignments in the corporate establishment.

General Guidelines:

1. The project should be original, of real-life value, and not copied from existing material from any source. A student should ensure that he understands what is expected by preparing a requirement document of his understanding and get it reviewed by the guide.
2. Design document should also be reviewed and code should also be peer reviewed.
3. A user manual has to be prepared and reviewed.
4. Testing has to be thorough and at various levels, followed by an acceptance test based on the requirement document and user manual.
5. Students should follow the steps as discussed in Software Development Life Cycle while writing dissertation and use Software Engineering Methodologies for development of deliverables, mere programming will not be sufficient. Students must note that interviewers for job are often more interested in the problem solved, alternatives that could have been tried and the benefits derived from the developed application, rather than just implementation details.
6. One Project will be submitted only by one student.However, if the nature of the project is very big & large enough to be divided in different independent big modules having an estimated required effort of minimum 06 weeks to be developed by one person, can be taken up and designed in such a way that every student will be responsible for one module and will submit only that specific module as it were a complete software project.
7. Every student has to get his / her synopsis approved from the guide.
8. The synopsis must be brief i.e., not more that 4-6 pages. It must address details like (however, students may follow the SRS format of IEEE for writing Synopsis)
   a. Name / title of the project,
   b. Statement about the problem,
   c. Why the Particular topic is chosen? It must address Present State of the Art.
   d. Objective and scope of the project,
   e. Analysis, Design, Development & Testing Methodology,
   f. H/W & S/W to be used,
   g. Testing Technologies to be used,
   h. What contribution / value addition would the project make?
   i. Limitations / constraints of the project,
   j. Conclusion, Future Scope for Modification,
   k. References and Bibliography.
9. After approval of the Synopsis, Students will need to give Two Presentations / Demonstration, as per the schedule fixed by their respective Institutions or University. First Presentation will ideally be given after Design Phase is over. Second should be given when System Testing is over. First Presentation **(Summer Training)** should be given in the first month. Second Presentation **(Projects)** is in second month**.** Final Project reports should be given latest by the end of the third month of the semester**.**
10. Summer Training report has to be submitted by **31ˢᵗ October of every academic year.**
11. The student will submit his/her project report/thesis in the prescribed format, as given hereunder, after the second presentation. The project report/thesis should include: -
    a. ONE hard copy (Maroon colour with golden print) of the project report / thesis.
    b. Soft copy of project on CD including all resource code/ compiled binary code and the manuscript in MS-Word document format.
12. Note the following guidelines with respect to Preparation of the Documentation. Please note that documentation is meant for other people, and hence it must be self-explanatory, in all respect.
    12.1.1   The sequence of the Pages in the Project Report will be as follows:

1. One Transparency Sheet
2. Title Page (Strictly as per the sample supplied)
3. Institute's Certificate
4. Company's Certificate
5. Candidate Declaration of originality of work
6. Acknowledgement.
7. Abstract
8. List of Figures (Strictly as per the sample supplied)
9. List of Tables (Strictly as per the sample supplied)
10. List of Abbreviations (Strictly as per the sample supplied)
11. Contents (Strictly as per the sample supplied) and then body of the dissertation according to the content.

12.2 The pages coming under the preview of the CONTENTS will only be numbered in the BOTTOM of the Page Centrally Aligned.

12.3 ONE Hardbound Copies (One Original and Two Xerox) will be submitted with the Institute out of which one will be given back to the candidate. All the students are required to follow the same binding format in maroon color with back quote mentioning title of the project, name of the student and year.

12.4 At the end of the Project Report Two White blank sheets must be attached.

12.5 At the beginning of each chapter one blank page (Strictly as per the sample supplied) must be attached. These pages will neither be numbered nor counted in total numbering of pages. They will only indicate the beginning of a New Chapter with its learning objectives.

12.6 Font size of the documentation will be *12 Times New Roman* and the pages will be one and half line spaced. The page margin will be as under: -

Top – 1 inch, Bottom – 1 inch,
Left – 1.5 inch, Right – 1 inch.

12.7 Kindly note that all-methodological details and theoretical aspects must be written in students' own words. Copying from books or other students will not be accepted, in any case.

All students are informed not to write definition of various concepts in index, mention the topics w. r. t. to your project (i.e., how various concepts have been implemented in the project)

* No detailed theories required
TEMPLATE FOR CHAPTER SCHEME

C O N T E N T S
(font size -18)

****

\# Please note that for all the System Design (Database, Input & Output) the basic Prototype, format, Table Structure, etc. is to be discussed along with related validations, verifications & normalization. However, the sample Input & Output (Screen Snapshots) will be attached in the annexure.

\#\# Under Testing, you have to discuss the approach of Testing, Test Data, Test Cases and Test Report. How Debugging has been performed, on the basis of Test Report, must be also discussed?

Template for blank page before every chapter

CHAPTER 2
SYSTEM ANALYSIS

Other Templates

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

Abbreviation	Description
CAD	Context Analysis Diagram
DFD	Data Flow Diagram
HIPO	Hierarchical Input Process Output

References/Bibliography:

1. Patterson D W, "Introduction to Artificial Intelligence and Expert Systems", Second Edition, 2002, Prentice Hall of India Private Ltd., New Delhi.

2. V. Rajaraman, "An Introduction to Digital Computer Design", Third Edition, 1995, Prentice Hall of India Private Ltd., New Delhi.

Note: All of the above three will be prepared on separate pages.

Template for back-quote

INVENTORY MANAGEMENT SYSTEM   STUDENT NAMEENROLLMENT NUMBER

Course Code: BCA 371		**L T/P C**
Course Name: Practical-X LINUX – OS LAB		**0 4 2**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to:
1. Unix/Linux environment
2. Understanding of Linux commands and scripts

PRE-REQUISITES:

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Understand Linux Environment with the help of its architecture.	BT Level 1	PO1,PO2
CO2	Understand the Linux environment by using general Linux Commands.	BT Level 2	PO1,PO2,PO4
CO3	Implement Process Related commands.	BT Level 4	PO1,PO2,PO4,PO5
CO4	Implement File Permission concept.	BT Level 4	PO1,PO2,PO4,PO5
CO5	Understanding the shell script by combining commands.	BT Level 2	PO1,PO2,PO4

	List of Practicals	
S. No.	**Detailed Statement**	**Mapping to CO #**
	Core Practicals	
1	Connect to the Linux Server and understand the basic Directory Structure of Linux.	CO1
2.	To understand help commands like:-man,info,help,whatis,apropos	CO2
3.	To understand basic directory navigation commands like cat,cd, mv, cp, rm, mkdir,rmdir ,file, pwd command.	CO2
4.	To understand basic commands like:-date,cal,echo,bc,ls,who,whoami,hostname,uname,tty,aliase	CO2
5.	To understand vi basics, Three modes of vi Editor, how to write, save, execute a shell script in vi editor.	CO5
6.	To understand process related commands like: -ps, top, pstree, nice, renice in Linux.	CO3
7	To understand how to examine and change File permissions.	CO4
8	Set a file to be read-only with the chmod command. Interpret the file permissions displayed by the ls -l command.	CO4
9	Delete one or more directories with the rmdir command. See what happens if the directory is not empty. Experiment (carefully!) with the rm -r command to delete a directory and its content.	CO2
10	Change your directory to the directory exercises. Create a file in that directory, named the file as example1 using the cat command containing the following text: water, water everywhere and all the boards did shrink; water, water everywhere, no drop to drink.	CO2
11	Write basic shell script to display the table of a number.	CO5
12	Write basic shell script to input a character from user and then check whether it is uppercase, lowercase or digit.	
13	Write basic shell script to calculate factorial of a number.	
14	Write basic shell script to input the month number and generate corresponding calendar.	
15	Write basic shell script to list all directories.	
16	Write basic shell script to display greatest of three numbers.	
17	Write basic shell script to check whether the number entered by user is prime or not.	

Note:

1. In total 15 practicals to be implemented. 2 additional practical may be given by the course instructor.

2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.

Course Code: BCA 373	L	T/P	C
Course Name: Practical - XI CG Lab	0	4	2

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to:
1. Concept of Computer graphics, the coordinate system of display devices.
2. Implementing various scan converting algorithms.
3. Methods of drawing of graphic objects on the display devices.
4. Generating complex graphic objects
5. Implementation of various 2D transformations
6. Implementing line clipping algorithms

PRE-REQUISITES:
Knowledge of Programming in C/C++ is preferable
Understanding of various functions included in graphics.h header files

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Develop basic computer generated graphic and drawing of graphic objects on 2D display devices.	BTL3	PO1, PO6
CO2	To perform various algorithms for generating objects	BTL4	PO4
CO3	To implement various 2D transformation operations through matrices.	BTL4	PO4, PO8
CO4	Implementation of cohen-sutherland line clipping algorithm.	BTL3	PO1
List of Practicals			
S. No.	Detailed Statement		Mapping to CO #
Core Practicals (Implement minimum 8 out of 10 practicals)			
1.	Drawing objects like circle, rectangle, polygon etc using graphic function		CO1
2.	raphics Inbuilt functions		CO2
3.	ne Drawing Algorithms (DDA & Bresenham's Algorithm)		CO2
4.	rcle Algorithms		CO2
5.	Translation in 2D		CO3
6.	Rotation in 2D		CO3
7.	Scaling in 2D		CO3
8.	Reflection in 2D		CO3
9.	Shearing in 2D		CO3
10.	Cohen Sutherland's Algorithm		CO4
Application Based Practicals (Implement minimum 5 out of 10 practicals)			
11.	Program to rotate a circle outside another circle		CO1
12.	Program to draw Flying Balloons		CO1
13.	Show Bouncing Ball Animation		CO2
14.	Draw pie chart of family income and Expenditure		CO2
15.	Show changing radius of circle		CO2, CO3
16.	Program to rotate a coin on table		CO3

17.	Making an Analog Clock	CO3
18.	Draw a moving cycle	CO3, CO4
19.	Design a screensaver	CO4
20.	Show Moving Car Animation	CO3, CO4

Note:
1. In total 15 practicals to be implemented. 2 additional practical may be given by the course instructor.
2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.