CHRIST
(DEEMED TO BE UNIVERSITY)
DELHI-NCR, INDIA

School of Sciences
Delhi NCR Campus

Syllabus
Bachelor of Computer Application
2020-21

CHRIST(Deemed to be University)
Delhi NCR Campus
www.ncr.christuniversity.in

CHRIST
(DEEMED TO BE UNIVERSITY)
BANGALORE · INDIA

Department of
COMPUTER-SCIENCE

Syllabus for
Bachelor of Computer Applications
Academic Year (2020)

1 Semester - 2020 - Batch				
Paper Code	Paper	Hours Per Week	Credits	Marks
BCA112	OFFICE AUTOMATION TOOLS LAB	2	1	50
BCA121	PROFESSIONAL ENGLISH	3	2	100
BCA132	STATISTICS I FOR BCA	3	3	100
BCA133	DIGITAL COMPUTER FUNDAMENTALS	4	4	100
BCA134	INTRODUCTION TO PROGRAMMING USING C	4	4	100
BCA151	DIGITAL COMPUTER FUNDAMENTALS LAB	4	2	100
BCA152	C PROGRAMMING LAB	4	2	100

2 Semester - 2020 - Batch				
Paper Code	Paper	Hours Per Week	Credits	Marks

BCA212	STATISTICS TOOL LAB	2	1	50
BCA221	COMMUNICATIVE ENGLISH	3	2	100
BCA232	STATISTICS II FOR BCA	3	3	100
BCA233	OPERATING SYSTEMS	4	4	100
BCA234	DATA STRUCTURES	4	4	100
BCA251	OPERATING SYSTEMS LAB	4	2	100
BCA252	DATA STRUCTURES LAB	4	02	100

3 Semester - 2019 - Batch

Paper Code	Paper	Hours Per Week	Credits	Marks
BCA312	ACCOUNTING TOOLS LAB	2	1	50
BCA333	OBJECT ORIENTED PROGRAMMING USING JAVA	4	4	100
BCA334	DATABASE MANAGEMENT SYSTEM	4	4	100
BCA351	JAVA PROGRAMMING LAB	4	4	100
BCA352	DBMS LAB	4	2	100
BCA361A	GERMAN	4	4	100
BCA361B	FRENCH	4	4	100

4 Semester - 2019 - Batch

Paper Code	Paper	Hours Per Week	Credits	Marks
BCA432	FINANCIAL MANAGEMENT	3	3	100
BCA433	DESIGN AND ANALYSIS OF ALGORITHMS	4	4	100
BCA434	SOFTWARE ENGINEERING	4	4	100
BCA435	WEB TECHNOLOGY	4	04	100
BCA451	.NET LAB	4	2	100
BCA481	DBMS PROJECT	6	3	150

5 Semester - 2018 - Batch

Paper Code	Paper	Hours Per Week	Credits	Marks
BCA531	PYTHON PROGRAMMING	4	4	100
BCA532	COMPUTER NETWORKS	4	4	100
BCA541A	MOBILE APPLICATIONS	4	4	100
BCA541B	GRAPHICS AND ANIMATION	4	4	100
BCA541C	BUSINESS INTELLIGENCE	4	4	100
BCA541D	MICROPROCESSOR AND ALP	4	4	100
BCA541E	DIGITAL IMAGE PROCESSING	4	4	100
BCA542A	MULTIMEDIA APPLICATIONS	4	4	100
BCA542B	OOAD USING UML	4	4	100
BCA542C	CYBER SECURITY	4	4	100
BCA542D	COMPUTER ARCHITECTURE	4	4	100

BCA542E	**SYSTEM SOFTWARE**	**4**	**4**	**100**
BCA551	**PYTHON PROGRAMMING LAB**	**4**	**2**	**100**
BCA552A	**MOBILE APPLICATIONS LAB**	**4**	**2**	**100**
BCA552B	**GRAPHICS AND ANIMATION LAB**	**4**	**2**	**100**
BCA552C	**BUSINESS INTELLIGENCE LAB**	**4**	**2**	**100**
BCA552D	**MICROPROCESSOR AND ALP LAB**	**4**	**2**	**100**
BCA552E	**DIGITAL IMAGE PROCESSING LAB**	**4**	**2**	**100**
BCA581	**PROJECT-I**	**4**	**2**	**100**
6 Semester - 2018 - Batch				
Paper Code	**Paper**	**Hours Per Week**	**Credits**	**Marks**
BCA631	**MACHINE LEARNING**	**6**	**5**	**150**
BCA641A	**CLOUD COMPUTING**	**6**	**5**	**150**
BCA641B	**UI/UX DESIGN**	**6**	**5**	**150**
BCA641C	**SOFTWARE TESTING**	**6**	**5**	**150**
BCA641D	**INTERNET OF THINGS**	**6**	**5**	**150**
BCA641E	**LINUX ADMINISTRATION**	**6**	**5**	**150**
BCA681	**MAJOR PROJECT**	**16**	**8**	**600**

Assesment Pattern

Theory Assessment

Component	Mode of Assessment	Parameters	Points
CIA I	Written Assignment/ Class test/ Problem based assignment	Basic and conceptual	10
CIA II	Mid-semester Examination	Conceptual and analytical knowledge of the subject	25
CIA III	Quiz/ Seminar/ Group Presentation/ Test	Mastery of the core concepts	10
Attendance	Attendance	Regularity and Punctuality	05
ESE		Basic, conceptual and analytical knowledge of the subject with core concepts	50
		Total	100

Practical Assessment:

The pattern of assessment depends on the types of courses (programming/minor applications/major projects/etc.) and the details will be provided in the course plan of the respective courses.

Examination And Assesments

- Continuous Internal assessment (CIA) forms 50% and the end semester examination forms the other 50% of the marks in both theory and practical.
- The MSE & ESE for each theory paper is of two and three hours respectively.
- The CIA for the practical sessions are done on a day-to-day basis depending upon their performance in the pre-lab, the conduct of the experiment, viva questions etc. Only those who qualify with minimum require attendance and CIA will be allowed to appear for the ESE.

Department Overview:

Department of Computer Science of CHRIST (Deemed to be University) strives to shape outstanding computer professionals with ethical and human values to reshape nation?s destiny. The training imparted aims to prepare young minds for the challenging opportunities in the IT industry with a global awareness rooted in the Indian soil, nourished and supported by experts in the field.

Mission Statement:

Vision The Department of Computer Science endeavors to imbibe the vision of the University ?Excellence and Service?. The department is committed to this philosophy which pervades every aspect and functioning of the department. Mission ?To develop IT professionals with ethical and human values?. To accomplish our mission, the department encourages students to apply their acquired knowledge and skills towards professional achievements in their career. The department also moulds the students t

Introduction to Program:

Bachelor of Computer Applications is a 3-year undergraduate programme spread over six semesters. The course is designed to bridge the gap between IT industries and

academic institutes by incorporating the latest developments into the curriculum and to give students a complete understanding within a structured framework. The curriculum supports students to gain adequate programming practices along with theoretical foundation and also includes interdisciplinary courses and electives for widening the domain expertise. State-of-the-art infrastructure provides an excellent learning environment to hone the knowledge of each student.

Program Objective:

Programme Objectives: - Provide strong foundations in fundamentals of computer science and applications for employability and/or further graduation. - Empower students with competencies in creative thinking and problem solving, inter-personal communication and managerial skills. - Facilitate overall understanding of the technological development with legal and ethical issues. - Equip the students in providing professional solutions to real-time problems. Ethics and Human Values: 1. Only proprietary or open source software would be used for academic teaching and learning purposes. 2. Copying of programs from internet, friends or from other sources is strictly discouraged since it impairs development of programming skills. 3. Unique Practical Domain based exercises ensures that the students don?t involve in code plagiarism. 4. Projects undertaken by students during the course are done in teams to improve collaborative work and synergy between team members. 5. Projects involve modularization which initiates students to take individual responsibility for common goals. 6. Passion for excellence is promoted among the students, be it in software development or project documentation. 7. Giving due credit to sources during the Seminar and Research Assignment is promoted among the students 8. The course and its design enforce the practice of good referencing technique to improve the sense of integrity. 9. Courses involving group discussions and debates on ethical pract

BCA112 - OFFICE AUTOMATION TOOLS LAB

(2020 Batch)

Total Teaching Hours for Semester:30

No of Lecture Hours/Week:2

Max Marks:50

Credits:1

Course Objectives/Course Description

MS-WORD

The purpose of this course is to teach students to identify word processing terminology and concepts, Create technical documents, Animation and Design document, format and edit documents, use simple tools and utilities, Mail merge concepts and Mathematical expressions.

MS-EXCEL

This course will teach you the skills you'll need to successfully use Excel. This course will start with basic skills, and then move forward to more advanced features and techniques.

Learning Outcome

CO1: Ability to Animate and Design the document.
CO2: Simplification of Mathematical expressions.
CO3: Create Format cells, rows, columns, and entire worksheets.
CO4: Create charts and diagrams for data.
CO5: Create data lists and forms.
CO6: Create and use pivot tables and pivot charts.
CO7: Work with VBA concept.

Unit-1 **Teaching Hours:30**

List of Programs

MS-WORD

1. Create and Design Admission/Enquiry Forms in Microsoft Word.
2. Create a mail to 'n' number of contacts from label and send mail to 'n' number of contacts selected from label using mail merge.
3. Prepare a document about any topic in mathematics which uses mathematical symbols.
   At least 5 mathematical symbols should be used.
   Assign a password for the document to protect it from unauthorized access.
   Demonstrate the use of Hyperlink Option.
   Write a macro that sets margins to your document, a font of size and double spaced document.
4. Create and Design Seminar/Conference/Workshop brochure.

MS-EXCEL

1. Enter the order id, product name, unit price, quantity and discount. Perform the following operation using MS – Excel.

a. Calculate the revenue and tax on the revenue for each product
b. Calculate the net come of each product
c. Calculate the total revenue of all products
d. Calculate the total net income of all products
e. Count the number of products in the list above
f. Count the number of products of Order ID <<X>>

g. Calculate the total net income of products of Order <<X>>

2. Enter the following details of 20 students data's in column wise, s.no, roll no, name, test – 1, test – 2 and test – 3 marks, total, mention and grade from

Cell A to h and do the following operations in excel

a. Calculate the total score of each student

b. Display the word "Fail" if the student failed and "Pass" if the student passed in Mention column.
c. Students are considered failed if their total is less than 30. Otherwise, they pass.

d. Count the number of students who failed in subject wise

e. Count the number of students who passed in a subject in the column "# of passed students.

f. Calculate the percentage of students who failed in all subjects and write "% of failed students"

g. Calculate the percentage of students who passed in all subjects write "% of passed students"
Format the cell in percentage <="80--"> <="75--"> <="70--"> <="65--"> <="55--"> <="50--"> <="45--"> <="40--">

h. Display grade letter of each student in Grade column, based on the following conditions:

75 <total Score <=80 à A

70 <total Score <=85 à B+

65 <total Score <=70 à B

55 <total Score <=65 à C+

50 <total Score <=55 à C

45 <total Score <=50 à D+

40 <total Score <=45 à D

35 <total Score <=40 à E+

30 <total Score <=35 à E

Total Score < 30 à F

3. Create a basic calculator with VBA in Excel.

4. Write some code in VBA (Visual Basic for Application) to manipulate records in Excel spreadsheet and work with VBA user form to build graphic user interface application.
In case that you have a lot of records in your data sheets, manipulating records--add new, update, save, delete, move, and find record is hard. With VBA, you can solve this problem.

5. Write some code in VBA (Visual Basic for Application) to manipulate records in Excel spreadsheet and work with VBA user form to build graphic user interface application.
In case that you have a lot of records in your data sheets, manipulating records--add new, update, save, delete, move, and find record is hard. With VBA, you can solve this problem.

6. Prepare a pay-bill using a worksheet. The work sheet should contain

Employee Id, Name, Designation, Experience and Basic Salary and Job ID.

If Job Id is 1 then DA is 45% of the basic salary. HRA is Rs. 5500.
If Job Id is 2 then DA is 40% of the basic salary. HRA is Rs. 4500. For all

the other Job ids DA is 35% of the basic salary and HRA is Rs. 3500. For all

the above Job ids PF to be deducted is 4%. For the job ids 1&2 Rs. 100 to be

deducted as Professional Tax.

a. Find the net pay.
b. Use filter to display the details of employees whose salary is greater than 10,000.
c. Sort the employees on the basis of their net pay.
Use advance filter to display the details of employees whose designation is Programmer and Net Pay is greater than 20,000 with experience greater than 2 yrs.

7. Using Excel project the Product sales for any five products for five years.

a. Compute the total sales of each product in the five years.
b. Compute the total sales of all the products in five year.
c. Compute the total sales of all products for each year.
d. Represent annual sale of all the products using Pie-Chart

e. Represent annual sales of all products using Bar Chart.
f. Represent sale of a product for five years using Pie-Chart.
g. Label and format the graphs.

Text Books And Reference Books:

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Essential Reading / Recommended Reading

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Evaluation Pattern

CIA - 50%

ESE - 50%

BCA121 - PROFESSIONAL ENGLISH (2020 Batch)

Total Teaching Hours for Semester:45 | **No of Lecture Hours/Week:3**

Max Marks:100 | **Credits:2**

Course Objectives/Course Description

This course focuses on preparing students to communicate verbally and non-verballyin an effective manner. The aim is to introduce students to communication in a professional environment. It is instrumental in learners comprehending the role of technical english in communication.

Objectives:

1. Introduce learners to language skills in their area of specialisation.

2. Enavle them to enhance career prospects and employability through English langiage skills

3. Help students gain understanding of language at the workplace

4. To develop verbal and non-verbal skills in English communication

Learning Outcome

1. comprehension and demonstration of language in the field of technology
2. Prepare individuals as Independent communicators
3. Illustrate professional requirements through language proficiency

Unit-1 **Teaching Hours:8**

reviewing grammar

This unit undertakes to revise the foundation of language; the grammar section of language learning. Students will be reviewed the grammar aspects mentioned through task based activities

Concept of time in language – reflective learning will be used to help students detect their grammatical errors in tenses and rectify.

- Degrees of comparison – using technical literature students can be engaged in apprehending degrees of comparison
- Direct and reported speech – to enable learners carry on a comprehensible conversation either spoken or written, in a business context
- Subject verb agreement – through worksheets and task based learning students will be familiarized to construct error free sentences
-

Unit-2 **Teaching Hours:6**

technical vocabulary

Learners will be acquainted with the basic of English language learning. They will be taught to identifying technical vocabulary from the general. Technical magazines prescribed by the institution that are subject specific can be used as teaching tools.

- Introduction to technical lexicon – help students identify jargon and technical terminologies. Assist them comprehend the significance of implementation with moderation through their subject literature.
- Internet lexis and contextualisation – provide meanings accurately to ensure right exercise of terms in a professional scenario through hands-on experience
- Circumstantial usage of diction – aid the comprehension of word usage as verbs and nouns based on the requirement. Differentiating the meanings of synonyms and their orientation in a text
- Integrating technical vocabulary in describing process and procedure – through prescribed texts students can be made to enhance their language by right integration of diction.
- Mind mapping of textual diction and allied words – diagrammatically mapping of words based on their meaning, context and usage will re-emphasise the words in the minds of the learners

Unit-3 **Teaching Hours:8**

rereading texts

Having gained familiarity with technical and subject specific vocabulary, students will be introduced to the types of reading. The basic receptive skill will help students help students prioritise and eliminate content.

- Reading strategies – acquaint the learners with the functions and benefits of reading strategy in the academic and professional set-up

- Reading: skimming, scanning – introduce learners to the types of reading. The integral aspects of each method will be familiarized to the students. They can be given practice sessions through subject material provided

- Intensive and extensive reading – benefits and features of the two types of reading can be elaborated. To emphasise on the learner the difference, practice sessions with subject material can be carried out

- Summarising – consolidation of key ideas can be carried out in the spoken and written format. Technical literature can be provided for the purpose

Unit-4 **Teaching Hours:5**

non - verbal communication

The ancillaries of speaking skill is in focus here. Prior to delving into the productive skill, the nitty gritty that enhance its effectiveness is made familiar to the learner. Classroom activities and vicarious learning through case studies and video clippings can be screened.

- Competence in non-verbal communication- create an awareness of the role of non-verbal communication in a professional set-up

- Functions of non-verbal communication – the various utilities of nonverbal communication can be elaborated to students with case studies

- Benefits of non-verbal communication – elucidate the advantages of non-verbal communication with reference to cultural distinctions

- Proxemics, Chronemics, Kinesics, Haptics, Gestures, Paralanguage - vicarious learning of these aspects of non-verbal communication can be carried out through video clippings of suitable material and print media

Unit-5 **Teaching Hours:4**

communication strategies

The productive skills are finessed through identification and refining of the elements mentioned in this unit. They contribute to holistic presentation. Task based activities must be used to practise. Business Communication texts and worksheets will provide ample support.

Nuances of Communication – communication in the work place requires knowing the dos and don’ts of professional communication. An

introduction to listening, speaking, reading and writing with reference to professional communication can be provided.

- Opening techniques
- Speech markers
- Fillers
- Turn taking
- Backchannelling
- Dealing with interruptions

every element mentioned can be elaborated. Ample examples can be provided through audio visual media, it can be provided to them through demonstrations and verbal reinforcement language checklists can be provided to aid students understand implementation of the elements. A follow up through mock sessions must be carried out in groups

Unit-6 **Teaching Hours:6**

writing skill

Having dealt with speaking skill in the previous unit, the other productive skill; writing is taken into consideration here. The various forms of sriting in an official context will be taught in form and content.

- Report writing – a corporate requirement is the ability to report on meetings and conferences. The format and requirements of a report writing can be taught to the students through samples and later they can be made to draft reports of their own and peer evaluated
- Note taking – corporate atmosphere calls for not taking at every step. Students need to be taught the framework of note taking. They can be given samples as reference. Later they can be made to listen to technical audio clips and provide the note taking carried out at an individual level.
- Minutes – corporate life calls for being in attendance of numerous meetings. Taking down the minutes is a skill that is assumed to be possessed by one. The essentials of maintaining the minutes must be made conversant through illustrations. This can be emphasised by classroom activities of the same

Unit-7 **Teaching Hours:8**

professional communication

Lastly students will be introduced to typical work scenarios through hands-on sessions.

- Small talk – the purpose and role of small talk must be taught to the students. They can be screened video clippings of the same. Mock sessions can be performed in the class. The key phrases and language used can be imparted through provision of language worksheets and skills checklists

- Meeting- types of meetings, hierarchy of most often featuring members, etiquette to be held at meeting and the duties to be performed can be taught implicitly. Chairing, setting the agenda, controlling the smooth functioning, participating, deliberating and diplomacy must be made clear. The key phrases and language used can be taught through language worksheets and skills checklists

- Group discussion – group discussions are carried out at every level. Students must be familiarized with the basics of a group discussions. Agreeing, disagreeing, and being diplomatic are essentials to be imparted. The soft skills and language essentials most commonly noted can be made comprehensible to the students. Vicarious learning and language charts can be used as learning tools.

Text Books And Reference Books:

[1] Driscoll, Liz. Common Mistakes at Intermediate and How to Avoid Them. CUP, 2008.

[2] Carter, Ronald and Michael McCarthy. Cambridge Grammar of English. CUP, 2006.

[3] Leech, Geoffrey, Jan Svartvik. A Communicative Grammar of English. Third Edition. New Delhi: Pearson Education, 2009.

Essential Reading / Recommended Reading

Booher, Dianna. E- Writing: 21st Century Tools for Effective Communication. Macmillan, 2008.

Knapp .M. Essentials of Non-Verbal Communication Theory Rea. FL: Harcourt, 1995.

Evaluation Pattern

CIA I - 20

MID SEMESTER EXAM - 50

CIA II -20

Total Teaching Hours for Semester:45 | **No of Lecture Hours/Week:3**

Max Marks:100 | **Credits:3**

Course Objectives/Course Description

To acquaint students with various statistical methods.
To cultivate statistical thinking among students.
To prepare students for future courses having quantitative components.

Learning Outcome

CO1: Understand and appreciate descriptive statistics.

CO2: Understand the concepts of probability and random variables.

CO3: Understand the different index numbers.

Unit-1 **Teaching Hours:10**

Introduction

Importance of Statistics, Primary and secondary data, data collection methods. Presentation of numerical and categorical data.

Unit-2 **Teaching Hours:12**

Concepts of central tendency and dispersion

Mean, median, mode and partition values-quartiles for grouped and ungrouped data. Range, quartile deviation, standard deviation and coefficient of variation for grouped data

Unit-3 **Teaching Hours:12**

Probability

Random Experiment- Sample space and events. Probability. rules. Conditional probability and Bayes theorm.

Unit-4 **Teaching Hours:6**

Random variable

Definition, types of random variables, probability functions, expectations and variance.

Unit-5 **Teaching Hours:5**

Index Number

Laspeyres', Paasches', Fishers price and quantity index numbers. Time reversal and factor reversal tests.

Text Books And Reference Books:

1. Berenson and Levine, *Basic Business Statistics*, New Jersey, 6th edition, Prentice- Hall India, 1996.

Essential Reading / Recommended Reading

1. D.C. Montogomery and G.C.Runger, *Applied Statistics and Probability for engineers*, New Jersey, John Wiley and Sons, 3rd edition, 2003.

Evaluation Pattern

Evaluation Pattern:

Component	Marks
Continuous Internal Assessment-I	10
Continuous Internal Assessment-II	25
Continuous Internal Assessment-III	10
Attendance	5
End Semester Exam(Written Test)	50
Total	**100**

End Semester Exam Pattern:

Section	Total number of questions	No. of questions to be answered	Max. Marks for each question	Total Marks
A	12	10	2	20
B	6	5	6	30
C	6	5	10	50
Total	24	19		100

BCA133 - DIGITAL COMPUTER FUNDAMENTALS (2020 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

This is an introductory course that provides the required knowledge about the digital fundamentals of computers. The course covers a few topics like number systems, logic gates, and flips flops. The course starts with an introduction to number systems and its applications in computers. The discussion about the working of devices like encoders and decoders, multiplexers, and demultiplexers are dealt with.

Learning Outcome

CO1: Ability to use math and Boolean algebra in performing computations in various number systems.

CO2: Simplification of Boolean algebraic expressions.

CO3: Ability to design efficient combinational and sequential logic circuit

implementations from a functional description of digital systems.

Unit-1 **Teaching Hours:12**

Introduction to Number System and Codes

Number systems: Decimal numbers, Binary numbers: Counting in binary, The weighted structure of binary numbers, Octal numbers, hexadecimal numbers, and their mutual conversions, Binary arithmetic: Addition, subtraction, multiplication, and division of binary numbers, 1‘s and 2‘s complement, signed numbers, arithmetic operations: addition, subtraction with signed numbers, 9‘s and 10‘s complement, BCD numbers, BCD addition, BCD subtraction, Gray code: Binary to Gray code conversion, Gray to Binary conversion, Weighted code: 8421 code and non-weighted codes: ASCII and EBCDIC.

Unit-2 **Teaching Hours:8**

Boolean Algebra

Boolean operations and expressions, Laws and rules of boolean algebra, Demorgan‘s Theorem, Boolean expressions, Simplification of a Boolean expression.

Unit-3 **Teaching Hours:10**

Logic Gates

AND gate, OR gate, NOT gate, NAND gate, NOR gate, X-OR gate, X-NOR gate, The universal property of NAND gate and NOR gate, Realization of basic gates. The boolean expression for logic circuits, Karnaugh map SOP with examples.

Unit-4 **Teaching Hours:10**

Combinational Logic

Basic Adders: Half adder, Full adder, 4-bit Parallel adders, Subtractor: Half subtractor, Full subtractor Implementation using logic gates, Decoders: 4-bit decoder, BCD to decimal decoder, Encoder: Decimal to BCD encoder, Multiplexer: 4 to 1 multiplexer, Demultiplexer: 1 to 4 demultiplexer.

Unit-5 **Teaching Hours:10**

Flip-flops

Latches: SR latch, Clocked flip-flops: SR flip-flop, D flip-flop, JK flip-flop, Positive edge-triggered flip flops, Timing diagrams, Master-slave JK flip-flop.

Unit-6 **Teaching Hours:10**

Registers and Counters

Modes of operation of registers: SISO, SIPO, PISO, and PIPO, Asynchronous counters: Four-bit ripple counter, Decade counter, Synchronous counters: Four bit synchronous counter, Decade counter

Self-Learning

Introduction to RAM, SRAM, DRAM, ROM, PROM, EPROM, EEPROM

Text Books And Reference Books:

Floyd, Thomas L: Digital Computer Fundamentals, 11th Edition, Pearson International, 2015.

Essential Reading / Recommended Reading

Malvino, Paul Albert, Leach, Donald P,GautamSaha: Digital Principles And Applications, TMH ,8th Edition, 2015.

Bartee, Thomas C: Digital Computer Fundamentals, 6 Edition,TMH, 2010.

Evaluation Pattern

CIA - 50%

ESE - 50%

BCA134 - INTRODUCTION TO PROGRAMMING USING C (2020 Batch)

Total Teaching Hours for Semester:60 | **No of Lecture Hours/Week:4**

Max Marks:100 | **Credits:4**

Course Objectives/Course Description

The course provides students with a comprehensive study of C programming language. The course lectures stress the strengths of C, which provides the outcome of writing efficient, maintainable and portable code. Course includes few lab exercises to make sure the student has not only gained the knowledge but can also apply and execute it. Objectives of the course are,

- To study about algorithms, flowcharts and programs.
- To solve problems through logical thinking.

Learning Outcome

CO1: To clearly understand the logic of the problem.

CO2: To analyze the given problem and write the algorithm, flowchart.

CO3: To write structured C programs, this is the foundation of any programming language.

Unit-1 | **Teaching Hours:8**

Introduction to computers and programming

Evolution of Computers, Generation of Computers, Classification of Computers.Characteristics of Computers. Advantages of Computers. Block Diagram of a Digital Computer. Types of Programming Languages.Structured Programming.Algorithms and Flowcharts with Examples.Programming Logic.

Unit-2 **Teaching Hours:10**

Introduction to C programming

History of C- Character set - Structure of a C program - constants, variables and keywords. Expressions – Statements – Operators – Arithmetic, Unary, Relational and logical, Assignment, Conditional. Library functions. Data Input and output – Single character input, getchar, getch, getc – Single character output putchar, putc, Formatted I/O scanf, printf, gets, puts.

Unit-3 **Teaching Hours:11**

Control structures and arrays

Branching: condition: if, if..else, switch. Looping: while, do..while, for, nested control structures, break, continue statement, goto statement. Arrays: definition, processing, types - One and Two dimensional arrays. String, string operations, arrays of strings.

Unit-4 **Teaching Hours:11**

Functions and Pointers

Functions: Definition, Accessing and prototyping, types of functions, passing arguments to functions, recursion, passing arrays to functions. Pointers: Definition, notation, applications, call by reference.

Unit-5 **Teaching Hours:11**

Structures, Unions and Files

Structures: Definition, Processing, user defined data type typedef - Unions – definition, declaration and accessing union elements. Enumerated Data type.Files: File opening in different modes, closing, reading and writing. fopen, fclose, fprintf, fscanf, getw, putw.

Unit-6 **Teaching Hours:9**

Low level programming and C preprocessor

Storage Structures: extern, register, static, auto. Bitwise Operations: AND, OR, exclusive OR, complement, right shift and left shift operators. Preprocessor: Types of C preprocessor directives. Macros- comparison with functions. File Inclusion. Command line Arguments.

Text Books And Reference Books:

[1] Byron Gottfried, JitenderChhabra ,*Programming with C, 3rd* Edition. Tata McGraw-Hill, 2010

Essential Reading / Recommended Reading

[1] Balagurusamy E., *Programming in ANSI C,* 6th Edition,TataMcGraw-Hill,2012.

[2] Deitel H M and Deitel P J, *C- How to Program*, 5th Edition, Prentice-Hall, 2006.

[3] SmarajitGhosh, *All of 'C',2nd Edition,2009.*

[4] M. T. Somashekara, *Problem Solving with C,* PHI,2009

Evaluation Pattern

CIA - 50%

ESE - 50%

BCA151 - DIGITAL COMPUTER FUNDAMENTALS LAB (2020 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:2**

Course Objectives/Course Description

This course offers an experimental view of hardware components, digital circuits and logic gates of a computer. Objective of the course is to understand the working principle and logic design of digital circuits.

Learning Outcome

CO1: Students will demonstrate an ability to identify the basic components to build digital circuits.

CO2: Students will be able to design efficient Combinational and Sequential logic circuits.

Unit-1 **Teaching Hours:60**

List of programs

1. Demonstration of the components of (i) Kindle (ii) iPad (iii) Smart Phone (iv) Laptops

2. Demonstration of the installation and discussion of the features of different Operating

Systems. Eg: Mac, Unix, Ubuntu, Windows etc.

3. Verification of the truth tables of AND, OR & NOT gates.

4. Verification of the truth tables of NAND & NOR gates.

5. Verification of the truth table of XOR using NAND gates.

6. Verification of the truth table of Half Adder circuits using NAND gates.

7. Verification of the truth table of Full Adder circuits using NAND gates.

8. Verification of the truth table of D flip flop.

9. Verification of the truth table of JK flip flop.

10. Verification of the truth table of RS flip flop.

11. Binary To Gray Code and Gray Code to Binary Converter

12. Verification of the Function table of Binary Ripple Counter using JK FF.

13. Verification of the Function table of Decade Counter.

14. Verification of the Function table of Serial In Serial Out Shift Register using D FF.

Text Books And Reference Books:

Floyd, Thomas L: Digital Computer Fundamentals, 11th Edition, Pearson International, 2015.

Essential Reading / Recommended Reading

Malvino, Paul Albert, Leach, Donald P,GautamSaha: Digital Principles And Applications, TMH ,8th Edition, 2015.

Bartee, Thomas C: Digital Computer Fundamentals, 6 Edition,TMH, 2010.

Evaluation Pattern

CIA - 50%

ESE - 50%

BCA152 - C PROGRAMMING LAB (2020 Batch)

Total Teaching Hours for Semester:60 | **No of Lecture Hours/Week:4**

Max Marks:100 | **Credits:2**

Course Objectives/Course Description

To learn problem solving through procedural language programming technique and Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.

Learning Outcome

CO1: Read, understand and trace the execution of programs written in C language. CO2: Write the C code for a given algorithm.

CO3: Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.

Unit-1 **Teaching Hours:60**

List of Programs

1. To demonstrate the usage of operators and data types in C

a. Write a program to print the size of all the data types with its modifiers supported by C and its range.

b. Write a program to convert Fahrenheit to Celsius.

2. To demonstrate the usage of if, if-else

a. Write a program to check whether the given number is a Prime number or not.

b. Write a program to accept three numbers and find the largest and second largest among them.

3. To demonstrate the concept of while, do-while, for loops, break and continue

a. Write a program to print all prime numbers between any 2 given limits.

b. Write a program to print all the Armstrong numbers between any 2 given limits.

4. To demonstrate the concept of arrays and strings

a. Write a program to check whether a string is a Palindrome.

b. Write a program to check whether a given matrix is an Identity matrix or not.

c. Write a program to perform matrix multiplication.

5. To demonstrate the concept of switch-case

a. Write a program to count the different vowels in a line of text.

b. Write a program to accept two numbers and perform various arithmetic operations (+, -, *, /) based on the symbol entered.

6. To demonstrate the usage of functions and recursion

a. Write a program to find the roots of a quadratic equation

b. Write a recursive program to find the factorial of a number.

7. To demonstrate the concept of structures and unions

a. Create an employee structure and display the same.

b. Create a student database storing the roll no, name, class etc. Implement modify and search operations.

8. To demonstrate the concept of

a. Write a function to swap two numbers using pointers

b. Write a program to access an array of integers using pointers

9. To demonstrate the concept of File

a. Create a file and store some records in it. Display the contents of the same. Implement search, modify, and delete operations.

10. To demonstrate the concept of Bitwise operators and preprocessors

a. Perform the different bitwise operations (menu driven program) .The i/p and the o/p should be displayed in Binary form.

b. Write a program to include your own header file.

Text Books And Reference Books:

Text Books and Reference Books

[1] Byron Gottfried, JitenderChhabra ,*Programming with C, 3rd* Edition. Tata McGraw-Hill, 2010

Essential Reading / Recommended Reading

[1] Balagurusamy E., *Programming in ANSI C,* 6th Edition,Tata McGraw-Hill,2012.

[2] Deitel H M and Deitel P J, *C - How to Program*, 5th Edition, Prentice-Hall, 2006.

[3] SmarajitGhosh, *All of 'C',2nd Edition, 2009.*

[4] M. T. Somashekara, *Problem Solving with C,* PHI, 2009

Evaluation Pattern

CIA weightage 50%

ESE weightage 50%

BCA212 - STATISTICS TOOL LAB (2020 Batch)

Total Teaching Hours for Semester:30 | **No of Lecture Hours/Week:2**

Max Marks:50 | **Credits:1**

Course Objectives/Course Description

This course is designed to help the students to explore and provide statistical knowledge with pragmatic tools for statistical analysis. The main objective of the course is to provide Hands-on Experience on any Statistical Tool.

Learning Outcome

CO1: Acquire the basics to understand descriptive statistics by practical application.

CO2: Demonstrate their knowledge on the basics of inferential statistics by making valid generalizations from sample data.

Unit-1 **Teaching Hours:30**

List of programs

1. Calculate mean, median, mode and display results in proper format.
2. Calculate the product and sum of two vectors.
3. Calculate Range, quartile deviation, standard deviation and coefficient of variation for grouped data.
4. Partition values-quartiles for grouped and ungrouped data and display formatted results.
5. Data Base Creation (including vector, matrix, data frames).
6. Graphical representation (Bar, Pie, Line, Histogram, Scatter).
7. Cross tabulation and Descriptive Statistics.
8. Implement Correlation.
9. Perform simple Regression and show results in chart.
10. Testing of hypothesis for single mean.
11. Testing of hypothesis for comparison of means.
12. Chi-square test for independence of attributes.

Text Books And Reference Books:

-

Essential Reading / Recommended Reading

-

Evaluation Pattern

CIA - 50%

ESE - 50%

BCA221 - COMMUNICATIVE ENGLISH (2020 Batch)

Total Teaching Hours for Semester:45 | **No of Lecture Hours/Week:3**

Max Marks:100 | **Credits:2**

Course Objectives/Course Description

communicative english BCA 221

Course Description:

This course focuses on making students understand the vitality of English as a tool in implementing and; interpreting technical and professional communication. The course aims at detecting and nurturing research skills through English for professional development. A holistic approach to recognize the fundamental role of language in technical communication is undertaken.

Course Objective:

- Nurture an enquiring spirit through English language in Technical communication
- Enhance English implementation in English learning for professional purposes
- Encourage students towards autonomous learning through enhanced English comprehension that go beyond the classroom

Learning Outcome

Learning Outcome:

- Students will demonstrate better comprehension and interpretation of technical literature
- Rudimentary research aptitude through language up-gradation will be initiated
- Learn the nuances of professional communication through English language

Unit-1 **Teaching Hours:5**

PRONUNCIATION

The most regularly used words in their field of knowledge, the most often committed mistakes and their right pronunciation will be given to the students. Applications available in this context can be made familiar to learners.

- Phonetics – students can me taught phonetics through phonetic apps that enable the student to relate the symbol with the sound. They can be taught to read and transcribe words to ensure ample understanding

- Commonly mispronounced words – technical vocabulary can be focused here. Audio sessions can be implemented to enable auditory retention

- Common errors in grammar – cooperative language learning will help students familiarize common errors and rectifications

Unit-2 **Teaching Hours:10**

TECHNICAL LITERATURE

Students need to learn to read and study literature of their subject. Any form of literature in context to the subject can be taken and students can be involved in these chapters mentioned below

- Comprehensive questioning of procedural writings & Comprehension answering of procedural queries – through subject based literature students can be taught cognition and responding to the prescribed material through writing and speaking

- Issuing of instructions – instructions being an integral part of their area of expertise, students need to be made familiar with the sequencing and of ideas and brevity of language. This can be carried out through written and spoken format.

- Procedural instructions – a set of operating procedures for a piece of technical equipment can be carried out in through first through oral presentations and writing exercises

- Discussion of processes, errors or glitches – going beyond the usual, students must be acquainted with dealing the nitty-gritty of technical literature. They must be taught to spell out glitches or errors to enable smooth functioning

Unit-3 **Teaching Hours:8**

RESEARCH ORIENTATION

An integral part of in-depth learning involves research. In this unit research will be introduced to the students. The nuances of exploratory study and their approaches will be made familiar to the students

- Structure of the essay – students need to be familiarized on the format and elements that contribute to a holistic essay. Deconstruction of essays can be carried out through cooperative learning and deliberated.

- Topic sentence recognition – Technical English calls for detection of topic sentence recognition of any technical literature. Students can be taught on detecting keywords and significant concepts that will aid in the process

- Thesis statement identification – research publications are an integral part of technical writing. Students can be provided research articles and familiarized on the format and texture of a thesis statement

- Interpretation of data – quantitative study is entirely dependent on data analysis and interpretation. The language to be used in the process can be fine-tuned for the students through case studies of the same

- Comprehension, organization of ideas and execution of writing project proposal – once learners have been taught the elements of a research paper, they can be encouraged to work in groups and draft their own research paper integrating all the major elements.

Unit-4 **Teaching Hours:6**

ANALYTICAL STUDY

An extension of rudimentary research is present in this chapter. Students will be encouraged to analyse texts, interpret and rewrite them.

- Rhetoric analysis; a comparative analysis of two texts – in context to the literature prescribed, students must be enabled to make a detailed study of the texts and chart out differences and similarities.

- Critical analysis – students can be taught to scrutinise the text based on the context and produce a systematic response

- Paraphrasing – in a professional atmosphere data needs to be interpreted and paraphrased. Tasks with data analysis can be used to help students comprehend the implementation of paraphrasing in the written

Unit-5 **Teaching Hours:6**

OFFICIAL CORRESPONDENCE

Productive skill; writing is nurtured in this chapter. A few elements of the same was handled in the first semester. Here students will further finesse their writing skills

- Official letter – the types and format of official letter can be imparted through examples. Students can be then asked to draft letters of their own. Etiquettes of letter writing, register, style and specific language phrases must be taught. H examples can be used to emphasise.

- Internet correspondence – the soft skills for corresponding through email, carbon copying, blind carbon copying, salutations, register, style, format and diction must be made familiar to the students,

- Resume writing – the organization of a resume along with the covering letter can be imparted to the learners through providing several samples. They can then be made to draft a resume with covering letter of their own.

Unit-6 **Teaching Hours:10**

SPEAKING SKILL

The previous semester dealt with a few productive oral skills. Furthering their productive expertise, speaking skills are taken into consideration. Students will be encouraged to demonstrate their skills under guidance of the teacher.

Interview – types of interviews can be elaborated to the learners. The essential language and skills required must be emphasised verbally and through case studies. Students can be encouraged to demonstrate the acquired knowledge through simulated sessions

- Presentations – the critical features and language checklists must be emphasised. Introducing the topic, linking, sequencing and dealing with questions must be mad familiar. The soft skills and paralinguistic aspects can be taught through examples. Group demonstrations must be mandatory

- Conference – the soft skills and language finesse required must be made clear to the students. Checklists can be provided as learning aids. Chairing sessions, targeting issues, key language, and steering the meeting is required to be acquainted. Audio visual examples can be screened and re-emphasis through practice sessions can be carried out.

Text Books And Reference Books:

Day, R A. Scientific English: A Guide for Scientists and Other Professionals. 2nd ed. Hyderabad: Universities Press, 2000. .

[2] Meenakshi Raman and Sangeetha Sharama . 2009. Technical Communication-Principles and Practice; - Oxford University Press,

[3] Jay. Effective Presentation. New Delhi: Pearson, 2009.

Essential Reading / Recommended Reading

English for Effective Communication. Oxford University Press, 2013.

Lynch, Tony. Study Listening. New Delhi. CUP, 2008.

Evaluation Pattern

CIA I - 20

MID SEMESTER EXAMINATION - 50

CIA II - 20

BCA232 - STATISTICS II FOR BCA (2020 Batch)

Total Teaching Hours for Semester:45 | **No of Lecture Hours/Week:3**

Max Marks:100 | **Credits:3**

Course Objectives/Course Description

The course statistics-II describes the concept of correlation and regression, probability distribution and testing hypothesis.

Objectives of the course are

- To acquaint students with various statistical methods.
- To cultivate statistical thinking among students.
- To train the students to apply the suitable statistical methods for real life data set for analysis.

Learning Outcome

Upon successful completion of the course one should be able to

CO1:Understand and analyze bivariate data with respect to their association.

CO2:Apply different models to the univriate and bivariate data set pertaining to real life problems.

CO3:Apply various tests of hypothesis understand their interpretation.

Unit-1 **Teaching Hours:10**

Correlation and Regression

Scatter diagram, Karl Pearson's and Spearman's correlation coefficient and their properties. Regression and properties of regression coefficient.

Unit-2 **Teaching Hours:10**

Probability Distributions

Discrete and continuous random variables. Probability mass and density functions. Expectation. Binomial, Poisson and normal distributions

Teaching Hours:12

Unit-3

Sampling distribution and confidence interval

Sampling distribution and estimation. Parameter and statistic. Chi-square, t and F distributions (definitions only) Confidence intervals for Single mean and difference between two means for known and unknown variances of normal distribution. Confidence interval for Single population proportion and difference of two population proportions.

Unit-4 **Teaching Hours:13**

Testing of Hypothesis

Types of hypothesis. Level of significance. Types of errors. Test for single mean and difference of means. Paired t test. Tests for proportions. Chi square test for independence of attributes.

Text Books And Reference Books:

1. Berenson and Levine, *Basic Business Statistics*, New Jersey, Prentice- Hall India, 6th ed. 1996.
2. SP Gupta, Statistical Methods, Sultan Chand & Sons, new Delhi, 41st Revised Edition, 2011

Essential Reading / Recommended Reading

1. C.Montogomery and G.C.Runger, *Applied Statistics and Probability for engineers*, New Jersey, John Wiley and Sons, 3rd ed. 2003.

Evaluation Pattern

Evaluation Pattern:

Component	Marks
Continuous Internal Assessment-I	10
Continuous Internal Assessment-II	25
Continuous Internal Assessment-III	10
Attendance	5
End Semester Exam(Written Test)	50
Total	**100**

End Semester Exam Pattern:

Section	Total number of questions	No. of questions to be answered	Max. Marks for each question	Total Marks
A	12	10	2	20
B	6	5	6	30
C	6	5	10	50
Total	24	19		100

BCA233 - OPERATING SYSTEMS (2020 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

Course Objectives

This course is an introduction to the concepts behind modern computer operating systems. Topics will include what an operating system does (and doesn't) do, system calls and interfaces, processes, resource scheduling and management (of the CPU, memory, etc.), virtual memory.

Objectives of the course are

· To acquire the fundamental knowledge of the operating system architecture and its components

· To know the various operations performed by the operating system.

Learning Outcome

Course Outcomes

CO1: Upon completion of the course students will be able to:

CO2: Understand the basic working process of an operating system.
CO3: Understand the importance of process and scheduling.

CO4: Understand the issues in synchronization and memory management.

Unit-1 **Teaching Hours:8**

Introduction and System Structures

Operating System Fundamentals; Computer System organization and architecture; Operating System structure and operations; Basics of process, memory and storage management and protection and security; Operating System services; User interface; System calls; System programs; Operating System structure; System boot.

Unit-2 **Teaching Hours:12**

Process Management

Process concept; Process scheduling; Operations on processes; Inter Process Communication; Overview of Threads; Multi-threading models; Threading issues

Unit-3 **Teaching Hours:12**

Process Synchronization

Need of synchronization; Critical section problems; Peterson‘s solution; Synchronization hardware; Mutex Locks; Semaphores, Classical problems of synchronization, Synchronization examples, Thread synchronization using mutex and semaphore.

Unit-4 **Teaching Hours:6**

CPU Scheduling

CPU Scheduling concepts; Scheduling criteria; Scheduling algorithms; Overview of thread scheduling; Multi-processor scheduling

Unit-5 **Teaching Hours:12**

Memory Management

Overview; Swapping; Memory allocation; Segmentation; Paging, Structure of the page table

Unit-6 **Teaching Hours:10**

Virtual Memory

Overview; Demand paging; Copy on Write; Page replacement; Allocation of Frames; Thrashing

Unit-6 **Teaching Hours:10**

Self Learning

File system structure, Directory structure

Text Books And Reference Books:

Text Books and Reference Books:

[1] A. Silberschatz, P.B. Galvin and G. Gagne, Operating System Concepts.9th Edition, New Delhi: Wiley India, 2011.

Essential Reading / Recommended Reading

Essential Reading/Recommended Reading

[1] Stalling William, Operating Systems: Internals and Design Principles. 7th Edition, Prentice Hall,2011.

[2] Dietel et al, Operating System.3rd Edition. Pearson Education,2004.

[3] A.S. Tanenbaum, Modern Operating Systems.3rd Ed, Prentice Hall,2007.

Evaluation Pattern

CIA : 50

ESE : 50

BCA234 - DATA STRUCTURES (2020 Batch)

Total Teaching Hours for Semester:60 | **No of Lecture Hours/Week:4**

Max Marks:100 | **Credits:4**

Course Objectives/Course Description

Data Structure is considered as one of the fundamental paper towards a more comprehensive understanding of programming and application development. The student is expected to work towards a sound theoretical understanding of Data Structures and also compliment the same with hands-on implementing experience.

Objectives of the course are

- Tobeabletopracticallyimplementthedatastructureslikestack, queue, array, etc.
- To understand and implement different searching and sorting techniques.

Learning Outcome

CO1: Understand the need for Data Structures when building applications.

CO2: Appreciate the need for an optimized algorithm.

CO3: Able to walk through insert and delete for different data structures.

CO4: Ability to calculate and measure the efficiency of the code.

CO5: Appreciate some interesting algorithms like Huffman, Quick Sort, and Shortest Path etc.

CO6: Able to walkthrough algorithm.

CO7: Improve programming skills.

Unit-1 **Teaching Hours:10**

Arrays

Introduction to data structures- Arrays and Structures: Abstract Data Type, Array in C, Dynamically Allocated Arrays, Structures, Unions, Internal Implementation of Structures, Self-Referential Structures, Polynomial Representation, Polynomial Additions.-sparse matrix

Unit-2 **Teaching Hours:10**

Searching and String

Linear Search, Iterative Binary Search, Recursions, Recursive Binary Search, String Abstract Data Type, String in C, Pattern Matching.

Unit-3 **Teaching Hours:9**

Stacks and Queues

Stacks- stacks using dynamic arrays- queues – circular queue using dynamic arrays- Evaluation of Expressions, Evaluating Postfix Expressions, Infix toPostfix

Unit-4 **Teaching Hours:9**

Linked Lists

Pointers, Using Dynamically Allocated Storage, Singly Linked Lists, Dynamically Linked Stacks and Queues, Polynomials, Representing Polynomials as Singly Linked Lists, Adding Polynomials, Erasing Polynomials, Polynomials as Circularly Linked Lists, Doubly Linked Lists.

Unit-5 **Teaching Hours:10**

Trees

Introduction, Terminology, Representation of Trees, Binary Trees, Abstract Data Type, Properties of BinaryTrees,BinaryTreeRepresentations,BinaryTreeTraversalsBinarySearchTrees:Introduction, SearchingaBinarySearchTree, InsertinganElement,DeletinganElement,HeightofBinarySearch Tree

Unit-6 **Teaching Hours:12**

Sorting techniques and Graphs

Introduction, Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Merge Sort. Graphs— Introduction-Definition-representation-Depth first search-Breadth first search

Text Books And Reference Books:

[1] Horowitz Sahni Anderson-Freed, *Fundamental of Data Structures in C,* Universities Press, Reprint 2009.

Essential Reading / Recommended Reading

[1] Yashwant Kanetkar, *Data Structures Through C*, 9th Edition, BPB Publication 2010.

[2] Tremblay J.P and Sorenson P.G: *An Introduction to Data Structures with Applications*,2nd Edition, 2002, TMH.

Evaluation Pattern

CIA --50%

ESE---50%

BCA251 - OPERATING SYSTEMS LAB (2020 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:2**

Course Objectives/Course Description

Course Objectives

This lab introduces basic commands in LINUX and helps students in familiarizing the concepts of operating system through various commands related to operating system activities.

Learning Outcome

Course Outcomes

CO1: To make students able to implement various LINUX commands.

CO2: Students will also be able to implement different process related commands.

Unit-1 **Teaching Hours:60**

List of programs

1. To study the execution of various file/directory handling commands.

2. To study the various commands operated in vi editor in LINUX.

3. To study the various File Access Permission and different types of users in LINUX

4. To study about process related commands.

5. To study about the commands related to memory allocation of variables for a process.

6. To study about commands for viewing system calls.

7. To study about commands used for debugging.

8. Write a program to demonstrate basic operations of a process.

9. Write a program to create a Zombie process and an orphan.

10. Write a program to demonstrate a one-way pipe between two processes.

11. Write a program to illustrate a two way pipe between two processes.

12. Write a program to demonstrate a one-way communication between two processes using FIFO

13. Write a program to demonstrate a two-way communication between two processes using FIFO

14. Demonstrate process synchronization using semaphore.

15. Demonstrate the basic operations of thread.

16. Demonstrate thread synchronization using mutex.

17. Demonstrate thread synchronization using semaphore.

Text Books And Reference Books:

Text Books and Reference Books:

[1] A. Silberschatz, P.B. Galvin and G. Gagne, Operating System Concepts.9th Edition, New Delhi: Wiley India, 2011.

Essential Reading / Recommended Reading

Essential Reading/Recommended Reading

[1] Stalling William, Operating Systems: Internals and Design Principles. 7th Edition, Prentice Hall, 2011.

[2] Dietel et al, Operating System.3rd Edition. Pearson Education, 2004.

[3] A.S. Tanenbaum, Modern Operating Systems.3rd Ed, Prentice Hall, 2007.

Evaluation Pattern

CIA : 50

ESE : 50

BCA252 - DATA STRUCTURES LAB (2020 Batch)

Total Teaching Hours for Semester:60 | **No of Lecture Hours/Week:4**

Max Marks:100 | **Credits:02**

Course Objectives/Course Description

The course is designed to provide a practical exposure on data structure and its applications.

Learning Outcome

Upon completion of the course

CO1: Students acquire the knowledge to build the logic and develop a solution for a problem statement.

Unit-1 **Teaching Hours:60**

List of programs

1. Strings:

   a. Write a menu driven program to compare, concatenate, copy strings and find the length of astring.

   b. Write a menu driven program to find the index of a pattern in a given string and to extract asubstring.

2. Arrays

   a. Write a program to insert and delete an element(s) in one dimensionalarray.

   b. Write a program to insert and delete an element(s) in twodimensional arrays.

3. Sparse Matrix

   a. Write a menu driven program to read a sparse matrix of integer values and to search the sparse matrix for any element specified by theuser.

   b. Write a program to print the appropriately triple < row, column, "value" > that represents the elements in the sparsematrix.

4. SearchingTechniques:

   a. Write a program to implement Linear Search withsentinels

b. Write a program to implement Binary Search usingrecursion

5. Sortingtechniques:

a. Write a menu driven program to implement insertionsort

b. Write a menu driven program to implement selectionsort.

c. Write a menu driven program to implement quick sort usingrecursion

d. Write a menu driven program to implement merge sort usingrecursion.

6. Singly linkedlist:

a. Write a menu driven program to implement singly linked lists creation, insertion and deletion

7. Stack:

a. Write a menu driven program to implement different operations on a stack using an array and linkedlist.

8. Queue:

a. Write a menu driven program to implement different operations on a queue using an array and linkedlist.

9. Binary searchtrees:

   a. Write a menu driven program to create a binary search tree and to perform Insertion and different types oftraversal

10. Graphs:

   a. Write a menu driven program to implement breadth first search(bfs)

   b. Write a menu driven program to implement depth first search(dfs)

Text Books And Reference Books:

[1] Horowitz Sahni Anderson-Freed, *Fundamental of Data Structures in C,* Universities Press, Reprint2009.

Essential Reading / Recommended Reading

1. Yashwant Kanetkar, *Data Structures Through C*, 9th Edition, BPB Publication 2010.

2. Tremblay J.P and Sorenson P.G: *An Introduction to Data Structures with Applications*,2nd Edition, 2002, TMH.

Evaluation Pattern

Category	Component	Description	Marks
Part -1 CIA-100 Marks	CIA	Section A Programs	25
		Section B Programs	25
		Section C Programs	25
		Section D Programs	25
Part-2 ESE-100 Marks	Test1	Questions based-on Section A	20
	Test2	Questions based-on Section A (and/or) B	25
	Test3	Questions based-on Section A (and/or) B (and/or) C	25
	Test4	Questions based-on Section A (and/or) B (and/or) C (and/or) D	30
		Total	**200**

- CIA is the regular assessment of programs from the list having four sections (A-D). Each program carries 25 marks and the average in each section is considered for final CIA.
- Evaluation Rubrics for each program in CIA is asfollows:
  - Attendance andon-timecompletion [5Marks]
  - Draft(observation) & Final Program(upload) [5Marks]
  - Complexity (Concepts&Operations) [5Marks]
  - FormattingandValidation [5Marks]
  - Viva-voce [5Marks]
- If a student fails to appear for any of the Test, there will be only one repeat test conducted in the last week of the semester. To appear for the repeat test, the student has to apply for the same in the format given by the class teacher and by paying the required fee, one week before the scheduled date. Appearance in the re-test is subject to the approval by the Course teacher, Programme Coordinator and Head of theDepartment.

BCA312 - ACCOUNTING TOOLS LAB (2019 Batch)

Total Teaching Hours for Semester:30 **No of Lecture Hours/Week:2**

Max Marks:50 **Credits:1**

Course Objectives/Course Description

The main objective of this tools lab is to practically implement the concepts in accounting.

Learning Outcome

CO1: Understanding the practical concepts of accounting.

CO2: Analyzing different financial statements and applying suitable solutions to generate a correct balance sheet.

CO3: Design a solution to solve accounts related problems.

Unit-1 **Teaching Hours:30**

List of Programs

1. Creation of inventory groups andledgers.

2. Consider an asset with an initial cost of Rs10000, a salvage value (residual value) of Rs1000

and a useful life of 10 periods (years).Solve the above using Straight Line Depreciation.

3. Vouchers, types and vouchers entry.

4. Creation of various accounting Ledgers.

5. Purchase order and sales order processing.

6. Generating trial balance, income statement and balancesheet.

7. Displaying Income statement and balance sheet under different options and time periods

8. Creation of pay rollrecords.

9. Recording of Pay roll information and salary statement.

Text Books And Reference Books:

Official guide to financial accounting using tally. BPB publications 2018. ISBN-13;978-9387284036.

Essential Reading / Recommended Reading

Computerised Accounting using Tally.ERP 9 (English),Sahaj Enterprises,2015

Evaluation Pattern

CIA:50%

ESE:50%

BCA333 - OBJECT ORIENTED PROGRAMMING USING JAVA (2019 Batch)

Total Teaching Hours for Semester:60 — **No of Lecture Hours/Week:4**

Max Marks:100 — **Credits:4**

Course Objectives/Course Description

This course teaches students how to develop java applications. Course gives an overview of difference between C++ and Java. Students will be developing and testing java application as a practical course work. The course introduces the concept of UI design in java using SWING and JAVAFX.

Learning Outcome

CO1:Understanding the basic concepts of object oriented programming.

CO2:Apply the Object Oriented Programming concepts in solving real world applications.

CO3: Build Client/Server GUI applications using SWING and JAVAFX.

Unit-1 Teaching Hours:10

JAVA BASICS

Java Fundamentals

Object oriented programming concepts – Benefits of OOPS-The origins of java - java's lineage C and C++ - how java impacted the internet - java bytecode - a first simple program - the java keywords - identifiers in java - the java class libraries.

Introducing data types and operators

Why data types are important - java's primitive types - literals - a closer look at variables - the scope and lifetime of variables - operators - type conversion in assignments - casting incompatible types - operator precedence -expressions.

Program control statements

Input characters from the keyboard - if statement - switch statement - for loop - the enhanced for loop - the while loop - the do-while loop – break – continue - nested loops.

Unit-2 Teaching Hours:10

ARRAYS AND CLASSES

Arrays

One dimensional arrays - multidimensional arrays - irregular arrays - alternative array declaration syntax - assigning array references - using the length member- the for each style for loop – command line arguments.

Class fundamentals - how objects are created - reference variables and assignment - methods returning a value - using parameters - constructors - parameterized constructors - the new operator revisited - garbage collection - the this keyword - controlling access to class members - method overloading -overloading constructors - understanding static - introducing nested and inner classes.

Unit-3 Teaching Hours:11

INHERITANCE,STRINGS AND EXCEPTION HANDLING

Inheritance

Inheritance basic - member access and inheritance - constructors and inheritance - using super to call superclass constructors - using super to access superclass members - creating a multilevel hierarchy - superclass references and subclass objects - method overriding - using abstract classes -using final - the object class.

Strings

Constructing strings - operating on strings - arrays of strings - strings are immutable - using a string to control a switch statement - different string handling functions.

Exception handling

The exception hierarchy - exception handling fundamentals - the consequences of an uncaught exception - using multiple catch statements - catching subclass exceptions - try blocks can be nested - throwing an exception - using finally -using throws - java's built in exceptions - creating exception subclasses.

Unit-4 **Teaching Hours:11**

INTERFACES, USING I/O AND MULTI THREADING

Packages and Interfaces

Packages - packages and member access - understanding protected members -importing packages - Interfaces - implementing interfaces - using interface references - variables in interfaces - interfaces can be extended - default interface methods - use static methods in an interface.

Using I/O

Java's I/O is built upon streams - byte streams and character streams - the byte stream classes - the character stream classes - the predefined streams- using the byte streams - reading and writing files using byte streams - reading and writing binary data, using java's character based streams - file I/O using character streams.

Multithreaded programming

Multithreading fundamentals - the thread class and runnable interface - creating a thread - creating multiple threads - determining when a thread ends -thread priorities - synchronization - suspending, resuming, and stopping threads.

Unit-5 **Teaching Hours:9**

SWING

Introducing swing - the origins and design philosophy of swing - components and containers - layout managers - swing event handling - use of JButton -work with JTextField - create a JCheckBox - work with JList.

Self Study

Advanced SWING components

Unit-6 **Teaching Hours:9**

INTRODUCING JAVAFX

Javafx basic concepts - the javafx packages - the stage and scene classes - nodes and scene graphs - layouts - the application class and the life-cycle methods - launching a javafx application - a javafx application skeleton - compiling and running a javafx program - the application thread - a simple javafx control- label - using buttons and events - three more javafx controls-CheckBox – ListView – TextField -introducing effects and transforms.

Text Books And Reference Books:

[1] Schildt Herbert, Java :The Complete Reference, Tata McGraw- Hill, 10th Edition,2017

[2] Dr.Rao,Nageswara ,Core Java,An Integrated Approach ,New Edition Kongent Solutions Inc, 2009. 2005.

Essential Reading / Recommended Reading

[1] Java ™ A Beginner's Guide, Herbert Schildt, McGraw-Hill Education, 7th Edition, 2017

Evaluation Pattern

CIA - 50%

ESE - 50%

BCA334 - DATABASE MANAGEMENT SYSTEM (2019 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

This course concentrates on introduction, principles, design and implementation of DBMS. It introduces about the distributed system and brief about data mining and data warehouse. To provide strong foundation of database concepts and develop skills for the design and implementation of a database application with a brief exposure to advanced databaseconcepts.

Learning Outcome

CO1: Understanding the core terms, concepts, and tools of relational database management systems.
CO2: Understanding database design and logic development for database programming.

Unit-1 **Teaching Hours:10**

DBMS Architecture

Data Models – Categories of data models, Schemas, Instances, and Database states. DBMS Architecture and Data Independence – The Three schema architecture, Data independence - DBMS Languages and Interfaces. Classifications of Database Management Systems.

Unit-1 **Teaching Hours:10**

Introduction

Data, Database, Database management system, Characteristics of the database approach, Role of Database administrators, Role of Database Designers, End Users, Advantages of Using a DBMS and When not to use aDBMS.

Unit-2 **Teaching Hours:10**

Data Modeling Using Entity-Relationship Model

Using High Level Conceptual Data Models for Database Design, Example Database applications. Entity types, Entity Sets, Attributes and Keys. Relationships, Relationship types, Roles and Structural constraints. Weak Entity Types and Drawing E- R Diagrams.

Unit-2 **Teaching Hours:10**

Index Structures for Files

Single Level Ordered Indexes – Primary indexes, Clustering indexes and Secondary indexes. Multi-level indexes, Hashing concepts.

Unit-3 **Teaching Hours:10**

Database Design

Functional dependencies and Normalization for Relational Databases - Normalization concepts, first, second, third normal forms, Boyce-Codd normal form.

Unit-3 **Teaching Hours:10**

Relational Data Model

Relation, Integrity constraints - domain, entity and Referential integrity constraints, Basic Relational Algebra operations, select, project and join operations.

Unit-4 **Teaching Hours:10**

SQL

SQL data definition and data types, specifying constraints in SQL, schema change statements, Basic queries, More Complex SQL queries, INSERT, DELETE and UPDATE statements in SQL, Views – Concept of a view in SQL.

Unit-4 **Teaching Hours:10**

Transaction Processing Concepts and Concurrency Control Techniques

Transaction and System concepts – Desirable properties of Transactions – Schedules and Recoverability. Lock-Based Protocols – Locks, Granting of Locks, and Two phase locking protocol and implementation of locking.

Unit-5 **Teaching Hours:10**

Database Recovery

Recovery Concepts: Recovery Outline and Categorization of Recovery Algorithms, Caching Buffering of Disk Blocks, Write-Ahead Logging, Steal/No-Steal, and Force/No-Force, Checkpoints in the System log and Fuzzy Check pointing, Transaction Rollback.

Unit-5 **Teaching Hours:10**

Data Base Administration

Introduction to Database security issues, Discretionary Access Control Based on Granting/Revoking of Privileges and Multi-level security.

Unit-6 **Teaching Hours:10**

Distributed Databases

Distributed database concepts, Data fragmentation, Replication, and Allocation Techniques for Distributed database design, Types of Distributed database systems.

Unit-6 **Teaching Hours:10**

Introduction to Advanced Database concepts

Brief introduction to Data warehousing and Data mining.

Text Books And Reference Books:

1. Elmasri Ramez and Navathe Shamkant B, Fundamentals of Database Systems, Addison-Wesley, 6th Edition, 2010.

Essential Reading / Recommended Reading

1. Silberschatz, Korth, Sudarshan, Database System Concepts, 5 Edition, McGraw Hill, 2006.
2. O`neil Patricand, O`neil Elizabeth, Database Principles, Programming and Performance, 2nd Edition, Margon Kaufmann Publishers Inc, 2008.

Evaluation Pattern

CIA-50%

ESE-50%

BCA351 - JAVA PROGRAMMING LAB (2019 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

This course teaches students how to develop java applications. Course gives an overview of difference between C++ and Java. Students will be developing and testing java application as a practical course work. The course introduces the concept of UI design in java using SWING and JAVAFX.

Learning Outcome

CO1: Demonstrate their ability to understand the concepts of Object oriented programming and will model the real world applications using Object Oriented Programming concepts

CO2: Apply the concept of Multithreading in concurrent programming.

CO3: Able to Analyze & Design the concept of Event Handling and Swing

CO4: Build MVC and Custom Components using JSF

Unit-1 **Teaching Hours:60**

Lab Programs

1. To implement different entry controlled and exit controlled looping statements

2. To Implement nesting of switch statement

3. To Implement single and multi-dimensional arrays

4. To implement constructor overloading and method overloading

5. To implement static keyword

6. To Implement multilevel inheritance

7. To implement super and this keyword

8. To implement abstract and final keyword

9. To implement methods of String class

10. To Implement exception handling and custom exceptions

11. To implement package and interface

12. To implement File Stream classes

13. To Implement multithreading

14. To implement mouse and keyboard events

15. To implement different layout managers

16. To design a customer registration form using advanced swing components

17. To implement 2D Shapes using JavaFX

18. To implement CheckBox and ListView events using JavaFX

19. To implement JavaFx Effects and Transformation

Text Books And Reference Books:

[1] Schildt Herbert, Java :The Complete Reference, Tata McGraw- Hill, 10th Edition,2017

[2] Dr.Rao,Nageswara ,Core Java,An Integrated Approach ,New Edition Kongent Solutions Inc, 2009. 2005.

Essential Reading / Recommended Reading

[1] Java ™ A Beginner's Guide, Herbert Schildt, McGraw-Hill Education, 7th Edition, 2017

Evaluation Pattern

CIA - 50%

ESE - 50%

BCA352 - DBMS LAB (2019 Batch)

Total Teaching Hours for Semester:60 | **No of Lecture Hours/Week:4**

Max Marks:100 | **Credits:2**

Course Objectives/Course Description

The main objective of this lab is to provide a strong foundation in database concepts, understand and implement the use of Structured Query Language (SQL) and Procedural Structured Query Language (PL/SQL) to create and query databases.

Learning Outcome

CO1: Design and implement a database schema for a given problem-domain using SQL-DDL commands.
CO2: Populate and query a database using SQL (DML/DCL) commands.
CO3: Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS
CO4: Programming PL/SQL including stored procedures, stored functions, cursors, packages.

Unit-1 **Teaching Hours:60**

List of programs

1. Introduction TO SQL

a. Introduction

b. Logging on to SQL interface

c. Choosing and Describing Tables

d. Elements of the SQL Query

e. The System Dummy Table

f. Selecting Tables and Columns

g. Duplicate Information DISTINCT

h. Sorting Information

2. Data Definition Language (DDL)

a. Create

b. Drop

c. Alter

d. Rename

3. Integrity Constraints

a. Types of Constraint

b. Referential Integrity

c. Defining Constraints

4. Data Manipulation Language DML

a. Select

b. Insert

c. Update

d. Delete

5. Filtering Data Using Where

a. Where Operators

b. Where with Keywords

c. Where and Logical Operators

6. SQL Functions and Data types

a. Date and Time Functions

b. Numeric Functions

c. String Functions

d. Conversion Functions

7. Group By

a. Group Function Examples

b. Group Function with Having

8. Retrieving Data from Multiple Tables using Joins

a. Natural Join

b. Inner Join

c. Outer Join

9. Sub-Queries

a. Basic Subqueries

b. Multiple Column Subqueries

c. Subqueries with Having

d. Correlated Subqueries

10. Views

a. CREATE VIEW

b. WITH CHECK OPTION

11. Indexes

a. Create Index

b. Unique Option

c. When and What to Index

d. Drop Index

12. Data Control Language (DCL)

a. Grant

b. Revoke

13. Transaction Control Language

a. Commit

b. Rollback

c. Savepoint

d. Set Transaction

14. PL/SQL

a. Variables and type declarations

b. Loop structure

c. Procedures and Functions

d. PL/SQL Blocks

e. Cursor/ Cursor loops

f. Exceptions

Text Books And Reference Books:

Vikram Vaswani, *MySQL(TM): The Complete Reference,* McGraw Hill, The Paperback edition,2017.

Essential Reading / Recommended Reading

James R Groff, Paul N. Weinberg and Andy Oppel, *SQL The Complete Reference*, 3rd Edition, McGraw Hill,2011.

Evaluation Pattern

ESE - 50%

CIA - 50%

BCA361A - GERMAN (2019 Batch)

Total Teaching Hours for Semester:60 | **No of Lecture Hours/Week:4**

Max Marks:100 | **Credits:4**

Course Objectives/Course Description

The Basic Course in German aims to provide students a good knowledge of the language, enabling them to read, write and speak German, whereby the emphasis is laid on speech.

Learning Outcome

CO1: Students are in the position to communicate in a basic manner.

Unit-1 **Teaching Hours:12**

Greetings

Greetings, ordering, requesting, saying thank you Grammar. Greetings, ordering, requesting, saying thank you Grammar - the article the, conjugation of verbs

Unit-2 **Teaching Hours:12**

Shopping

Shopping Grammar

Shopping Grammar - adjectives, endings before nouns.

Unit-3 **Teaching Hours:12**

Addresses, Occupations, Studies

Addresses, Occupations, Studies Grammar

Addresses, Occupations, Studies Grammar - verb to be, the definite/indefinite articles.

Unit-4 **Teaching Hours:12**

Leisure Time, Sport, Hobbies

Leisure Time, Sport, Hobbies Grammar

Leisure Time, Sport, Hobbies Grammar - position of a verb in a mainclause.

Unit-5 **Teaching Hours:12**

At a Restaurant, Food and Drink

At a Restaurant, Food and Drink Grammar

At a Restaurant, Food and Drink Grammar - the personal pronoun in the Nominative, Accusative.

Text Books And Reference Books:

Haeusermann/Dietrich/Guenther, Sprachkurs Deutsch, 6th Ed., Delhi: Goyal 1997

Kaminski/Woods/Zenker

Essential Reading / Recommended Reading

Dollenmayer/Hansen, Neue Horizonte, 4th Ed., Lexington: D.C. Heath 1996

Evaluation Pattern

CIA - 50%

ESE - 50%

BCA361B - FRENCH (2019 Batch)

Total Teaching Hours for Semester:60 | **No of Lecture Hours/Week:4**

Max Marks:100 | **Credits:4**

Course Objectives/Course Description

The curriculum of the French course offered as an elective to the 3 sem BCA students is designed to suit the present day requirements where the emphasis is more on the Oral communication. Completely desined for the basic level, the method through its day to day situations with its dialogues aids the students of Zero level. The part on French civilization offers one useful insights on life and living in France.

The teaching hours include tutorials ,exercises, activities like role plays, creative projects and moodle testing.

Learning Outcome

Enhancement of linguistic competencies and sharpening of written and oral communicative skills in French.

Unit-1 **Teaching Hours:30**

Let's learn together

1. Do you understand?
2. At work!
3. Shall we relax?
4. Tell me

Unit-2 **Teaching Hours:30**

Managing in French

5. Happy Journey
6. Enjoy your meal!
7. What a Day!
8. We are good here!

Text Books And Reference Books:

1. Girardet. J ; J.Pécheur. Echo A1 Méthode de français. Paris : Clé International, 2010. (Units 1 & 2, L 1-8)

Essential Reading / Recommended Reading

French websites - < www.yahoo.fr> , <www.google.fr> , <www.monum.fr> etc.

Evaluation Pattern

CIA I MOODLE/CREATIVE ASSIGNMENT 20 MARKS

CIA 2 MID SEMESTER EXAMINATION 50 MARKS

CIA 3 THEATRE/ROLE PLAY 20 MARKS

END SEMESTER EXAMINATION 100 MARKS

BCA432 - FINANCIAL MANAGEMENT (2019 Batch)

Total Teaching Hours for Semester:45 | **No of Lecture Hours/Week:3**

Max Marks:100 | **Credits:3**

Course Objectives/Course Description

The main objective of this paper is to bring them knowledge about the basics of finance. It also intends to provide various forms of techniques to make decision about long-term investment. Various forms of financial statement analysis like ratios, fund flow and cash flow statement also included to make them know about the tools of financial performance analysis.

Learning Outcome

CO1: Understand the process and methods of evaluating a long term project using capital budgeting techniques and appreciate the risks and benefits involved.

CO2: Familiar with the Management concepts and the tools in Management Accounting.

CO3: Demonstrate the knowledge of financial statements and their analysis and interpretations.

Unit-1 **Teaching Hours:3**

Financial Management

Introduction, Definition, Objectives of Financial Management-Profit Vs Wealth Maximization, Functional areas of Financial Management.Time Value of Money- Compounding and discounting techniques, Financial Markets- Theory.

Unit-2 **Teaching Hours:10**

Capital Budgeting

Meaning, Importance, Process of Capital Budgeting. Payback Period, Accounting Rate of return, Net Present Value, Profitability Index, Internal Rate of Return, Capital Rationing.

Unit-3 **Teaching Hours:12**

Financial Statement Analysis and its Interpretation

Meaning and nature of financial statements-Significance of financial statements-Types of financial statements-Limitations of financial statements-Steps involved in financial statement analysis-Tools of financial analysis – Comparative Statements, Common size statements , Trend Analysis –practical problems

Unit-4 **Teaching Hours:10**

Financial Statement Analysis and its Interpretation: Ratio Analysis

Meaning, Types and Uses, Ratio Analysis-Meaning, Importance, Limitations, Types- Liquidity, Solvency, Activity and Profitability Ratios.

Unit-5 **Teaching Hours:10**

Cash Flow

Cash Flow- Meaning of cash, differences between funds flow and cash flow, Preparation of cash flow statement- Operating, Investing and Financing activities.

Text Books And Reference Books:

[1] Shashi K Gupta .R.K.Sharma and Neeti Gupta.Financial Management.Kalyani Publishers, 2 nd Revised Edition, 2008, Reprint 2010.

[2] M. N. Arora. Management Accounting, Himalaya Publication, 4 th Edition, 2010

Essential Reading / Recommended Reading

[1] M.Y. Khan & V.K. Jain. Financial Management.Tata McGraw Hill, 6 th Edition, 2011.

[2] R K Sharma , Shashi K Gupta. Practical Problems in Management Accounting, 5 th Edition , 2011

Evaluation Pattern

CIA-50%

ESE-50%

BCA433 - DESIGN AND ANALYSIS OF ALGORITHMS (2019 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

Course Objectives

To demonstrate the different ways to analyze and evaluate the performance of an algorithm.

To apply different design techniques of algorithms to solve problems.

Learning Outcome

Course Outcomes

CO1:Demonstrate their ability to apply appropriate Data Structures.

CO2: Design and develop algorithms using relevant data structure operations.

CO3: Evaluate the Algorithms for its efficiency.

UNIT 1 **Teaching Hours:10**

INTRODUCTION

A simple example of design using insertion sort, pseudo code for insertion sort and analysis of time complexity. Performance Analysis - Space complexity and Time complexity (posteriori testing, and a priori approach), Asymptotic Notations (O, Ω, Θ).Polynomial Vs. Exponential Algorithms. Average, Best and Worst case complexity.

UNIT 2 **Teaching Hours:12**

DIVIDE AND CONQUER ALGORITHMS

Introduction to Divide and Conquer Algorithms - Finding the Maximum and Minimum, Quick sort (Derivation of Average case analysis and Worst case analysis), Binary Search (Derivation of Average case analysis), and Strassen's Matrix Multiplication.

UNIT 3 **Teaching Hours:12**

GREEDY ALGORITHMS

Introduction to Greedy Algorithms - Fractional Knapsack problem, minimum cost spanning trees, Kruskal's and Prim's Algorithms, Optimal Merge patterns and Single-Source Shortest Paths

UNIT 4 **Teaching Hours:8**

DYNAMIC PROGRAMMING

Definition - All-pairs shortest paths, Traveling salesman problem, optimal parameterization for product of sequence of matrices and Multistage graphs

UNIT 5 **Teaching Hours:10**

BACK TRACKING AND RANDOMIZED ALGORITHMS

Introduction - N-Queens, Sum of Subsets, Graph coloring, Hamiltonian Cycles problem using Back tracking algorithms.

Random Number Generators and Primality Testing using randomized algorithms

UNIT 6 **Teaching Hours:8**

GRAPHS AND HEAPS AND LOWER BOUND THEORY

Definitions - Adjacency Matrix, Adjacency Lists .Breadth First Search and Traversal, Depth First Search and Traversal. Priority Queues using Heap and Design of Heap sort using Heap.

Text Books And Reference Books:

[1] Horowitz, Sahni, Rajasekaran, Fundamentals of Computer Algorithms,Silicon Pr, 2nd Edition, November 2012

Essential Reading / Recommended Reading

1. Donald E. Knuth, *The Art of Computer Programming Volume 3, Sorting and Searching*, 2nd Edition, Pearson Education, Addison-Wesley, 1997.
2. GAV PAI, *Data structures and Algorithms,* Tata McGraw Hill, Jan 2008.

Evaluation Pattern

CIA (Weightage)	ESE (Weightage)
50%	**50%**

BCA434 - SOFTWARE ENGINEERING (2019 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

This course is an introduction to software development process and design. It includes the descriptions about stages of software development, various process models and software engineering principles.

Learning Outcome

CO1: Understand the importance of the stages in the software life cycle.

CO2: Understand the various process models.

CO3: Understand the UML notation.

CO4: Be able to design software by applying the software engineering principles.

Unit-1 **Teaching Hours:10**

Process models

A generic process model – Defining a framework activity, identifying a Task Set, Process Patterns - Process Assessment and improvement, Prescriptive Process Models – The waterfall Model,

Incremental Model, Evolutionary Process Model, Concurrent Models- A Final Word on Evolutionary Processes.

Unit-1 **Teaching Hours:10**

Software and Software Engineering

Nature of software- Defining software, Software Application Domains, Legacy Software - Software Engineering, The software process, Software Engineering practice – The essence of Practice, General Principles - Software Myths.

Unit-2 **Teaching Hours:10**

Requirement Modelling

Requirement Analysis, Data modelling concepts, Class-based modelling, Requirement modelling strategies, Flow oriented modeling.

Unit-2 **Teaching Hours:10**

Understanding Requirements

Requirements Engineering, Establishing the groundwork – Identifying Stakeholders, Recognizing multiple viewpoints, Working toward Collaboration, Asking the first questions-, Eliciting requirements – Collaborative requirement gathering, Quality function Deployment, Usage Scenario Elicitation Work Products - Developing use cases, building the requirements model – Elements of the requirements Model, Analysis pattern - Negotiating requirements, validating requirements.

Unit-3 **Teaching Hours:10**

User Interface Design

The golden rules- Place the User in Control, Reduce the User's Memory load, Make the interface Consistent-, Interface Analysis and Design models, The Process, Interface Analysis User Analysis, Task Analysis, Analysis of Display Content, Analysis of the Work Environment - Interface design steps – Applying Interface Design steps, User Interface design patterns, Design Issues.

Unit-3 **Teaching Hours:10**

Design Concepts

The design within the context of Software Engineering, The design process – Software quality guidelines and attributes, The evolution of software design - Design concepts – Abstraction, Architecture, Patterns, Separation of concerns, Modularity, information hiding, Functional Independence, refinement, Aspects, Refactoring, Object Oriented design concepts Design classes - The design Model – Data Design elements, Architectural Design elements, Interface Design Elements, Component-Level Design elements, Deployment level Design elements.

Unit-4 **Teaching Hours:10**

Quality Management

Introduction, Software quality, Achieving software quality, Review metrics and their use, Informal reviews, Formal technical reviews, SQA tasks, Goals and metrics, Formal approaches to SQA, Statistical Software quality assurance, Software Reliability, SQA plan.

Unit-5 **Teaching Hours:10**

Software Testing

A Strategic approach to testing, Test strategies for conventional software, Test strategies for Object Oriented software, Validation testing, White-box testing, Basic path testing, control structure testing, Black-box testing, Object oriented testing methods.

Unit-6 **Teaching Hours:10**

Project Management concepts

The management spectrum, Metrics in the process and project domains, software measurement, metrics for software quality, The project planning process, Software project estimation, Decomposition techniques, Empirical estimation models, Project scheduling, Risk identification, Risk projection, The RMMM plan.

Text Books And Reference Books:

[1] Pressman S Roger, Software Engineering A Practitioner‟s Approach, McGraw Hill, International Editions, 7th edition, 2010.

Essential Reading / Recommended Reading

[1] Sommerville, Ian, Software Engineering, Addison Wesley, 9th Edition, 2010.

[2] Rumbaugh, James, Object Oriented Modeling and design, Pearson Education, New Delhi, 2005.

Evaluation Pattern

CIA	50%
ESE	50%

BCA435 - WEB TECHNOLOGY (2019 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:04**

Course Objectives/Course Description

This subject will provide basic understanding of WWW, Web Development, Client side and Server side technologies to develop and deploy Websites on Internet.

Learning Outcome

CO1: Understand the concepts of Internet basics to design, implement and maintain a typical web page

CO2: Develop and incorporate dynamic capabilities in Web pages using DOM and JavaScript.

CO3: Learn the importance of server-side scripts for web Interactivity and Web Hosting

Unit-1 **Teaching Hours:10**

WEB ESSENTIALS AND STYLE SHEETS

Clients, Servers, and Communication. The Internet - Basic Internet Protocols -The World Wide Web - HTTP request message - response message - Web Clients - Web Servers - Markup Languages: XHTML. An Introduction to HTML – History – Versions -Basic XHTML Syntax and Semantics - Fundamentals of HTML.

CSS - Introduction to Cascading Style Sheets – Features - Core Syntax - Style Sheets and HTML - Cascading and Inheritance - Text Properties – Positioning.

Unit-2 **Teaching Hours:10**

CLIENT-SIDE PROGRAMMING

Introduction to JavaScript – Functions – Objects – Arrays – Built - in Objects - JavaScript Debuggers. Browsers and the DOM - Introduction to the Document Object Model DOM History and Levels - Intrinsic Event Handling - Modifying Element Style - The Document Tree -DOM Event Handling.

Unit-3 **Teaching Hours:10**

SERVER-SIDE PROGRAMMING

Introduction to PHP - Basic Programming Concepts of PHP: Variables - Data-types - Constants - Scope of Variables - Type of Variables - Type Casting – Operators - Operators Precedence – References – Arrays - Control Structures: Branching -If statement - Switch statement - Looping: for Loop - while Loop - do while Loop - for each Loop -Functions: User Defined Functions - Built-in Function - Functions for Variables - Script Controlling Functions - Array Functions - Date and Time Functions - Mathematical Functions -String Functions - PHP Server Variables; Working with form - Uploading files to Web Server using PHP.

Unit-4 **Teaching Hours:12**

PHP and MySQL

Basic commands with PHP examples - Connection to server - creating database - selecting a database - listing database - listing table names - creating a table, -inserting data - altering tables – queries -deleting database -deleting data and tables -PHP myadmin and database bugs.

Unit-5 **Teaching Hours:8**

XML

Documents and Vocabularies - Versions and Declaration - Namespaces JavaScript and XML: Ajax-DOM based XML processing. Selecting XML Data: XPATH - Template based Transformations: XSLT - Displaying XML Documents in Browsers.

Unit-6 **Teaching Hours:8**

JSF and JAVA Web Services

Introduction – Java Web Technologies – Creating and running simple application- JSF components -Session Tracking.

Basics- Creating, Publishing and Consuming Web Services - Session Tracking in Web Services.

Text Books And Reference Books:

1.Web Technologies-A Computer Science Perspective, Jeffrey C.Jackson, Pearson Education, 2008.

2. Internet & World Wide Web - How To Program, H.M.Deitel, P.J. Deitel , et.al , Pearson Education, Fifth Edition, 2012.

Essential Reading / Recommended Reading

1. Programming the World Wide Web, Robert. W. Sebesta, Pearson Education, Fourth edition, 2007.
2. Web Technologies Uttam K Roy, Oxford University Press, 2011.
3. Web Programming: Desktop Management, Aferganatel, PHI, 2004.
4. Web Technology, Rajkamal, Tata McGraw-Hill, 2001.

Evaluation Pattern

CIA:50%

ESE:50%

BCA451 - .NET LAB (2019 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:2**

Course Objectives/Course Description

The course introduces the concepts of converting the real time problems into an interactive window based application to attain a solution.

Learning Outcome

CO1: Demonstrate the skills in designing an interactive Graphical User Interface using windows based application.
CO2: Design and develop an application using fundamentals of object-oriented programming concepts.
CO3: Build an application using different controls available in windows form application and convert to exe file.

Unit-1 **Teaching Hours:60**

List of Programs

1. Introduction to windows form application design
(Tool box, Property window,Solution Explorer,Server Explorer) Properties associated with each control

2. Introduction to common controls Part I and their properties
Text boxes
Rich Text Box
Label
Link label
Button
Panel
Event associated with each of the control
Changing the properties at runtime with C# code

3. Validating controls
Numbers
Texts
Regular expression

4. Looping structures
If structure in C#
Switch case in C#
While loop in C#
Do .. While loop in C#
For loop in C#

5. Introduction to common controls Part II and their properties
List Box
Combo box
Check box
Radio button
Group Box
Events associated with each of the control
Changing the properties at runtime with C# code

6. Introduction to common controls Part III and their properties
Date time picker
Month Calendar
Numeric Up Down
Events associated with each of the controls
Changing properties at runtime using C# code

7. Introduction to common controls Part IV and their properties
Progress bar
Tool Tip
Picture box
Properties associated with each of the controls
Changing properties at runtime using C# code

8. Introduction to Menus & Toolbars and their properties
Menu Strip
Status Strip
Tool Strip
Events associated with each of the controls
Changing properties at runtime using C# code

9. Introduction to Dialog control and their properties
Font Dialog
Open File Dialog
Save File Dialog
Events associated with each of the controls
Changing properties at runtime using C# code

10. Introduction to database using SQL Server and their properties
Creating a table
Introducing Primary Key
Introducing Data types
Writing Queries in SQLServer (SELECT, UPDATE, DELETE, INSERT)

11. Windows Form Interaction with database using INSERT, UPDATE Query
Connecting form with database
Writing INSERT query in windows form to store data in the database

12. Windows Form Interaction with database using SELECT, DELETE Query
Connecting form with database
Writing SELECT query in windows form to store data in the database

13. Introduction to the control data grid. Retrieving data from the database to the grid control

14. Report generation
Generating reports using tools available

15. Converting the application to an exe file

Text Books And Reference Books:

-

Essential Reading / Recommended Reading

-

Evaluation Pattern

CIA (Weightage)	ESE (Weightage)
50%	50%

BCA481 - DBMS PROJECT (2019 Batch)

Total Teaching Hours for Semester:90 **No of Lecture Hours/Week:6**

Max Marks:150 **Credits:3**

Course Objectives/Course Description

The purpose of this course is to provide comprehensive understanding to develop web applications with database systems. Started with web programming using HTML, CSS, PHP and connect with database concepts DDL, DML andPL/SQL.

Learning Outcome

CO1: Install, configure, and interact with a database management system
CO2:Describe,defineandapplythedatabasecomponentstodatabasedesign
CO3: Analyze the design of a database schema and apply normalization techniques
CO4: Develop dynamic web pages to meet specified needs using HTML, PHP, CSS

Unit-1 **Teaching Hours:90**

Part1 and Part2

Part 1: Web Technology

HTML

1) Develop static pages usingHTML

   (Using Heading elements, Text Elements, Logical Styles, Physical Styles, Ordered, Unordered and Definition list, Hyper Links, Image Link, Link to page containing Images and Videos, FileLink)

2) HTML Page usingFrames.

   (Navigation, Floating, Inline Frames , Frames to add Images and Videos)

CSS/ XSL /DTD

3) Add a Cascading Style sheet for designing the webpage.

4) Create any catalog and display it using CSS orXSL

5) Document Type Definition (DTD) to validateXML

JavaScript / PHP

6) Design a dynamic web page with validation usingJavaScript

7) PHP program to perform File operations / RegularExpressions

8) PHP program to sort the records which are stored in thedatabase

Data Connectivity and Web Services

9) Install DBMS/ Configure DBConnectivity

10)JSF and Web ServicesConfigurations

Part 2: Database Management System Project

Text Books And Reference Books:

-

Essential Reading / Recommended Reading

-

Evaluation Pattern

CIA:50%

ESE:50%

BCA531 - PYTHON PROGRAMMING (2018 Batch)

Total Teaching Hours for Semester:60 | **No of Lecture Hours/Week:4**

Max Marks:100 | **Credits:4**

Course Objectives/Course Description

This course covers the programming paradigms associated with python. It explores the object-oriented programming, Graphical programming aspects of python with help of built in modules.
The objective of this course is to provide comprehensive knowledge of python programming paradigms

Learning Outcome

CO1: Demonstrate the use of built-in objects of Python

CO2: Demonstrate significant experience with python program development environment

CO3: Implement GUI programming concepts.

Unit-1 **Teaching Hours:10**

INTRODUCTION TO PYTHON DATA STRUCTURES

Underlying mechanism of Module Execution- Sequences, Mapping and Sets- Dictionaries- Functions - Lists and Mutability- Problem Solving Using Lists and Functions

Unit-2 **Teaching Hours:10**

OBJECT ORIENTED PROGRAMMING USING PYTHON AND REGULAR EXPRESSIONS

Classes: Classes and Instances-Inheritance—Polymorphism- Abstract classes-Exceptional Handling- Regular Expressions using “re” module.

Unit-3 **Teaching Hours:10**

GUI PROGRAMMING

Introduction-Tkiner module-Root window-Widgets-Button-Label-Message-Text-Menu- Listboxes-Spinbox-Creating tables

Unit-4 **Teaching Hours:10**

FILE HANDLING

Writing and Reading Binary Data, Writing and Parsing Text Files, Writing and Parsing XMLFiles.

Unit-5 **Teaching Hours:10**

INTRODUCTION TO WEB FRAMEWORK

Introduction-Web framework-creating model to add database service-python application shell-Django administration application-input-forms and models.

Unit-6 **Teaching Hours:10**

USING NUMPY AND PANDAS

Computation on NumPy-Aggregations-Computation on Arrays-Comparisons, Masks and Boolean Arrays-Fancy Indexing-Sorting Arrays-Structured Data: NumPy's Structured Array. Introduction to Pandas Objects-Data indexing and Selection-Operating on Data in Pandas-Handling Missing Data-Hierarchical Indexing.

Text Books And Reference Books:

1. Wesely J.Chun,*Core Python Application Programming* ,Prentice Hall,third edition2015.

2. T.R.Padmanabhan, *Programming with Python*,SpringerPublications,2016

Essential Reading / Recommended Reading

Zhang.Y ,*An Introduction to Python and Computer Programming,* Springer Publications,2016

Evaluation Pattern

CIA 50%

ESE 50%

BCA532 - COMPUTER NETWORKS **(2018 Batch)**

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

The goal of this course is to introduce the basics computer networks. Students will learn their fundamental layered structure, understand common offered layered services, examine protocols and algorithms used to operate the network.

Objectives of the course are

• To study about network components.

• To study about topologies and network models.

• To study about various network protocols, algorithms.

Learning Outcome

Students will gain knowledge about networks, internal components and its functionality.

Unit-1 **Teaching Hours:10**

Physical Layer

Data communications : components – Network criteria – physical structures – network models – categories of networks – interconnection of networks – inter network Protocols and standards : protocols-standards-standards organizations- internet standards Network models: Layered tasks – OSI model – layers in the OSI model – TCP/IP protocol suite.

Unit-2 **Teaching Hours:10**

Digital Transmission, Analog Transmission and Transmission Media

Digital Transmission: Digital to digital conversion: Line coding – line coding schemes – block coding - analog to digital conversion – PCM - transmission modes: serial transmission – parallel transmission

Analog Transmission: Digital to analog conversion: FSK-ASK-PSK Analog to Analog conversion: Amplitude modulation – Frequency modulation – phase modulation Multiplexing: Frequency division multiplexing – Time division multiplexing

Transmission Media Guided media: Twisted pair cable – coaxial cable – fiber optic cable Unguided media: radio waves - micro waves – infrared.

Unit-3 **Teaching Hours:10**

Data Link Layer

Error correction and detection: Introduction- block coding-linear block cods-cyclic codes-checksum. Data link Control: protocols-simplest protocol- stop and wait protocol- stop and wait automatic repeat request-go back n automatic repeat requestselective repeat-automatic repeat request-piggybacking. **MultipleAccess:** Random access- Aloha-CSMA-CSMA/CD-CSMA/CA Controlled access: reservation, polling, token passing. Channelization: FDMA,TDMA, CDMA.

Unit-4 **Teaching Hours:10**

Wired LANs:

Wired LANs: Ethernet: IEEE standards, standard Ethernet- fast Ethernet. Wireless Lans: IEEE 802.11-arhitecture-MAC sublayer addressing mechanism, physical layer-Bluetooth: architecture-Bluetooth layers-radio layer-baseband layer-L2CAP-other upper layers. Network Layer: AddressingIPV4 addresses - IPV6

Addresses Internet Protocol: IPv4 –IPv6 Address mapping protocols: ARP – RARP.

Unit-5 **Teaching Hours:10**

Routing protocols:

Routing protocols: Unicast routing protocols: distance vector routing, Link State routing Multicast Routing protocols Any two Transport Layer: Process to process delivery – UDP – TCP Congestion control and QOS:Data traffic – congestion – congestion control – quality of service – techniques to improve quality of service.

Unit-6 **Teaching Hours:10**

Application layer: & Network Security

Application layer: & Network Security :DNS: Name space – domain name space – distribution of name space Electronic mail Architecture – FILE transfer: FTP WWW and HTTP: Architecture – web documents – HTTP Network Security: Introduction - definitions – two categories - symmetric key cryptography – traditional ciphers – asymmetric key cryptography.

Text Books And Reference Books:

[1] Behrouz A Forouzan, Data communication and networking, McGraw-Hill, 5 th edition, 2012.

Essential Reading / Recommended Reading

[1] Andrew S Tanenbaum ,Computer Networks, PHI publications, 5 th edition, 2011.

Evaluation Pattern

Component	Marks
CIA I	20
Mid Semester Examination CIA II	50
CIA III	20
Attendance	10
End Semester Exam	100
Total (CIA + ESE)	200

BCA541A - MOBILE APPLICATIONS **(2018 Batch)**

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

This course focuses on developing applications for modern Smartphone operating systems. Most of the course is dedicated to Google's Android and Microsoft's Windows. Rapid application development techniques are covered, as well as setup of the development environment, real-world testing, and deployment. The course provides a practical approach to Android mobile application development and

theoretical knowledge about windows application. To make students understand, how to develop and deploy an application to the appmarket.

Learning Outcome

1: Build Androidapplications.

2: Explain the differences between Android, Windows and other mobile developmentenvironments.

3: Secure, tune, package and deploy applications.

Unit-1 **Teaching Hours:10**

Introduction

Brief History of mobile technologies, Different mobile technologies, Introduction to Android, Get to know the required tools, Creating your first Android application, Anatomy of android Application. Understanding Activities, linking Activities using intents, fragments, calling Built-in Applications using Intents, Displaying Notifications

Unit-2 **Teaching Hours:12**

User Interface and Designing with views

Understanding the components of a screen, adapting to display orientation, managing changes to screen orientation, Utilizing the Action Bar, Creating the user Interface programmatically, Listening for UI Notifications. Using Basic Views, Using Picker views, Using List views to display lists, Understanding specializedfragments.

Designing User interface

Designing User interface Designing by declaration, creating the opening screen, using alternate resources, implementing an about box, applying a theme, adding a menu, adding settings, debugging with log messages, debugging withdebugger.

Unit-3 **Teaching Hours:12**

Displaying with views,Data persistence

Using Image Views to display pictures, using menus with views, some additional views. Saving and loading user preferences, persisting DataFiles

Storing local Data

Reading/writing local data, Accessing the Internal File system, Accessing the SDcard.

Unit-4 **Teaching Hours:10**

Content Providers

Creating and using Databases. Sharing Data in Android, using content provider, creating your own content providers, using content providers.

Putting SQL to work

Introducing SQLite, In and Out of SQLite, Hello Database, Data Binding, using content provider, implementing content provider.

Preparing and Publishing

Preparing app for publishing, Deploying APK files, uploading in Market

Unit-5 **Teaching Hours:8**

Messaging, Location based services and Networking

SMS Messaging , Sending E-mail, Displaying Maps, Getting Location Data, Monitoring a Location.

Preparing and Publishing

Preparing app for publishing, Deploying APK files

Unit-6 **Teaching Hours:8**

Introduction to Windows Phone Programming

Vision and architecture - A different kind of phone - Windows phone architecture - Building and delivering apps - Getting started with “Hello World”

Text Books And Reference Books:

[1] Wei-Meng Lee, Beginning android 4 application Development, John Wiley & sons, Inc, 2012.

[2] Andrew Whitechapel, Sean McKenna, Windows Phone 8 Development Internals, Microsoft Press2013.

Essential Reading / Recommended Reading

[1] Grant Allen, Beginning Android 4, Apress,2012.

[2] Ed Burnette, Hello, Android: Introducing Google's Mobile Development Platform,Pragmatic. Bookshelf (2009), ISBN-13:978-1934356173.

[3] Jerome (J.F) DiMarzio , Android - A programmer's Guide, TataMcgraw Hill ,2010, ISBN:9780071070591.

[4] Charles Petzold, Programming Windows Phone, Microsoft Press,2010

Evaluation Pattern

CIA 50%

ESE 50%

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

To acquire knowledge in three dimensional modeling and animation using 3DS Max software and to render the animated scene effectively using light and material design. Objectives of the course are: To get a hands on graphic and animation application development. To understand the concept of 3D and 2D.

Learning Outcome

CO1: Create objects using 3d modelling.

CO2: Add effects using light and material.

CO3: Create animated frames.

Unit-1 **Teaching Hours:10**

Getting to Know Autodesk 3ds Max

Introduction, getting started, touring the interface, working with objects, and viewing. Introducing Objects:Understanding standard primitives, modelling with modifiers, making clones, working with groups.

Unit-2 **Teaching Hours:12**

Creating Shapes with Splines

Drawing with splines, modifying a shape, outlining and extruding splines, combining and extruding primitive splines, creating a solid form with splines. Editing Meshes and Creating Complex Objects: Creating shapes with Boolean objects, tracing a sketch, editing meshes, create symmetric forms, smoothing meshes. Organizing and Editing Objects: Naming and renaming objects, organizing objects by layer, lofting an object.

Unit-3 **Teaching Hours:10**

Light and Shadow

Lighting your model, rendering a view, ambient light, adding shadow effects, playing in the shadows, using the light listener, using scene states. Enhancing Models with Materials: Understanding texture maps, adding materials to object, editing materials, using the standard material, assigning materials to parts of an object.

Unit-4 **Teaching Hours:10**

Using the Camera

Understanding the 3ds max camera, setting up an interior view, creating an environment, using immersive environment for animation, using render type and elements, matching your scene to background image. Organizing Objects and Scene Management: Gaining access, arranging furniture, replacing objects, using the rendered framework window.

Unit-5 **Teaching Hours:8**

Understanding Animation

Understanding the world of video time, creating a quick study animation, understanding keyframes, increasing and editing keyframes, adding more frames, moving the camera target over time, controlling lights over time.

Unit-6 **Teaching Hours:10**

Rigging for animation

Creating Animations, Particles, and Dynamics: Rendering the animation, automating the output, rendering a shadow study, creating a walkthrough, animation file output option, using particle system. Creating parent child hierarchies, using the morpher modifier, assembling an articulated luminaire, understanding bones, understanding biped.

Text Books And Reference Books:

[1] J. Harper, Mastering Autodesk 3ds Max 2013. Sybex, 2012.

Essential Reading / Recommended Reading

[1] R. L. Derakhshani and D. Derakhshani, Autodesk 3ds Max Essential. Sybex, 2011.

[2] K. L. Murdock, 3ds Max 2012 Bible. Wiley, 2011.

[3] T. Mullen, Introducing Character Animation with Blender. Sybex, 2007.

Evaluation Pattern

CIA 50%

ESE 50%

BCA541C - BUSINESS INTELLIGENCE (2018 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

The fundamental objective of this course is for the student to develop knowledge and expertise on "how to select and/or develop,

and deploy an information system. Analyze managerial decision situations to determine whether it is practical to support them with computer technology. It also provides an understanding of data organization, and examine the BI processes and techniques used in transforming data to knowledge and value.

Learning Outcome

Upon completion of this course, the students will be able to:

CO1: Understand the importance of BI development projects in a team environment

CO2: Apply the knowledge of data integration for better business decision

CO3: Analyse different data modelling techniques and use enterprise reporting

CO4: Demonstrate the impact of BI using data mining concepts

Unit-1 **Teaching Hours:10**

Introduction to Business Intelligence

Introduction to OLTP and OLAP, BI Definitions & Concepts, Business Applications of BI, BI Framework, Role of Data Warehousing in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities.

Unit-2 **Teaching Hours:10**

Basics of Data Integration ETL

Concepts of data integration need and advantages of using data integration, introduction to common data integration approaches, introduction to ETL, Introduction to data quality, data profiling concepts and applications.

Unit-3 **Teaching Hours:10**

Introduction to Multi-Dimensional Data Modeling

Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi-dimensional modeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, introduction to business metrics and KPIs, creating cubes using SSAS.

Unit-4 **Teaching Hours:10**

Basics of Enterprise Reporting

Introduction to enterprise reporting, concepts of dashboards, balanced scorecards, and overall architecture.

Unit-5 **Teaching Hours:10**

Data Mining Functionalities

Association rules mining, Mining Association rules from single level, multilevel transaction databases, Classification and prediction, Decision tree induction, Bayesian Classification, k-nearest neighbour classification, Cluster analysis, Types of data in clustering, categorization of clustering methods.

Unit-6 **Teaching Hours:10**

Case Study

Case study on BI Business applications, OLTP Models, Data Models.

Text Books And Reference Books:

[1] Cindi Howson ,Successful Business Intelligence, Unlock the Value of BI & Big Data Hardcover –Second Edition: Import, 1 Nov 2013.

[2]Gert H.N. Laursen, JesperThorlund , Business Analytics for Managers: Taking Business Intelligence beyond Reporting Paperback , 26 Sep 2013

Essential Reading / Recommended Reading

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Evaluation Pattern

CIA	50%
ESE	50%

BCA541D - MICROPROCESSOR AND ALP (2018 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

The course is an introduction to the 8085 microprocessor and programming. Student will have both theoretical and practical approach on 8085 microprocessors. Objective of the course is to help students to understand the basics of 8085 microprocessor- based Systems and assembly languageprogramming.

Learning Outcome

Upon the completion of the course, students will be able to :

CO1: Identify the basic element and functions of 8085 microprocessors. CO2: Describe the architecture of 8085 microprocessor.
CO3: Apply the programming techniques in developing the assembly language program.

Unit-1 **Teaching Hours:8**

Microprocessors

Introduction, Advances in semiconductor technology, Organization of microprocessor-based system, 8085

microprocessor.

Unit-2 **Teaching Hours:10**

The 8085 MPU architecture

8085 Bus organization, Demultiplexing the bus AD7-AD0, Generating control signals. ALU, Timing and control unit, Instruction register and decoder, Register array, Decoding and executing aninstruction.

Unit-3 **Teaching Hours:10**

8085 Machine cycles and bus timings

Opcode fetch machine cycle, Memory read machine cycle, Memory write machine cycle, IO read machine cycle, IO Write machine cycle, Execution time of the instruction cycle.

Unit-4 **Teaching Hours:12**

Introduction to 8085 programming

Instructions, Data format and storage, Addressing modes, Instruction classification – Data transfer instructions, Arithmetic instructions, Logical instructions, Branching instructions, Machine control instructions, Assembly language programs Addition / Subtraction of 8 bit data, Interchanging a block of data, Largest of N numbers, Number of 1‘s& 0‘s in a 8-bit data, Look-uptable.

Unit-5 **Teaching Hours:12**

8085 programming techniques

Counters and time delays, Time delay using single register and register pair, Stack and subroutines, Call and return instructions, Advanced subroutine concept. Assembly language program Hexadecimal counter, Sum of odd and even numbers , Hex to BCD conversion.

Unit-6 **Teaching Hours:8**

Interrupts

Introduction – INTR, TRAP, RST 7.5, 6.5, 5.5, RST n instruction, SIM and RIM instructions.

Text Books And Reference Books:

[1] Ramesh.S.Goankar ―Microprocessor Architecture, Programming & Applications With 8085‖ - 5th Edition –ISBN 81-87972-09-2,Penram International– 2011.

Essential Reading / Recommended Reading

[1] Soumitra Kumar Mandal, ―Microprocessors and MicrocontrollersArchitecture, Programming and Interfacing using 8085, 8086 and 8051‖, 1st Ed. TMH, 2011, ISBN- 9780071329200.

[2] Krishna Kant, ―Microprocessors And Microcontrollers: Architecture Programming and System Design 8085, 8086, 8051,8096‖, PHI Learning Pvt. Ltd., 2010.

[3] M.Rafiquzzaman ―Microprocessors-Theory and Applications‖, Edition PHI, 2009.

[4] D.V.Hall ―Microprocessor and Digital System‖, McGraw Hill Publishing Company,2008.

Evaluation Pattern

CIA: 50

ESE: 50

BCA541E - DIGITAL IMAGE PROCESSING (2018 Batch)

Total Teaching Hours for Semester:60 | **No of Lecture Hours/Week:4**

Max Marks:100 | **Credits:4**

Course Objectives/Course Description

Learn the concepts of basic image processing techniques which includes preprocessing, segmentation and object recognition

Learning Outcome

CO1:Comprehend the knowledge of image processing techniques.

CO2:Analyze image processing techniques in spatial domain.

CO3: Design algorithms to solve classification and compression techniques

Unit-1 **Teaching Hours:12**

Fundamentals of Image Processing

The origins of Digital Image Processing, Elements of Digital Image Processing System. Image Sampling and Quantization, Basic relationships: Neighbors, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations.

Unit-2 **Teaching Hours:12**

Image Enhancement Techniques

Gray Level Transformations, Histogram Processing,Histogramequalization. Basics of Spatial Filters, Smoothening and Sharpening SpatialFilters.

Unit-3 **Teaching Hours:12**

Image Compression and Image restoration techniques

Huffman coding and Run Length encoding and decoding techniques. A model of the Image Degradation/ Restoration Process, Noise Models, Restoration in the presence of Noise.

Unit-4 **Teaching Hours:12**

Image Segmentation

Region Based Segmentation – Region Growing and Region Splitting and Merging. Representation – Chain codes. Point, Line and Edge detection. Thresholding – Global thresholding

Unit-5 **Teaching Hours:12**

Object recognition

Introduction to Patterns and Pattern Classes. Minimum distance classifier, K-NN classifier and Bayes. Boundary descriptors –Regional and Topological descriptors

Text Books And Reference Books:

[1] R.C.Gonzalez & R.E.Woods, Digital Image Processing, 3rd Edition. Pearson Education, 2009.

[2] A.K. Jain, Fundamental of Digital Image Processing, 4th Edition. PHI, 2011.

Essential Reading / Recommended Reading

[1] M. A. Joshi, Digital Image Processing: An algorithmic approach, 2nd Edition. PHI, 2009.

[2] B.Chanda, D.Dutta Majumdar, Digital Image Processing and analysis, 1st Edition, PHI, 2011.

Evaluation Pattern

CIA weightage 50%

ESE weightage 50%

BCA542A - MULTIMEDIA APPLICATIONS (2018 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

Course Description

This course teaches students how to fully utilize the latest image editing tool and animation tool to create and manipulate images and animation. Students will learn to paint and retouch images, use layers, support video, work with vector tools, manage digital assets, work with RAW camera files, manage color, and prepare images for output to the web, Prepare 2D animation, interactive presentation, slideshows and Games and Enables the student to think creatively.

Learning Outcome

CO 1: Through with Design and color Concepts

CO 2: Prepare Images for Print and Web, Create Layouts for web pages, Paper Adverts, CD covers, Posters, brochure Package Designing, take necessary steps to fix colour issues. Converting B/W photo tocolor.

CO 3: Creating Interactive slide Shows, Interactive high graphic Presentations and 2D animation.

Unit-1 **Teaching Hours:8**

Concept of Graphics and Multimedia

Graphics, Vector Graphics, Raster Graphics, Multimedia Definition, Applications of Multimedia, Advantages of Multimedia, Different types of Medias -Text, Graphics, Image,

Animation, Audio, Video, Special Effects, compositing, Morphing, Virtual Reality and its applications.

Color theory, typography and File formats- Color Theory, Color Modes, Concept of Digital Images ,Image compression, Different File formats BMP , JPEG , GIF , TIFF , PDF , PSD, WBMP …etc Image for Print and WEB Resolutions, Monitor Configurations, Graphic Card.

Unit-2 **Teaching Hours:12**

Getting to know the work area

Staring to work with Adobe Photoshop, Using tools, option bar and other panels, undoing actions in Photoshop, customizing the workspace, finding resources for using Photoshop. Strategy for retouching, resolution and Image size, straightening and cropping the image, replacing the colors in image, Brush tools and options, adjusting saturation using Sponge tool, repairing with Clone Stamp, spot healing brush tool, applying content-aware patch, unsharp mask, saving image for color printing. About selecting and selection tools, Quick selection tool, Moving selected area, manipulating selections, Magic wand, lasso tools, cropping and erasing with selection, saving and retrival of selection.

Unit-3 **Teaching Hours:12**

Correcting and Enhancing Digital Photographs

About layers, layers panel , Rearranging layers, applying gradient to a layer, applying a layer stylet, adding an adjustment layer, updating layer effects, adding a border, flattening and saving files.

About camera raw, processing files in camera raw, correcting digital photographs in photoshop, correcting image distortion, adding depth of field.

Working with Masks and channels, creating mask, refining mask, creating quick mask, puppet warp, working with channels. About Type, Creating clipping mask from type, creating type on a path, warping point type, designing paragraphs of type.

Unit-4 **Teaching Hours:12**

Advanced Compositing and Vector drawing techniques

Paths and Pen tool, paths with artwork, creating vector objects for background, working with defined custom shapes, importing smart objects, applying filters, hand-coloring selections on a layer, applying smart filters, drop shadow and a border, color schemes , automating multistep task, stitching panorama, finishing image for Print and web.

Editing Video, creating video projects, animating text with key frames, creating effects, transitions, adding and muting audio, rendering video.

Painting with mixer brush, Selecting brush settings, mixing colors, creating custom brush preset, mixing color with a photograph. Creating slices, exporting HTML and images, using zoomify feature, creating a web gallery. Preparing for PRINT – specifying color Management settings, proofing an image, identifying out-of-gamut colors, saving as CMYK EPS files, printing.

Unit-5 **Teaching Hours:8**

Introduction to Flash

Getting to know the workspace, working with library, understanding timeline, using property inspector, using panel, using tools panel, previewing your movie, modifying with content and stage, saving and publishing.

Working with Graphics-Understanding strokes and fills, creating shapes, making selections, editing shapes, using gradients and bitmap fills, making patters and decorations, creating curves, creating and editing text.

Creating and editing symbols-Importing illustrator files, about symbols, creating symbols, importing Photoshop files, editing and managing symbols, changing the size and position of instance, understanding blend effects, applying filters and special effects.

Unit-6 **Teaching Hours:8**

Adding Animation and Interactivity

About animation, understanding project file, animating position, changing the pacing and timing, All types of tweening, animating filters, animating transformations, swapping tween targets, nested animations, motion blur, easing, animating 3D motion, testing movie. Creating buttons, understanding action Script 3.0, preparing the timeline, adding stop action, creating event handlers for buttons, creating destination key frames, home button with code snippets, code snippets option, and animated buttons. Adding sound and video content to flash project , encoding video files , working with text tools , hyperlinks. Publishing flash documents, understanding publishing, publishing desktop application, publishing for a mobile device.

Text Books And Reference Books:

[1] Lisa DanaeDayley, Brad Dayley, "*Adobe Photoshop CS6 Bible"*, John Wiley & Sons, 2012.

[2] *Adobe Flash Professional CS6*, Adobe Classroom in a Book- The official training workbook from Adobe Systems, Adobe Press, 2012.

Essential Reading / Recommended Reading

[1] Lesa Snider, *"Photoshop CS6: The Missing Manual"*, O'Reilly Media Inc, 1st Edition, 2012.

[2] *Adobe Photoshop CS6, Adobe* Classroom in a Book- The official training workbook from Adobe Systems, Adobe Press, 2012.

[3] Chris Grover, "Flash CS6: The Missing Manual", O'Reilly Media Inc, 1st Edition, 2012.

Evaluation Pattern

CIA - 50%

ESE - 50%

BCA542B - OOAD USING UML (2018 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

The course provides instruction and practical experience focusing on the effective use of object-oriented methodology life cycle models and the judicious use of software modelling as applied to a software development process.

Learning Outcome

CO1: Understand the object oriented life cycle.

CO2: Know how to identify classes, objects, relationships.

CO3: Learn the Object Oriented Design process.

CO4: Understand about software quality and usability.

CO5: Build model use case diagrams.

Unit-1 **Teaching Hours:12**

Complexity

The inherent complexity of software, The Structure of complex systems, Bringing order to chaos, on designing complex systems, Categories of analysis and Design methods.

The Object Model

The evolution of object model, Elements of object model.

Unit-2 **Teaching Hours:10**

Classes and Objects

The Nature of an Object, Relationship among objects, nature of a class, Relationship among classes.

Unit-3 **Teaching Hours:8**

Introduction to Modeling and UML

Importance of modeling, principles of modeling, object oriented modeling, overview of UML conceptual model of the UML, Architecture.

Unit-4 **Teaching Hours:10**

Basic Structural Modeling

Common Mechanism: Terms and Concepts, Common modeling techniques. Diagrams, Class Diagrams.

Advanced Structural Modeling

Interfaces, Types and Roles, Packages, Object Diagrams.

Unit-5 **Teaching Hours:10**

Basic Behavioral Modeling

Interaction, Interaction diagram, Use case, Use case diagram.

Advanced BehavioralModeling

State Machines, State Diagrams.

Unit-6 **Teaching Hours:10**

Architectural Modeling

Deployment, Deployment Diagram, Collaboration

Case Study

Any application can be discussed with help of an open tool.

Text Books And Reference Books:

[1] Michael Blaha,JamesRumbaugh, Object Oriented Modeling and Design with UML, 2nd Edition, Pearson, 2010.

Essential Reading / Recommended Reading

[1] Grady Booch, Robert A.Makimchul,MichaelW.EagelJimConallen,Kelli A. Houston, Object Oriented Analysis and Design with Applications, 3rd Edition, Pearson Education Inc,2013.

[2] Grady Booch, James Rumbaugh, Ivar Jacobson, The Unified Modeling Language User Guide, 2nd Edition, Pearson Education Inc,2013.

Evaluation Pattern

CIA - 50%

ESE - 50%

BCA542C - CYBER SECURITY (2018 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

This course aims to introduce the core fundamentals concepts of cyber security and privacy related to various processes related to IT sectors.

Learning Outcome

CO1: Understand the core fundamentals of system security

CO2: Demonstrate the security essentials related to Cyber Security and encryption Concepts

CO3: Analyse the Issues related to Privacy and Storage security in different IT domains CO4: Apply and manage security essentials in IT Sector

Unit-1 **Teaching Hours:10**

SYSTEM SECURITY

Building a secure organization- A Cryptography primer- detecting system Intrusion- Preventing system Intrusion- Fault tolerance and Resilience in cloud computing environments- Security web applications, services and servers.

Unit-2 **Teaching Hours:10**

NETWORK SECURITY

Internet Security - Botnet Problem- Intranet security- Local Area Network Security - Wireless Network Security - Wireless Sensor Network Security- Cellular Network Security- Optical Network Security- Optical wireless Security.

Unit-3 **Teaching Hours:10**

SECURITY MANAGEMENT

Information security essentials for IT Managers- Security Management System - Policy Driven System Management- IT Security - Online Identity and User Management System - Intrusion and Detection and Prevention System.

Unit-4 **Teaching Hours:10**

CYBER SECURITY AND CRYPTOGRAPHY

Cyber Forensics- Cyber Forensics and Incidence Response - Security e-Discovery - Network Forensics - Data Encryption- Satellite Encryption - Password based authenticated Key establishment Protocols.

Unit-5 **Teaching Hours:10**

PRIVACY AND STORAGE SECURITY

Privacy on the Internet - Privacy Enhancing Technologies - Personal privacy Policies - Detection of Conflicts in security policies- privacy and security in environment monitoring systems. Storage Area Network Security - Storage Area Network Security Devices - Risk management - Physical Security Essentials.

Unit-6 **Teaching Hours:10**

CYBER SECURITY POLICY

Cyber Security Metrics – Security Management Goals – Counting Vulnerabilities – Security Frameworks – E Commerce Systems – Industrial Control Systems – Personal Mobile Devices – Security Policy Objectives – Guidance for Decision Makers – Tone at the Top – Policy as a Project – Cyber Security Management – Arriving at Goals – Cyber Security Documentation – The Catalog Approach – Catalog Format – Cyber Security Policy Taxonomy.

Text Books And Reference Books:

1. John R.Vacca, Computer and Information Security Handbook, Second Edition, Elsevier 2013.
2. Michael E. Whitman, Herbert J. Mattord, Principal of Information Security, Fourth Edition, Cengage Learning, 2012.

Essential Reading / Recommended Reading

1. Richard E.Smith, Elementary Information Security, Second Edition, Jones and Bartlett Learning, 2016
2. Jennifer L. Bayuk, J. Healey, P. Rohmeyer, Marcus Sachs, Jeffrey Schmidt, Joseph Weiss "Cyber Security Policy Guidebook" John Wiley & Sons 2012.

Evaluation Pattern

CIA: 50%

ESE: 50%

BCA542D - COMPUTER ARCHITECTURE (2018 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

The subject deals with basic model of a computer with the concepts on processor design in which data representation and instruction basics are discussed, the basics of design of an ALU, the concepts of memory design including characteristics and features of different types of memories are included. The objective of this course is to study computer architecture design by examining architectural concepts with consideration of performance, usability, reliability, and power management etc. This course covers a number of issues involved in the design and utilization of high performance computingsystems.

Learning Outcome

CO 1: Understand how computer hardware has evolved to meet the needs of multiprocessing systems and explain and demonstrate the concept of top down approach.

CO 2: Make a summary on basic operation and state the significant components in computer.

CO 3: Explain and demonstrate the basic concept of computer organization and computerarchitecture.

Unit-1 **Teaching Hours:9**

Introduction

Basic Model of a Computer, Computer Components, Register transfer and Microoperations: Register Transfer Language ,Register Transfer , Bus and Memory Transfers, Arithmetic Microoperations , Logic Microoperations , Shift Microoperations , Arithmetic Logic and ShiftUnit.

Unit-2 **Teaching Hours:9**

Basic computer organization and design

Instruction codes, Computer registers, Computer Instruction, Timing and control, Instruction cycle, Memory reference instructions, Input output and Interrupt, Design of basic computer, Design of Accumulator logic.

Unit-3 **Teaching Hours:11**

Central processing unit

Introduction, General Register Organization, Stacks organizations- Register stack, Memory stack, Reverse polish notation , Instruction formats- Three address

instruction, two address instruction, one address instruction, zero address instruction , Addressing modes, Data transfer and manipulation- Data transfer instructions, Data manipulation instructions. Program control.

Unit-4 **Teaching Hours:11**

Computer arithmetic

Introduction, Addition and Subtraction – Addition and subtraction with signed magnitude data, addition and subtraction with signed 2‘s complement data, Multiplication Algorithms- Signed magnitude, Booth multiplication algorithm, array multiplier, Division Algorithms- signed magnitude algorithm, Decimal Arithmetic, Decimal Arithmetic Operation- Addition, Subtraction, Multiplication,Division.

Unit-5 **Teaching Hours:10**

Input output organization

Peripheral Device, Input Output Interface – I/O bus and interface modules , I/O versus memory bus, Asynchronous data transfer, Modes of transfer – programmed I/O , Interrupt initiated I/O, Priority Interrupt-Daisy chaining priority, parallel priority interrupt, Priority encoder,Interruptcycle,DirectMemoryAccess– DMAcontrollerandDMAtransfer.

Unit-6 **Teaching Hours:10**

Memory organization

Serial Access Memories, Access Methods, Memory Organization, Magnetic Surface Recording, Magnetic Disk Memories, Optical Memories, Memory Systems, Multilevel Memories, General Characteristics, Virtual Memory, Locality of Reference, Address Translation, Base Addressing, Cache, Main Features, Cache Organization, Cache operation, AssociativeMemory.

Self Learning

Memory Technology , Random Access Memory , Organization, Semiconductor RAM, RAM Design, Memory Interleaving

Text Books And Reference Books:

[1] Mano M Morris, Computer System Architecture, PHI, 4th Edition, 2016.

Essential Reading / Recommended Reading

[1] Stalling, Williams. Computer Organization and Architecture, 7th Edition,2010.

[2] Hayes, John. P. Computer Architecture and Organization 3rd Edition, McGraw-Hill, International Editions,2011.

Evaluation Pattern

50% CIA + 50% ESE

BCA542E - SYSTEM SOFTWARE (2018 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:4**

Course Objectives/Course Description

Thie main aim of the course is to learn about the system software, which is software designed to operate and control the computer hardware. Students will be learning different concepts of the system software, like compiler phases. Macro language and processors etc.

The objective of the course is

- To provide basic knowledge of various components of the system software.
- To analyze the actual processing of a computer program in an efficient way.

Learning Outcome

CO1: Understand the fundamentals of various components of system software.
CO2: Analyze the design of various components of system software.
CO3: Apply code optimization and code generation techniques for efficient programming.

Unit-1 **Teaching Hours:10**

Introduction

System Software.Evolution of Components of a Programming System, General Machine Structure - Memory, Registers, Data and Instructions. Machine Language - No Looping, Address modification using instruction as Data and Index registers, Looping. Assembly Language Program using Literals and pseudo -ops.

Unit-2 **Teaching Hours:10**

Assembler

General design procedure, Design of Assembler- Statement of problem, Data Structures, Format of Databases, Algorithm 2-pass assembler in brief with flowchart.

Unit-3 **Teaching Hours:10**

Macro language and the macro processor

Macro instructions, Features of Macro facility , Macro instruction argument, Conditional Macro expansions, Macro call within Macro, Implementation

Unit-4 **Teaching Hours:10**

Loaders and linkers

Loader Schemes - Compile and Go Loader, General Loader scheme, Absolute Loaders, Subroutine Linkages, Relocating Loaders, Direct-Linking Loaders Binders, Linking loaders, Overlays, Dynamic Binders, Design of an Absolute Loader, Design of direct linking loader

Unit-5 **Teaching Hours:8**

Compilers

Statement of problem – Problem No1 - Recognizing basic elements, Problem No 2 - Recognizing syntactic units and interpreting meaning, Intermediate form , Problem no 3 – storage allocation, problem no 4 – code generation, General model of compiler, General model of compiler

Unit-6 **Teaching Hours:12**

Phases of compilers

Different phases- Lexical Phase, Syntax Phase, Interpretation Phase, Optimization Phase, Storage Assignment Phase, Code Generation Phase and ,Assembly phase. Passes of a Compiler with flow chart.

Text Books And Reference Books:

[1] Donovan, John J, Systems Programming, Tata McGraw-Hill, Reprint., 2010 .

Essential Reading / Recommended Reading

[1] D.M.Dhamdere, Introduction to System Software , McGraw-Hill Education, First Reprint,2011.

[2] Aho, Sethi&Ullman ,Compilers Principles, techniques and tools, Pearson Education, 2006.

Evaluation Pattern

Component	Marks
CIA I	20
Mid Semester Examination CIA II	50
CIA III	20
Attendance	10
End Semester Exam	100
Total (CIA + ESE)	200

BCA551 - PYTHON PROGRAMMING LAB (2018 Batch)

Total Teaching Hours for Semester:60 | **No of Lecture Hours/Week:4**

Max Marks:100 | **Credits:2**

Course Objectives/Course Description

Learn to program and programming paradigms brought in by Python with a focus on File Handling and Regular Expressions

Learning Outcome

CO 1: Able to walkthrough algorithm

CO 2: Improve programming skills

CO 3: Appreciate Python Programming Paradigm CO 4: Hands on Regular Expression CO 5: Ability to Text Processing scripts CO 6: Write to file handling scripts

Unit-1 **Teaching Hours:60**

List of Lab Programs

1. Implement a sequentialsearch
2. Create a calculatorprogram
3. Explore stringfunctions
4. Implement Selection Sort
5. ImplementStack
6. Read and write into afile
7. Demonstrate usage of basic regularexpression
8. Demonstrate use of advanced regular expressions for datavalidation.
9. Demonstrate use ofList
10. Demonstrate use ofDictionaries
11. CreateCommaSeparateFiles(CSV),LoadCSVfilesintointernalDataStructure
12. Write script to work like a SQL SELECT statement for internal Data Structure made in earlierexercise
13. Write script to work like a SQL Inner Join for an internal Data Structuremade in earlier exercise
14. Demonstrate Exceptions inPython

Text Books And Reference Books:

[1]. Mark Summerfield, Programming in Python 3 A Complete Introduction to the Python Language, Addison-Wesely Reprint 2011

Essential Reading / Recommended Reading

[1]. Allen Downey, Think Python, Version 2.0.17, Green Tea Press, Needham, Massachusetts,2012

Evaluation Pattern

CIA 50%

ESE 50%

BCA552A - MOBILE APPLICATIONS LAB (2018 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:2**

Course Objectives/Course Description

This course focuses on developing applications for modern Smartphone operating systems. Most of the course is dedicated to Google's Android and Microsoft's Windows. Rapid application development techniques are covered, as well as setup of the development environment, real-world testing, anddeployment.

- To provide a practical approach to Windows and Android mobile application development.
- To make students understand, how to develop and deploy an application to the app market.

Learning Outcome

CO 1: Build your own Android and Windows applications.

CO 2: Explain the differences between Android, Windows and other mobile development environments.

CO 3: Secure, tune, package and deploy Applications.

Unit-1 **Teaching Hours:60**

List of Programs

1. Creating "Hello world"Application.
2. Creating an Application that displays message based on the screenorientation.
3. Create an application that displays custom designed OpeningScreen.
4. Play an audio, based on the userevent.
5. Create an UI with allviews.
6. Create menu inApplication.
7. Read/ write the Localdata.
8. Create / Read / Write data with database (SQLite).
9. Create an application to sendSMS.

10. Create an application to send ane-mail.

11. Display Map based on the Current/givenlocation.

12. Learn to deploy androidApplications.

Text Books And Reference Books:

[1] Wei-Meng Lee, Beginning android 4 application Development, John Wiley & sons, Inc, 2012.
[2] Andrew Whitechapel, Sean McKenna, Windows Phone 8 Development Internals, Microsoft Press2013.

Essential Reading / Recommended Reading

[1] Grant Allen, Beginning Android 4, Apress,2012.
[2] Ed Burnette, Hello, Android: Introducing Google's Mobile Development Platform,Pragmatic. Bookshelf (2009), ISBN-13:978-1934356173.
[3] Jerome (J.F) DiMarzio , Android - A programmer's Guide, TataMcgraw Hill ,2010, ISBN:9780071070591.

[4] Charles Petzold, Programming Windows Phone, Microsoft Press,2010

Evaluation Pattern

CIA 50%

ESE 50%

BCA552B - GRAPHICS AND ANIMATION LAB

(2018 Batch)

Total Teaching Hours for Semester:60 — **No of Lecture Hours/Week:4**

Max Marks:100 — **Credits:2**

Course Objectives/Course Description

To acquire knowledge in three dimensional modelling and animation using 3DS Max software and to render the animated scene effectively using light and material design.

Objectives of the course are

- To design and develop 3D models for various objects
- To understand various tools available in 3DS Max to construct/build 3D models

Learning Outcome

Upon completion of the course students will be able to:

CO 1: Create real-time 3D objects using 3DS Max.

CO 2: Add effects to objects using light and material.

CO 3: Create animated frames.

Unit-1 **Teaching Hours:60**

List of programs

List of programs

1. Modelling basic objects using standard primitives.
2. Editing shapes with meshes.
3. Transformations and filling of images.
4. Working with color palette and layers.
5. Enhancing objects with lights and shadow.
6. Enhancing models with materials.
7. Creation of images with special effects.
8. Rendering a Scene with layers in the time line.
9. Keyframe animation.
10. Rendering the animation.

Text Books And Reference Books:

[1] J. Harper, Mastering Autodesk 3ds Max 2013. Sybex, 2012.

Essential Reading / Recommended Reading

[1] J. Harper, Mastering Autodesk 3ds Max 2013. Sybex, 2012.

Evaluation Pattern

CIA 50%

ESE 50%

BCA552C - BUSINESS INTELLIGENCE LAB

(2018 Batch)

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:2**

Course Objectives/Course Description

Many organizations have a wealth of data residing in their databases, and generate additional valuable data that is often not captured. Business intelligence BI is the process of collecting and turning this resource into business value. This course will provide an understanding of data organization, and examine the BI processes and techniques used in transforming data to knowledge and value. The fundamental objective of this course is for the student to develop knowledge and expertise on "how to select and/or develop, and deploy an information system. Analyze managerial decision situations to determine whether it is practical to support them with computer technology.

Learning Outcome

CO 1: Work on BI development projects in a team environment.

CO 2: Select and/or develop, and deploy successful business intelligence systems to assist managers in decision making.

CO 3: Use data analysis techniques to make better business decisions.

CO 4: Know when to use various data preparation and analysis techniques.

CO 5: Know the strengths and weaknesses of various data mining tools and methods.

Unit-1 **Teaching Hours:60**

LIST OF PROGRAMS

1. Practice various data access methods. Representation formats: CSV, FLV, ARFF, XML.

2. Implement data conversion. eg. CSV2ARFF file format conversion in Java.

3. Configuring and testing the ETL tools.

4. Implement pipeline, sampling.

5. Implement surrogate keys.

6. Implement change in dimensions.

7. Practice data source views, dimensions, hierarchies.

8. Implement OLAP explorative data analysis with Pivot Tables.

9. Implement the metrics.

10. Implement Parent-child hierarchies. ROLAP and MOLAP.

11. Implement SQL reporting services.

12. Configuring and testing Weka API

13. Implement data mining preprocessing in Weka explorer and knowledge flow.

14. Implement classification in Weka explorer and knowledge flow.

15. Implement association rules in Weka.

Sample tools: SSIS, SSAS, SSRS, Excel, Weka, etc.

Text Books And Reference Books:

-

Essential Reading / Recommended Reading

-

Evaluation Pattern

CIA - 50%

ESE - 50%

BCA552D - MICROPROCESSOR AND ALP LAB (2018 Batch)

Total Teaching Hours for Semester:60 | **No of Lecture Hours/Week:4**

Max Marks:100 | **Credits:2**

Course Objectives/Course Description

Students are able to understand Assembly level language Programming.

Learning Outcome

CO 1: Students are able to write and execute Assembly level language Programs.

Unit-1 **Teaching Hours:60**

Lab Programs

1. Program to add two 8-bit numbers.

2. Program to subtract two 8-bit numbers.

3. Program to add two multi byte binary number.

4. Program to add N one byte numbers.

5. Program to add two BCD numbers.

6. Program to implement multiplication by successive addition method.

7. Program to find square of decimal number using Look-up table.

8. Program to move data block with and without overlap.

9. Program to find the smallest of N numbers.

10. Program to perform linear search over a set of N numbers. Display FF and its position if

found otherwise 00.

11. Program to check the 4th bit a number is 0 or 1. Display FF if 1 otherwise display 00.

12. Program to find number of 1‘s and 0‘s in 8-bit number.

13. Program to find sum of ODD and EVEN numbers.

14. Program to sort an array.

15. Program to implement BINARY to BCD conversion using a subroutine.

16. Program to implement decimal up counter.

17. Program to implement real-time clock.

18. Program to display BCA.

Text Books And Reference Books:

Ramesh.S.Goankar ―Microprocessor Architecture, Programming & Applications With 8085‖ - 5th Edition –ISBN 81-87972-09-2,Penram International – 2011

Essential Reading / Recommended Reading

Soumitra Kumar Mandal, ―Microprocessors and Microcontrollers Architecture, Programming and Interfacing using 8085, 8086 and 8051‖, 1st Ed. TMH, 2011, ISBN-9780071329200.

Evaluation Pattern

CIA - 50%

ESE - 50%

BCA552E - DIGITAL IMAGE PROCESSING LAB (2018 Batch)

Total Teaching Hours for Semester:60 | **No of Lecture Hours/Week:4**

Max Marks:100 | **Credits:2**

Course Objectives/Course Description

Students are able to understand image types and image processing techniques.

Learning Outcome

CO1 : Students are able to write and implement various image processing programs.

CO2 : Analyze different filtering methods in Spatial domain.

Unit-1 **Teaching Hours:60**

List of programs

1. Write a program to display frequency of each pixel occurring in a row of an image.

2. Write a program to convert color images to Gray scale Images.

3. Write a program to perform Rotation of images using different methods.

4. Write a program to perform resizing of images using different methods.

5. Write a program to implement Contrasts tretching

6. Write a program to demonstrate smoothening of animage

7. Write a program to perform non-linear filtering of animage(Median)

8. Write a program to implement of Edge detection

9. Write a program to extract the three color components in theimages

10. Write a program to perform bit plane slicing.

Text Books And Reference Books:

-

Essential Reading / Recommended Reading

-

Evaluation Pattern

CIA weightage 50%

ESE weightage 50%

BCA581 - PROJECT-I **(2018 Batch)**

Total Teaching Hours for Semester:60 **No of Lecture Hours/Week:4**

Max Marks:100 **Credits:2**

Course Objectives/Course Description

Student will develop a project based on their based on their field of interest and specialization papers which students are opted for.

Learning Outcome

-

Unit-1 **Teaching Hours:60**

Project

-

Text Books And Reference Books:

-

Essential Reading / Recommended Reading

-

Evaluation Pattern

CIA : 50%

ESE : 50%

BCA631 - MACHINE LEARNING (2018 Batch)

Total Teaching Hours for Semester:90 **No of Lecture Hours/Week:6**

Max Marks:150 **Credits:5**

Course Objectives/Course Description

Machine learning is a discipline that focuses on algorithms which transform data into actionable knowledge. This is an introductory course in machine learning to provide foundation to the core machine learning principles and theirreal word applications.

The objective of this course is to provide introduction to the principles and applications of machine learning algorithms.

Learning Outcome

CO1: Understand the basic principles of machine learning models.

CO2: Evaluate and prepare data for machine learning models.

CO3: Evaluate the performance of machine learning models

Unit-1 **Teaching Hours:15**

UNIT I

Origins of Machine Learning- Uses and abuses of machine learning- Machine learning successes - limits of machine learning - machine learning ethics-data storage – abstraction – generalization – evaluation - How machines learn- Machine Learning in practice – types of input data – types of machine learning algorithms – matching input data to algorithms Exploring and understanding data – exploring the structure of data – exploring numeric variables–exploringcategoricalvariables– exploringtherelationshipamongvariables

Lab Exercises

1. Demonstrate data Exploration (NumericData)
2. Demonstrate data Exploration (Categorical and NominalData)

Unit-2 **Teaching Hours:15**

UNIT 2

Lazy Learning – Classification using Nearest neighbor-Understanding nearest neighbor classification- measuring similarity with distance-choosing appropriate K, preparing data for use with KNN-Why is K-NN algorithmLazy

Probabilistic Learning – Classification using Naïve Bayes-Understanding naïve Bayes – basic concepts of Bayesian Methods-understanding probability - understanding joint probability- The naïve Bayes algorithm-classification with naïve Bayes- The Laplace corrector, using numeric features for naïveBayes

Lab Exercises

1. Demonstrate KNNclassification
2. Demonstrate Naïve Bayesclassification

Unit-3 **Teaching Hours:15**

UNIT 3

Divide and conquer-classification using decision trees and rules-understanding decision trees

– the C5.0 algorithm - choosing the best split – pruning the decision tree - understanding classification rules – Separate

and Conquer – The 1R algorithm – the RIPPER algorithm – Rules from decision tree – what makes trees and rulesgreedy

Lab Exercises

1. Demonstrate classification using decisionTree

Unit-4 **Teaching Hours:15**

UNIT 4

Forecasting numeric data – regression methods – understanding regression – simple linear regression, ordinary least square estimation – correlations – multiplelinear regression

Black box methods – understanding neural networks – from biological to artificial neurons, activation functions-network topology-training neural network with backpropagation

Lab Exercises

1. Demonstrate simple linearregression

Unit-5 **Teaching Hours:15**

UNIT 5

Finding groups of data – understanding clustering – clustering as machine learning task – using distance to update clusters – choosing appropriate number ofclusters

Lab Exercises

1. Demonstrate dataclustering

Unit-6 **Teaching Hours:15**

UNIT 6

Evaluating model performance-working with classification and prediction data-closer look at confusion matrices-using confusion matrices to measure performance-beyond accuracy-other measures of performance-visualizing trade offs

Lab Exercises

1. Demonstrate classification usingMLP

Text Books And Reference Books:

Brett Lantz, Machine Learning with R: Expert techniques for predictive modeling, 3rd Edition, Packt

Publishing,2019

Essential Reading / Recommended Reading

1. K. P. Murphy, Machine Learning: A Probabilistic Perspective. MIT Press,2012.
2. P. Harrington, Machine Learning in Action. Manning Publications,2012
3. C. M. Bishop, Pattern Recognition and Machine Learning. Springer,2016.
4. S. Marsland, Machine Learning: An Algorithmic Perspective. 1st Ed. Chapman and Hall, 2009

Evaluation Pattern

CIA 50%

ESE 50%

BCA641A - CLOUD COMPUTING (2018 Batch)

Total Teaching Hours for Semester:90 | **No of Lecture Hours/Week:6**

Max Marks:150 | **Credits:5**

Course Objectives/Course Description

This course covers a series of current cloud computing technologies, including technologies for Infrastructure as a Service, Platform as a Service, Software as a Service, and Physical Systems as a Service. For different layers of the cloud technologies, practical solutions such as Google, Amazon, Microsoft, SalesForce.com.

Learning Outcome

CO1: Demonstrate the fundamental principles of distributed computing.

CO2: Evaluate the importance of virtualization technique and how this has enabled the development of Cloud Computing

CO3: Critically evaluate business models that underlie cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, and hybrid cloud.

CO4: Design the appropriate cloud computing solutions and recommendations according to the applications

Unit-1 **Teaching Hours:10**

INTRODUCTION

The vision of cloud computing - The cloud computing reference model - Characteristics and benefits - Challenges ahead - Historical developments - Building cloud computing environments - Application development - Infrastructure and system development.

Parallel vs. distributed computing - Elements of parallel computing - Hardware architectures for parallel processing - Approaches to parallel programming - Laws of caution.

Lab: 1. Create Virtual Machines using Hypervisors (VMware/VMBox/KVM)

Unit-2 **Teaching Hours:10**

CLOUD COMPUTING ARCHITECTURE

Virtualization: Introduction - Characteristics of virtualized environments - Taxonomy of virtualization techniques - Virtualization and cloud computing - Pros and cons of virtualization - Technology example: VMware: full virtualization Cloud Computing Architecture: Introduction - The cloud reference model - Types of clouds - Economics of the cloud

Lab: Create Computeservice

Unit-3 **Teaching Hours:10**

UNDERSTANDING SERVICES AND APPLICATIONS

Defining Infrastructure as a Service (IaaS) - IaaS workloads - Pods, aggregation - Defining Platform as a Service (PaaS) - Defining Software as a Service (SaaS) - SaaS characteristics - Open SaaS and SOA - Salesforce.com and CRM SaaS - Defining Identity as a Service (IDaaS) - Identity - Authorization markup languages

Lab: Working with storage (Objectstorage)

Unit-4 **Teaching Hours:10**

CLOUD PLATFORMS IN INDUSTRY

Infrastructure as a Service (1): Create compute service; Create and use storage; Create and launch virtual network; launch a web server; Build a database server; Use Identity and Access Management principles;

Platform as a Service (2): Exposure to application development environment.

Software as a Service (3): Application development and deployment.

Note:

1 - Using AWS/GCP

2 - Using Google AppEngine

3 - Using Salesforce.com

Lab: 1. Build virtual private network and launch a webserver

2. Build a database server(RDBMS/NoSQL)

Unit-5 **Teaching Hours:10**

MEASURING THE CLOUD'S VALUE

Early adopters and new applications - The laws of cloudonomics - Cloud computing obstacles - Behavioral factors relating to cloud adoption - Measuring cloud computing costs - Avoiding Capital Expenditures - Right-sizing - Computing the Total Cost of Ownership - Specifying Service Level Agreements - Defining Licensing Models.

Lab: Introduction to Identity and AccessManagement

Unit-6 **Teaching Hours:10**

CLOUD APPLICATIONS

Scientific applications - Healthcare: ECG analysis in the cloud - Geoscience: satellite image processing - Business and consumer applications - CRM and ERP - Social networking - Media applications - online gaming

Lab: 1. Working with GoogleAppEngine

2. Application development using Salesforce.

Text Books And Reference Books:

[1] Rajkumar Buyya, Christian Vecchiola and S. Thamarai Selvi, "Mastering Cloud Computing" - Foundations and Applications Programming , MK publications, 2013.

[2] Barrie Sosinky, Cloud Computing: Bible, 1st edition, Wiley Publishing, Inc., 2011.

Essential Reading / Recommended Reading

[1] Anthony TVelte, Toby JVelteand Robert Elsenpeter, Cloud Computing –A Practical Approach, Tata McGraw Hill Education

Pvt Ltd, 2010.

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

Evaluation Pattern

50% CIA + 50% ESE

BCA641B - UI/UX DESIGN (2018 Batch)

Total Teaching Hours for Semester:90 **No of Lecture Hours/Week:6**

Max Marks:150 **Credits:5**

Course Objectives/Course Description

Students will learn practical principles and guidelines needed to develop high quality interface designs–ones that users can understand, predict, and control. It covers theoretical foundations, and design processes such as expert reviews and usabilitytesting.

Learning Outcome

CO 1: Understand the Usability of Interactive Systems CO 2: Understand Guidelines and Principles

CO 3: Be able to manage the development process and interaction styles

Unit-1 **Teaching Hours:15**

UNIT 1

Introduction: Usability Goals and Measures, Usability Motivations, Universal Usability, Goals for our Design Profession. Guidelines, Principles, and Theories ofDesign.

LAB

1. Design a touch screen kiosk that displaying customer information for a large international bank and use appropriate icons for accessing information.While using icons follow the various guidelines and consistency factors for thesame.

2. Design a mobile application for furniture information system that gives various furniture information to its users. For that select appropriate menu structure and use it as per various guidelines and follow consistency for atleast 5 components such as Menu title,Error messages,Menu status report,Menu Instructions,Function key usage of menusetc.

Unit-2 **Teaching Hours:15**

UNIT 2

Managing Design Process: Organizational Design to support Usability, The four Pillars of Design, Development Methodologies, Participatory design, Scenario Development, Legal Issues.

LAB

1. Design a system that will helps user to check repharse,speak,write,personal Trainer and settings indocument.

2. Design a system that will helps user to perform translate,define,synonyms,personal dictionary and help center indocument.

3. Design a social media application that dealt with sharing educational information and personal information among social mediausers.

Unit-3 **Teaching Hours:15**

UNIT 3

Interaction Styles: Examples of direct Manipulation, discussion of Direct Manipulation, 3D interfaces, teleoperation, Virtual and Augmented Reality. Task related menu organization, single menus, combinations of multiple menus, content organization, fast movement through menus, Data entry with Menus, audio menus and menus for smalldisplays.

LAB

1. Design a bank application that consist A/c holders information,Type of Account,and transaction details for their customers and use appropriate windows and its features for easy access forusers.

2. DesignaformthatenablesyoutoapplypassportinthepassportauthorityofIndia

Unit-4 **Teaching Hours:15**

UNIT 4

Command and Natural Languages:

Introduction, Command Organization functionality, strategies and structure, naming and abbreviations, Natural language in computing.

Interaction Devices.Keyboards and keypads, Pointing devices, speech and auditory interfaces, displays-smallandlarge.

LAB

1. Design any two web browser screens that helps its users for accessing various information including images and video links and it includes various general icon options, application based icons and various other general options.Follow the icon rules for thesame

Unit-5 **Teaching Hours:15**

UNIT 5

Collaboration and Social Media Participation Introduction, Goals of collaboration and participation, Asynchronous Distributed Interfaces: Different Place, Different Time, different time,Synchronous Distributed Interfaces: Different Place, Same Time, Face-to-Face Interfaces: Same Place, Same Time.

1. DesignanUIDscreenforanapplicationthatgivesyouinformationaboutastudenthostel.Use appropriate menus,icons,Logo,font style and sizes whereverrequired.

Unit-6 **Teaching Hours:15**

UNIT 6

Case Study and Hands on Experience

Designing UI for Laptops, designing artifacts, Designing interactive screens for Mobile devices with the help of an opentool.

Text Books And Reference Books:

[1] Alan Dix, Human-Computer Interaction, PearsonEducation,2009.

[2] Wilber O Galitz, An Introduction to GUI Design Principles and Techniques, John- Wiley &Sons,2007.

Essential Reading / Recommended Reading

[1] Shineiderman, Plaisant, Cohen, Jacobs, Designing the User Interface - Strategies for Effective Human-Computer-Interaction, Pearson Education, 5th Edition, 2010.

Evaluation Pattern

CAI 50%

ESE 50%

BCA641C - SOFTWARE TESTING (2018 Batch)

Total Teaching Hours for Semester:90 **No of Lecture Hours/Week:6**

Max Marks:150 **Credits:5**

Course Objectives/Course Description

This course is an introduction for a series of software testing track. This course aims to introduce software testing process and definition. Then, it reflects the roles and responsibilities of test team in collaboration with development team. Finally, the course demonstrates the training bundles of software testing.

Objectives of the course are:

- To study the fundamentals and principles of software testing.
- To learn few techniques of testing.

Learning Outcome

CO 1: To understand the significance of testing

CO 2: To learn the essentials of testing

Unit-1 **Teaching Hours:15**

Introduction to software testing

Testing as an Engineering Activity – Role of Process in Software Quality – Testing as a Process – Basic Definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support for Developing a Defect Repository

Unit-2 **Teaching Hours:16**

Levels of Testing

The Need for Levels of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests. The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – scenario testing – defect bash elimination -System Testing – types of system testing - Acceptance testing – performance testing - Regression Testing – internationalization testing – ad-hoc testing - Alpha – Beta Tests – testing OO systems – usability and accessibility testing.

Unit-3 **Teaching Hours:16**

Test Management

People and organizational issues in testing – organization structures for testing teams – testing services - Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process - Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group

Unit-4 **Teaching Hours:15**

Controlling and monitoring

Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation

Unit-5 **Teaching Hours:13**

Reporting

Test metrics and measurements –project, progress and productivity metrics – Status

Meetings – Reports and Control Issues – Criteria for Test Completion – SCM – Types of reviews – Developing a review program – Components of Review Plans– Reporting Review Results. – Evaluating software quality – defect prevention – testing maturity model

Unit-6 **Teaching Hours:15**

Case Study

Case study and open source testing tools.

List of Programs

1. Write a program to solve based on boundary value testing method for triangle problem. Derive test cases for your program based on boundary value analysis, execute the test cases and discuss the results.

2. Write a program to solve based on boundary value testing method for date validation. Generate and execute possible test cases for dd/mm/yyyy format.

3. Write a program to implement any search algorithm and determine the basis paths and discuss the results.

4. Write a program to implement the quicksort algorithm and determine the basis paths and derive different test cases and execute the test cases

5. Write a program to test the path of the looping construct

6. Write a program to implement unit testing

7. Write a program to implement string validation for a particular PAN number

8. Implement form level validation

Text Books And Reference Books:

[1]. SrinivasanDesikan and Gopalaswamy Ramesh, Software Testing – Principles and Practices, Pearson education, 2007

Essential Reading / Recommended Reading

[1] Boris Beizer, Software Testing Techniques, SecondEdition,Dreamtech,2011.

[2] Elfriede Dustin, Effective Software Testing, First Edition, Pearson Education,2010.

[3]Renu Rajani, Pradeep Oak, Software Testing–Effective Methods, Tools and Techniques,TataMcGrawHill,2008.

Evaluation Pattern

CIA-50%

ESE-50%

BCA641D - INTERNET OF THINGS (2018 Batch)

Total Teaching Hours for Semester:90 | **No of Lecture Hours/Week:6**

Max Marks:150 **Credits:5**

Course Objectives/Course Description

This course provides comprehensive understanding of the Internet of Things and its enabling technologies. This course enables students to explore the world of interconnected devices, communication among these connected devices and transmission of data for further analysis

Learning Outcome

CO1: Understand the architecture and the functional blocks of Internet of Things. CO2: Demonstrate the process of capturing and analyzing data in Internet of Things

CO3: Appreciate the role of Big data, Cloud Computing and Data Analytics in an IoT system

Unit-1 **Teaching Hours:12**

Introduction to IOT

Introduction, Definition and Characteristics of IoT, Physical Design of IoT, Things in IoT, IoT Protocols, Logical Design of IoT, IoT Functional Blocks, IoT Communication Models, IoT Communications APIs, IoT Enabling Technologies, Wireless Sensor Networks, Cloud Computing, Big Data Analytics, Communication Protocols, Embedded Systems.

Domain Specific IoTs – Home Automation, Smart Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health and Life Style.

Unit-2 **Teaching Hours:12**

IOT Physical devices and Endpoints

IoT Devices, Exemplary Device: Raspberry Pi, About the Board, Linux on Raspberry Pi, Raspberry Pi interfaces, Programming Raspberry Pi with Python. Other IoT Devices – pcDuino, BeagleBone Black,Cubieboard.

IoT and M2M – Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT.

Unit-3 **Teaching Hours:42**

Arduino Programming

The Arduino ecosystem, Installing the software, Connecting the Arduino, Opening a sketch, Sketching in code, The Structure of Arduino C, Verifying and Uploading, Working with

variables, Making Decisions, Digital Ins and Outs, Analog In, Analog Out, Advanced Functions, Arrays and Memory.

Unit-3 **Teaching Hours:42**

Lab Exercises

1. Study and Install IDE of Arduino / RaspberryPi.

2. Write program using Arduino / Raspberry Pi for Blink LED and RGB LED.

3. Write program for monitoring temperature using Arduino / RaspberryPi.

4. Write program for Traffic Light System Design using Arduino / RaspberryPi.

5. Write program for reading analog and digital inputs using Arduino / RaspberryPi.

6. Smart street lights: The street lights should increase or decrease their intensity based on the actual requirements of the amount of light needed at that time of the day. This will save a lot of energy for the municipalcorporation.

7. An Agricultural System (Greenhouse System) that makes use of sensors like humidity, temperature etc, to identify the current situation of the agricultural area and taking necessary measures such as activating the water spraying motor, the alarm system (to indicate if there is excess heat)etc.

8. Elderly care: We want to monitor very senior citizens whether they had a sudden fall. If a very senior citizen falls suddenly while walking, due to stroke or slippery ground etc, a notificationshouldbesentoutsothathe/shecangetimmediatemedicalattention.

9. Implementing sensor data storage and analysis application using cloudcomputing.

10. Creating an application to send sensor data to central system for data evaluation and throwing an appropriate message.

Unit-4 **Teaching Hours:12**

Infrastructure and Service Discovery Protocols for the IoT Ecosystem

Infrastructure Protocols: Routing Protocol, IEEE 802.15.4, Bluetooth Low Energy, Z-Wave, ZigBee. Protocols for IoT Service Discovery: multicast Domain Name System (mDNS), DNS Service Discovery, Universal Plug and Play. Prominent IoT Service Discovery Products available in themarket

Unit-5 **Teaching Hours:12**

The Enablement Platforms for IoT Applications and Analytics

The IoT Building Blocks, IoT Use Cases, IoT Application Enablement Platforms, Characterizing IoT or Machine-to-Machine Application Platforms, IoT AEPs - The Architectural Building-Blocks, Azure IoT Hub, Amazon Web Service IoT Platform, The Axeda IoT Platform, The IoT Data Analytics Platforms, The IoT Data Virtualization Platforms, IoT Data Visualization Platform, The IoT Edge DataAnalytics

Text Books And Reference Books:

[1] Arshdeep Bahgaand VijayMadisetti,"InternetofThings: A Hands-on Approach",

Universities Press, 2015

[2] Pethuru Raj and Anupama C. Raman , “The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press,2017.

Essential Reading / Recommended Reading

[1] Brian Evans, Beginning Arduino Programming, Apress,2011

[2] March Schwartz,"Internet of Things with Arduino Cook book", PacktPublishing, 2016

[3] Peter Waher, "Mastering Internet of Things: Design and create your own IoT applications using Raspberry Pi 3", Packt Publishing,2018.

Evaluation Pattern

CIA - 50%

ESE - 50%

BCA641E - LINUX ADMINISTRATION (2018 Batch)

Total Teaching Hours for Semester:90 **No of Lecture Hours/Week:6**

Max Marks:150 **Credits:5**

Course Objectives/Course Description

This course is designed to introduce the students to develop the skills needed for basic administration and configuration of Red Hat Enterprise Linux. This course introduces key command line concepts and enterprise-level tools, laying the foundation for the rapid deployment of Red Hat Enterprise Linux.

This course provides a practical introduction to Linux system Administration. It helps students gain knowledge and skills required for the role of Linux system administrator.

Learning Outcome

CO1: Understand basics of various OS related concepts, from system administrator's point of view, like files, directories, kernel, inodes, APIs, system calls, processes, signals, etc.

CO2:Develop applications where several processes need to communicate with each other to complete a task.

CO3: Create customized partitions using LVM

Unit-1 **Teaching Hours:18**

System Administration Overview

Introduction- Installation- -History of Linux-Linux Architecture-Duties of the System Administrator- Superusers and the Root Login- Sharing Superuser Privileges with Others- Boot Process-Kernel- System Initialization- GRUB(Modify the system boot loader)- GUI- CLI(Access a shell prompt and issue commands with correct syntax-- create and edit text files, delete, copy, and move files and directories- Introduction to Bash Shell- Basic Commands, Editors, Man Pages- Boot systems into different targets manually & automatically-Yum Repo configuration-Installation using Kickstart

Unit-2 **Teaching Hours:18**

Linux Security and File System

File Permissions-Directory Permissions-Octal Representation-Changing Permissions-Setting Default Permissions-Access Control Lists (ACLs)-The getfacl and setfacl commands-Special Permision(SUID,SGID,Stickybit)-Filesystem Types-Conventional Directory Structure-Mounting a File System-The /etc/fstab File-Special Files (Device Files)-Inodes-Hard File Links-Soft File Links-Creating New File Systems with mkfs-Breaking the ROOT password and NMCLI configuration-Special File Permissions and Access Control Lists

Unit-3 **Teaching Hours:18**

Linux User Management

Setting Policies-User File Management-The /etc/passwd file-The /etc/shadow file-The /etc/group file-The /etc/gshadow file-Adding Users-Modifying User Accounts-Deleting User Accounts-Working with Groups-Setting User Environments-Characteristics of Processes-Parent-Child Relationship-Examining Running Processes-Background Processes- Controlling Processes-Signaling Processes-Killing Processes-Automating Processes-cron and crontab-at and batch- Process related commands-NICE,RENICE,FG,BG,TOP,NOHUPScheduling process using at and crontab

Unit-4 **Teaching Hours:18**

Linux Kernel and Linux Volume Manager

Linux Kernel Components-Types of Kernels-Kernel Configuration Options-Recompiling the Kernel-Partitions-Logical Volume Manager – LVM-File System Overview- Extend LVM Partitions-LVM Snapshot-LVM Partitions and Extending LVM-Swap Partitions

Unit-5 **Teaching Hours:18**

Advanced concepts in LVM

Swap Partition Considerations-Other Partition Considerations-LVM Replace-LVM Remove- LVM Rename-Amanda backup for LVM-Controlling LVM in CLI mode- LVM Snapshot-LVM Extend

Text Books And Reference Books:

1. Mastering Linux Administration, Paul Cobbaut, First Edition, Samurai Media Limited,2016.

2. Linux Administration: A Beginners Guide, Sixth Edition (Network Pro Library), Wale Soynika,McGraw-Hill Education,2012.

Essential Reading / Recommended Reading

1. Collings Terry and Wall Kurt, Red Hat Linux Networking & System Administration, Wiley Indian, 3rd Edition, reprint 2009.

2. Petersen Richard, The Complete Reference: Fedora 7 & Red Hat Enterprise Linux, Tata McGraw Hill Edition, 2007.

Evaluation Pattern

CIA-50%

ESE-50%

BCA681 - MAJOR PROJECT (2018 Batch)

Total Teaching Hours for Semester:240 | **No of Lecture Hours/Week:16**

Max Marks:600 | **Credits:8**

Course Objectives/Course Description

To provide students with knowledge of practical skills for various technological applications.

To enable the student to develop an application with their respective domain.

Learning Outcome

CO1: Demonstrate their ability to apply database concepts to design any application of their choice.

CO2: Develop solutions by adhering to coding standards using any front end and back end tools.

CO3: Evaluate the code by following the various testing methodology.

Unit-1 **Teaching Hours:240**

Major Project

-

Text Books And Reference Books:

-

Essential Reading / Recommended Reading

-

Evaluation Pattern

CIA 50%

ESE 50%