

BCA Curriculum & Syllabus 2017 (CBCS)
CURRICULUM AND SYLLABUS
2017
(Choice Based Credit System)

DEPARTMENT OF
BACHELOR OF COMPUTER APPLICATIONS

KALASALINGAM UNIVERSITY

(Under Section 3 of the UGC Act 1956)

Anand Nagar, Krishnankoil-626126

Srivilliputtur(via); Virudhunagar(Dt.), Tamil Nadu, INDIA

(www.kalasalingam.ac.in)

| VISION & MISSION | |
|---|---|
| <p style="text-align: center;"><u>UNIVERSITY VISION</u></p> <p>To be a Center of Excellence of International Repute in Education and Research.</p> | <p style="text-align: center;"><u>DEPARTMENT VISION</u></p> <p>To be a Center of Excellence in education and research in the field of Computer Applications to produce high quality competitive software professionals for the national growth.</p> |
| <p style="text-align: center;"><u>UNIVERSITY MISSION</u></p> <p>To produce socially committed technocrats to meet the Industrial challenges or an administrator in the field of Information Technology with adequate technical knowledge and skills through quality education and research</p> | <p style="text-align: center;"><u>DEPARTMENT MISSION</u></p> <p>To be a Center of Excellence in education and research in the field of Computer Applications to produce high quality competitive software professionals for the national growth.</p> |
| PROGRAM EDUCATIONAL OBJECTIVES (PEO's) | |
| PEO | DESCRIPTION |
| PEO1 | To equip the students to meet the requirement of Corporate world and Industry standard. |
| PEO2 | To engage in professional development and to pursue post graduate education in the fields of Information Technology and Computer Applications |
| PEO3 | To provide the students about computing principles and business practices in software solutions, outsourcing services, public and private sectors |

| PROGRAM OUTCOMES (PO'S) | |
|--------------------------------|--|
| PO | DESCRIPTION |
| PO1 | Understand the concepts of key areas in computer science. |
| PO2 | Analyze and apply latest technologies to solve problems in the areas of computer applications. |
| PO3 | Analyze and synthesis computing systems through quantitative and qualitative techniques |
| PO4 | Apply technical and professional skills to excel in business. |
| PO5 | Communicate effectively in both verbal and written form. |
| PO6 | Develop practical skills to provide solutions to industry, society and business. |

REVISED CURRICULUM STRUCTURE-BCA

Scheme of Instruction

| Subject Code | Subject Name | C |
|---------------------|----------------------------|----------|
| BAE17R112 | Tamil | 3 |
| BAE17R106 | Communicative English | 2 |
| BCA17R101 | Programming in C | 4 |
| BCO17R102 | Financial Accounting | 5+1(T) |
| MAT17R151 | Probability and Statistics | 5+1(T) |
| BCA17R181 | C Programming Laboratory | 2 |
| BAE17R113 | English | 3 |
| CHY17R103 | Environmental Science | 2 |
| BCO17R104 | Cost Accounting | 5+1(T) |

| | | |
|-----------|---|--------|
| BCA17R105 | Object Oriented Programming with C++ | 4 |
| MAT17R152 | Discrete Mathematics | 5+1(T) |
| BCA17R182 | Object Oriented Programming with C++ Laboratory | 2 |
| BCA17R201 | Operating Systems | 4 |
| MAT17R253 | Operations Research | 5+1(T) |
| BCO17R202 | E-Commerce Technologies | 5+1(T) |
| BCA17R281 | Operating Systems Laboratory | 2 |
| BCA17R2** | Skill Enhancement course Elective - I | 2 |
| BCA17R203 | .Net Programming | 4 |
| MAT17R254 | Numerical methods | 5+1(T) |
| BCO17R204 | Programming in Tally. | 4 |
| BCA17R282 | .Net Programming Laboratory | 2 |
| BCO17R283 | Programming in Tally Laboratory | 2 |
| BCA17R2** | Skill Enhancement course Elective - II | 2 |
| BCA17R*** | Discipline Specific Elective - I | 6 |
| BCA17R*** | Discipline Specific Elective - II | 6 |
| BCA17R*** | Discipline Specific Elective - III | 6 |
| BCA17R3** | Skill Enhancement course Elective - III | 2 |
| BCA17R*** | Discipline Specific Elective - IV | 6 |
| BCA17R*** | Discipline Specific Elective - V | 6 |

| | | |
|----------------------|--|-----|
| BCA17R399 | Project Work | 6 |
| BCA17R3** | Skill Enhancement course Elective - IV | 2 |
| Total Credits | | 135 |

DISCIPLINE SPECIFIC ELECTIVES

| S.No | Code | Subject Name | Credits |
|-------------|-------------|-------------------------------------|----------------|
| 1 | BCA17R351 | Programming in Java | 4+2(Lab) |
| 2 | BCA17R352 | RDBMS | 4+2(Lab) |
| 3 | BCA17R353 | Data Structures and Algorithms | 4+2(Lab) |
| 4 | BCA17R354 | Software Engineering | 4+2(Lab) |
| 5 | BCA17R355 | Computer Networks | 5+1(T) |
| 6 | BCA17R356 | Internet Technologies | 4+2(Lab) |
| 7 | BCA17R357 | Data Warehousing and Data Mining | 4+2(Lab) |
| 8 | BCA17R358 | Mobile Applications | 4+2(Lab) |
| 9 | BCA17R301 | Computer System Architecture | 5+1(T) |
| 10 | BCA17R359 | Cloud Computing | 4+2(Lab) |
| 11 | BCA17R302 | Soft Computing | 5+1(T) |
| 12 | BCA17R303 | Social Network Analysis | 5+1(T) |
| 13 | BCA17R304 | Object Oriented Analysis and Design | 5+1(T) |
| 14 | BCA17R305 | Computer Graphics | 5+1(T) |
| 15 | BCA17R306 | Programming in MATLAB | 5+1(T) |
| | | | |

SKILL ENHANCEMENT COURSES

| S.No | Code | Subject Name | Credits |
|-------------|-------------|---------------------------------------|----------------|
| 1 | BCA17R251 | Office Automation Tools | 1+1(Lab) |
| 2 | BCA17R252 | HTML Programming | 1+1(Lab) |
| 3 | BCA17R253 | My SQL (SQL/PL-SQL) | 1+1(Lab) |
| 4 | BCA17R254 | Multimedia and Applications | 1+1(Lab) |
| 5 | BCA17R255 | PHP Programming | 1+1(Lab) |
| 6 | BCA17R256 | Programming in Visual Basic | 1+1(Lab) |
| 7 | BCA17R360 | System Administration and Maintenance | 1+1(Lab) |
| 8 | BCA17R361 | Programming with SCILAB | 1+1(Lab) |
| 9 | BCA17R362 | Software Testing | 1+1(Lab) |
| 10 | BCA17R363 | Linux Programming | 1+1(Lab) |
| 11 | BCA17R364 | Internet of Things | 1+1(Lab) |
| 12 | BCA17R365 | Programming in R | 1+1(Lab) |

Syllabus

| | | | | | |
|---|--|----------|----------|----------|----------|
| BAE17R112 | Tamil ilakkiya varalarum puthinamum | L | T | P | C |
| | | 2 | 0 | 0 | 3 |
| Course Category : Humanities and Social Science Language | | | | | |
| Course Type : Theory | | | | | |

கல்கலிநகம் கல்வி மற்றும் அபரூப்ச்சி நிறுவனம்

அனந்த நகர், கிருஷ்ணன்சேலம்

Subject code: BAE17R112 / BAE17R114(முதல் பருவம்)

தமிழ் இலக்கிய வரலாறும் புதினமும்

(இலங்கலை, இளம் அறிவியல், இளநிலை வணிகவியல், இளநிலை வணிக நிர்வாகவியல் பட்டப்படிப்பு
2017-2018 கல்வியாண்டு முதல் ஆண்டு மாணாக்கர்களுக்கானது)

கூறு-1

தமிழ் மொழியின் பழமையும் சிறப்பும் - திராவிட மொழிக்குடும்பம் - தமிழ்நாடு - தமிழின் சிறப்புகள்
- பழந்தமிழ் இலக்கண நூல்கள்-தொல்காப்பியம், நன்னூல் முதலிய இலக்கண நூல்கள்-எழுத்து, சொல்,
மொருள் அதிகாரங்கள்.

கூறு-2

சங்க காலம் - மூன்று சங்கங்கள் - இலக்கியச் சான்றுகள் - கல்வெட்டுச் சான்றுகள் - இலக்கண, சங்க
நூல்களின் சிறப்பு - பத்துப்பாட்டு - எட்டுத்தொகை - சங்கத் தமிழர் மாண்புகள்.

கூறு-3

சங்கம் மருவிய காலம் - பதினெண் கழக்கணக்கு நூல்கள் - வகைகள்
காப்பிய இலக்கிய வரலாறு - ஐம்பெருங்காப்பியங்கள் - சிறு காப்பியங்கள்-காப்பியக்கூறுகள்

கூறு-4

புதினம் : சேடல்

கூறு-5

அடிப்படை இலக்கணம்
முதல், சாப்பு எழுத்துக்கள், மொழி முதல், இறுதி எழுத்துக்கள், வல்லினம் மிகும் மிகா இடங்கள்.

பாட நூல்கள்:

1.தமிழ் இலக்கிய வரலாறு

2.நன்னூல்-எழுத்ததிகாரம்

3.சேடல் - பொன்னுலகம்

| | | | | | |
|--|------------------------------|----------|----------|----------|----------|
| BAE17R106 | COMMUNICATIVE ENGLISH | L | T | P | C |
| | | 2 | 0 | 0 | 2 |
| Course Category : Humanities and Social Science- AECC – Ability Enhancement Compulsory Courses Course Type : Theory | | | | | |

Preamble:

Acquire proficiency in Communicative English

COURSE OUTCOME(S):

On their completion of this course, the students will be able to

CO 1: Understand the types of communication,

CO 2: Analyze the verbal communication and non verbal Communication.

CO 3: Practice dynamics of Professional presentations.

CO 4: Know how to translate the foreign language.

CO 5: Know how to write letters both personal and professional.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | S | |
| CO2 | | M | | | S | |
| CO3 | | | W | | S | |
| CO4 | | | | M | S | |
| CO5 | W | | | M | S | |

UNIT – I

9 Hours

Introduction : Theory of communication, types and modes of communication

UNIT – II

9 Hours

Language of communication :

Verbal and Non - Verbal (Spoken and written)

Personal/ Social and Business

Barriers and Strategies

Intra Personal, Inter Personal and Group Communication

UNIT – III

9 Hours

Speaking Skills:

Monologus

Dialogue

Group Discussion

Effective Communication / Mis - Communication

Interview

Public Speech

UNIT – IV

9 Hours

Reading and Understanding

Cloze Reading

Comprehension

Summary Paraphrasing

Analysis and Interpretation

Translation (From Indian Language to English and vice - versa)

Literary / Knowledge

UNIT - V**9 Hours****Writing skills**

Documenting
 Report writing
 Making Notes
 Letter writing

TEXT BOOK(S):

1. Language through Literature (Forthcoming)
 ed.Dr.Gauri Mishra, Dr.Ranjana Kaul, Dr.Brat Biswas.
2. Fluency in English Part II Oxford University Press,
 2006, Business English, Pearson, 2008

| | | | | | |
|---|-------------------------|----------|----------|----------|----------|
| BCA17R101 | PROGRAMMING IN C | L | T | P | C |
| | | 3 | 1 | 0 | 4 |
| Course Category : Program Core-DSC1A – Discipline Specific Core Course Type : Theory | | | | | |

PREREQUISITE:

Basic knowledge of computers.

COURSE OBJECTIVE(S):

This course is designed to provide adequate knowledge on the need of programming languages and problem solving techniques. It provides the skills to develop programming skills using the fundamentals and basics of C Language. It enables the effective usage of arrays, structures, functions, pointers and to implement the memory management concepts. It teaches the issues in file organization and the usage of file systems.

COURSE OUTCOME(S):

After completing this course, the student will be able to

- CO1:** Understand the basic terminology used in computer programming.
- CO2:** Develop programs using the basic elements like control statements, Arrays and Strings.
- CO3:** Implement the concepts like functions, structures and union to develop an application.
- CO4:** Understand about the dynamic memory allocation using pointers which is essential for utilizing memory.
- CO5:** Learn the basics of file handling mechanism.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | M |
| CO2 | | | | S | | |
| CO3 | | S | | | | |
| CO4 | | | S | | W | |
| CO5 | M | | | | | S |

UNIT – I**12 Hours**

Importance of C- Character set – C Token- Keywords and identifiers – Constants and variables- Data Types – Operator: Arithmetic Operator, Increment/Decrement Operator, Assignment operator, Relational Operator, Logical Operator

and conditional operators, bitwise operators, special operators – Arithmetic Expressions – Evaluation of Expression – Precedence of Arithmetic Expressions- Type Conversion in expression.

UNIT-II

12 Hours

Decision Making with if Statement – if else statement – Nesting of if ...else – else if Ladder – Switch Statement - ?: Operator – goto statement – While statement – Do-While Statement – For Statement - One Dimensional Array – Declaration of One Dimensional Array – Initialization of One Dimensional Array - Two Dimensional Array – Multi-Dimensional Array.

UNIT-III

12 Hours

Function definition –Types of functions- User Defined functions – elements of user defined function- return values and their types- function calls- function with no argument and no return value- function with argument and no return value - function with argument and return value - function that returns multiple values- recursion- passing arrays to functions- passing strings to functions – Defining the structure – defining structure variable- structure initialization- array of structures- arrays within structure- Nested Structures- Union.

UNIT-IV

12 Hours

Understanding Pointers – Accessing the address of the variable- declaring the Pointer variable- accessing the variable through pointer- pointer expression – pointer increment and scale factor- pointers and arrays- pointers and character string- array of pointer- pointer as function arguments- function returning pointers- pointer to function- pointers and structure.

UNITV

12 Hours

Defining and opening the file- closing the file – I/p and o/p operations of file- random access file- dynamic memory allocation- declaring and initializing the string variable – reading strings from terminal- writing strings to screen- arithmetic operation on character- comparison of two strings- string handling functions

TEXT BOOK(S):

1. E Balagurusamy - Programming in ANSI C - Tata Mc - Graw Hill - 2008 (4th edition).

REFERENCE(S):

1. Herbert Schildt, The Complete Reference C - Tata Mc Graw Hill - 2000 (4th Edition)
2. Byron C Gottfried - Programming with C - Schaums' outline series- Tata Mc - Graw Hill - 2006 (2nd Edition).
Brian Kernighan, W., Dennis Ritchie M. - The C Programming - Prentice-Hall - 1988.

| | | | | | |
|---|-----------------------------|----------|----------|----------|----------|
| BCO17R102 | FINANCIAL ACCOUNTING | L | T | P | C |
| | | 5 | 1 | 0 | 6 |
| Course Category : Program Core-DSC2A – Discipline Specific Core Course Type : Theory | | | | | |

PREREQUISITE:

Basic knowledge of accounts.

COURSE OBJECTIVE(S):

- To teach the fundamentals of accounting.
- To make the students to prepare journal, ledger and trial balance.
- To understand the types of subsidiary books.
- Acquire knowledge on types of errors.
- To have a clear idea of preparing final accounts of individuals.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Knowing the fundamentals accounting.

CO2: Preparation of journal, ledger and trial balance by the students.

CO3: Understanding the types of subsidiary books.

CO4: Acquiring knowledge on types of errors.

CO5: Having clear idea of preparing final accounts of individuals.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | W | |
| CO2 | | S | | | | |
| CO3 | | | | S | | |
| CO4 | | | S | | W | |
| CO5 | | | | | | S |

UNIT-I**12 Hours**

Transaction - Definition of Book-keeping - Objects - Definition of Accounting - Functions of Accounting - Advantages - Limitations - Double entry system - Advantages - Disadvantages - Single entry system - Advantages - Disadvantages - Differences between double entry system and single entry system.

UNIT-II**12 Hours**

Accounting Rules - Accounting concepts and conventions - Journal - Ledger - Journal vs Ledger - Trial balance - Objectives - Limitations

UNIT-III**12 Hours**

Subsidiary books: Purchase, sales, purchase returns, sales returns, cash book- single, double and triple column cash book - petty cash book, journal proper.

UNIT-IV**12 Hours**

Errors - Meaning of error - Types of errors - Suspense account (Simple problems only).

UNIT – V**12 Hours**

Final accounts - Meaning - Trading Account - Profit and loss account - Trading account vs Profit or loss account - Differences between Gross profit and Net profit - Balance sheet - Trial balance vs Balance sheet - Treatment of some important adjustments (Simple problems only).

TEXT BOOK(S):

1. R. L. Gupta and M. Radha Samy- Advanced Accountancy – Sultan Chand & sons - 2001 (10th Edition).

REFERENCE(S):

1. V.Sudhakar, M.Anbalagan and K.Jeyalakshmi - Fundamentals of Financial Accounting – S. Chand & Sons - 2009 (1st Edition).
2. M. Arulanantham & Raman - Advanced Accountancy – Himalaya Publishing House - 1999 (5th Edition).

| | | | | | |
|--|-----------------------------------|----------|----------|----------|----------|
| MAT17R151 | PROBABILITY AND STATISTICS | L | T | P | C |
| | | 5 | 1 | 0 | 6 |
| Course Category : Program Core-DSC2A – Discipline Specific Core | | | | | |
| Course Type : Theory | | | | | |

COURSE OBJECTIVE(S):

The students will be enabling to have the knowledge on probability and correlation.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Understand the basic concept of Probability and Conditional probability.

CO2: Know the concept of random variables, expectations and moment generating functions.

CO3: Know about some standard distributions.

CO4: Know about correlation and regression.

CO5: Understand the concept of testing of hypothesis.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | W | |
| CO2 | | S | | | | M |
| CO3 | | | S | | | |
| CO4 | | | | S | | |
| CO5 | M | | | | | S |

UNIT-I**12 Hours**

Probability: Probability - Conditional Probability –Baye's Theorem.

UNIT-II**12 Hours**

Random Variables: Random Variables- Discrete Random Variable- Continuous Random variable - Probability mass function and probability density function- Mathematical Expectations of discrete random variable and Continuous Random Variable - Moment Generating Function (Except cumulant generating function).

UNIT-III

12 Hours

Some Special Distributions: Binomial Distribution- Poisson Distribution- Normal Distribution.

UNIT-IV

12 Hours

Correlation and Regression: Correlation- Rank Correlation- Regression lines.

UNIT-V

12 Hours

Testing of Hypothesis: Sampling- Sampling Distribution- Testing of Hypothesis-Procedure for Testing of Hypothesis for Large Samples- Tests of Significance for Large Samples- Test of Significance for Means- Test for Standard Deviation-Test of Significance based on t-Distribution (t-test) - Test of Significance based on F-test- Test for Significance of an Observed Sample Correlation. Test Based on Distribution- Chi-square -Test to test the Goodness of Fit

TEXT BOOK(S):

S.Arumugam,, A. Thangapandi Isaac – Statistics - New Gamma Publishing Houses – 2009.

REFERENCE(S):

S.C.Gupta, V.K.Kapoor - Elements of Mathematical Statistics - Sultan Chand and Sons - 2001(3rd Editon).

Unit I:Chapter 11

Unit II: Chapter 12 (Except cumulant generating functions)

Unit III: Chapter 13

Unit IV:Chapter 6 (6.1, 6.2, 6.3)

Unit V: Chapter 14 and Chapter 15

| | | | | | |
|---|--|----------|----------|----------|----------|
| BCA17R181 | PROGRAMMING IN C LABORATORY | L | T | P | C |
| | | 0 | 0 | 3 | 2 |
| Course Category : Program Core-DSC2A – Discipline Specific Core Course Type : Laboratory Course | | | | | |

PREREQUISITE:

Basic knowledge of Computer.

COURSE OBJECTIVE(S):

This course is designed to help in formulating and implementing problems using C language. It enables to effectively choose programming concepts that efficiently solves computing problems in real-world.

COURSE OUTCOME(S):

After completing this course, the student will be able to

- CO1:** Understand the basic concepts used for writing C Program.
- CO2:** Code program using operators, type conversion and other building blocks of C Language.
- CO3:** Implement the real time applications using conditional expressions and looping statements
- CO4:** Develop the program using the functions involving the idea of reusability.
- CO5:** Develop programs using files, structures and union.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | |
| CO2 | | | | S | | |
| CO3 | | S | | | W | |
| CO4 | | | | M | | S |
| CO5 | | | | S | | S |

List of Programs**36 Hours**

1. To demonstrate use of data types, simple operators (expressions).
2. To demonstrate decision making statements (if and if-else, nested structures).
3. To demonstrate decision making statements (switch case).
4. To demonstrate the use of looping statements.
5. To demonstrate writing C programs in modular way (use of user defined functions).
6. To demonstrate recursive functions.
7. To demonstrate the use of arrays.
8. To demonstrate the use of pointers.
9. To demonstrate the concept of strings.
10. To demonstrate the concept of structures.
11. To implement the concepts of nested structures and Unions.
12. To demonstrate the concept of file handling.

| | | | | | |
|--|----------------|----------|----------|----------|----------|
| BAE17R113 | ENGLISH | L | T | P | C |
| | | 3 | 0 | 0 | 3 |
| Course Category : Humanities and Social Science | | | | | |
| Course Type : Theory | | | | | |

PREAMBLE:

The course aims to help the students to achieve fluency and accuracy in English.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: To introduce World renowned prose writers to students.

CO2: To introduce World renowned poets to student.

CO3: To make them understand the nuances of Short stories.

CO4: To excel in Grammar.

CO5: To excel in Composition.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|----------------|-----------|----------|----------|----------|----------|----------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | | S | | | | |
| CO2 | | W | | | S | |
| CO3 | | | | S | | |
| CO4 | | | | | S | |
| CO5 | | | | | S | |

UNIT-I Prose **9 Hours**

V.S.Srinivasa Sastri - Mahatma Gandh. John Frazer -
Mother Teresa R.N.Roy - Martin Luther King

UNIT-II Poetry **9 Hours**

Sri Aurobindo – The Tiger and the Deer Gabriel Okara –
Once Upon a Time Robert Frost – Stopping By Woods on a
Snowy Evening

UNIT-III Short Stories **9 Hours**

Anton Chekhov – The Lottery Ticket Oscar Wilde – The
Selfish Giant. O.Henry – The Last Leaf

UNIT – IV Grammar **9 Hours**

- a) Modals
- b) Introductory 'it',
- c) Introductory 'there'
- d) Questions
- a) Infinitive forms

UNIT – V Composition **9 Hours**

- a) Précis Writing
- b) Email
- c) Advertisement
- d) Notices, Agenda, Minutes
- e) Jumbled Sentences

TEXT BOOK(S):

1. David Green - Contemporary English Grammar
Structures and Composition – Macmillan - 1971.
2. Meenakshi Raman & Sangeeta Sharma - Technical
Communication: Principle and Practice - New Delhi:
OUP, 2011.

| | | | | | |
|--|------------------------------|----------|----------|----------|----------|
| CHY17R103 | ENVIRONMENTAL SCIENCE | L | T | P | C |
| | | 2 | 0 | 0 | 2 |
| Course Category : Humanities and Social Science- AECC – Ability Enhancement Compulsory Courses Course Type : Theory | | | | | |

PREREQUISITE:

Basic knowledge on environmental issues.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: To Know the importance of environmental studies and methods of conservation of natural resources.

CO2: Describe the structure and function of an ecosystem and explain the values and Conservation of biodiversity.

CO3: Explain the sources, environmental effects and control measures of various types of pollutions.

CO4: Select the appropriate methods for waste management.

Co5: Recall social issues and legal provision and describe the necessities for environmental act.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|----------------|-----------|----------|----------|----------|----------|----------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | W | | | | S | |
| CO2 | | M | | | | S |
| CO3 | | | | S | | |
| CO4 | | | W | | | S |
| CO5 | | | | | | M |

UNIT-I

4 Hours

Natural Resources: Definition, scope, and importance of environmental sciences -Need for public awareness-Natural resources: Forest resources, Water resources, Land resources, Mineral resources, and Energy resources - Role of an individual in conservation of natural resources.

UNIT-II

4 Hours

Ecosystem and Biodiversity: Concept of an ecosystem - Structure and function of an ecosystem - Food chains, food webs and ecological pyramids - Biodiversity - Definition, value of biodiversity- Hot spots of biodiversity - Threats to biodiversity - Endangered and endemic species of India - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT-III

4 Hours

Environmental Pollution: Sources, consequences and control measures of Air pollution, Water pollution, Soil pollution, Thermal pollution and nuclear pollution. Environmental threats, Acid rain, Climate change, Global warming (Greenhouse effect), Ozone layer depletion. Fireworks: current environmental issues.

UNIT-IV

4 Hours

Management of Environmental Pollution: Causes, effects, treatments methods and control measures of solid waste, municipal waste, biomedical waste - Waste minimization techniques - Cleaner technology- Disaster management: floods, earthquake, cyclone, landslides and Tsunami.

UNIT-V

4 Hours

Social Issues and the Environment: Water conservation, rain water harvesting- Environmental impact assessment- Precautionary and polluters pay principle- environment protection act - air (prevention and control of pollution) act - water (prevention and control of pollution) act - Population explosion - Family Welfare Programmes - Environment and human health - Human Rights - Women and Child Welfare.

TEXT BOOK(S):

1. Dhameja, S. K. - Environmental Engineering and Management - S. K. Kataria and sons, New Delhi - 2015(1st edition).
2. Anubha Kaushik and Kaushik C.P. - Environmental Science & Engineering - New Age international Publishers - New Delhi, 2010.

REFERENCE(S):

1. Gilbert M. Masters - Introduction to Environmental Engineering and Science - Pearson Education Pvt., Ltd. - 2004(2nd edition).
2. Erach Bharucha - Textbook for Environmental Studies UGC New Delhi -2004.
3. Miller T.G. Jr. -Environmental Science - Wadsworth Publishing USA–2004(2nd edition).
4. Erach Bharucha -The Biodiversity of India - Mapin publishing Pvt. Ltd Ahmedabad India –2002.

| | | | | | |
|---|------------------------|----------|----------|----------|----------|
| BCO17R104 | COST ACCOUNTING | L | T | P | C |
| | | 5 | 1 | 0 | 6 |
| Course Category : Program Core - DSC1B – Discipline Specific Core Course Type : Theory | | | | | |

PRE REQUISITE:

Acquaint student with basic concept used in cost accounting and various methods involved in cost ascertainment systems.

COURSE OBJECTIVE(S):

- To provide knowledge regarding crucial concept in cost accounting.
- To study the cost accounting technique applied in Material Cost.
- To enable the students to develop the skill relating to various techniques in computing Labor cost.
- To provide knowledge about the allocation and absorption of overhead.
- To understand the idea about procedure for preparing reconciliation statement.

COURSE OUTCOME(S):

After completing this course, the student will be able to

- CO1:** Give the information about various concepts in cost accounting and preparation of cost sheet.
- CO2:** Obtain the knowledge about the cost accounting technique applied in material and labour.

CO3 : Present the skills relating to various techniques of Labor cost.

CO4 : Gain the knowledge about the overhead, apportionment allocation of the expenditures.

CO5 : Know the idea about preparation and procedure of reconciliation statement.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | M | | | | | W |
| CO2 | | S | | | M | |
| CO3 | | | S | | | |
| CO4 | | | | S | | |
| CO5 | | | | | | S |

UNIT – I

12 Hours

Cost Accounting: Meaning – Objectives – Importance – Advantage – Cost accounting vs. Financial accounting - Cost accounting vs. Management accounting – Classification and elements of cost – Components of total cost – Preparation of cost sheet.

UNIT – II

12 Hours

Material: Purchase procedure – Store keeping – Different levels of stock – Material issues procedure – Pricing of material.

UNIT – III

12 Hours

Labour: Methods of Remuneration and Incentive wage plans – Control of Labour cost.

UNIT – IV**12 Hours**

Overhead: Meaning – Classification – Allocation – Apportionment and Absorption

UNIT – V**12 Hours**

Reconciliation statement: Reconciliation of Cost and Financial Accounting – Reasons – Procedure for reconciliation

TEXT BOOK(S):

1. R.S.N.Pillai & Bhagavathi - Cost Accounting - S.Chand & Company Ltd- 2013.

REFERENCE(S):

1. Jain & Narang - Cost Accounting - Kalyani Publishers – 2008(Revised Edition).
2. M.N. Arora, Cost Accounting - Vikas Publishing House Pvt. Ltd - 2007 (Revised edition).

| | | | | | |
|--|---|----------|----------|----------|----------|
| BCA17R105 | OBJECT ORIENTED PROGRAMMING WITH C++ | L | T | P | C |
| | | 3 | 1 | 0 | 4 |
| Course Category : Program Core - DSC1B – Discipline Specific Core | | | | | |
| Course Type : Theory | | | | | |

PREREQUISITE:

Basic knowledge of C programming.

COURSE OBJECTIVE(S):

This course is designed to get clear idea about object-oriented concepts and implement the concepts using C++ for developing real time applications.

COURSE OUTCOME(S):

After completing this course, the student will be able to

- CO1:** Understand the benefits of object oriented design and understand when it is an appropriate methodology to use.
- CO2:** Apply good programming style and understand the impact of style on developing and Maintaining programs
- CO3:** Design object oriented solutions for small systems involving multiple objects.
- CO4:** Understand the role of inheritance, polymorphism and dynamic binding in developing and application
- CO5:** Implement error handling mechanisms and Templates in C++.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | |
| CO2 | | S | | | W | |
| CO3 | | | | | | |
| CO4 | | | | S | | S |
| CO5 | | | S | M | | |

UNIT-I**12 Hours**

Procedure-Oriented Programming-Object Oriented programming paradigm –basic concept of Object Oriented programming-benefit of OOPS-Object Oriented languages-Application of OOPS- Application of C++ - Structure of C++ program.

UNIT-II

12 Hours

Tokens-key words-identifiers and constants- basic data types-user- defined data types-storage classes- derived data type – type compatibility- operators in C++- scope resolution Operator- member dereferencing operator- memory management operator- type cast operator- special assignment expression- the main function- function prototyping- call by reference-return by reference- inline function- default argument-recursion.

UNIT-III

12 Hours

Specifying a class- defining member function-making an outside function inline- nesting of member function-private member function-arrays with in a class- memory allocation for object- static data member-static member function- array of object- object as function argument- friendly function- constructor- parameterized constructor- multiple constructor in a class – constructor with default argument-copy constructor-dynamic constructor-destructor.

UNIT-IV

12 Hours

Polymorphism-function overloading-defining operator overloading-overloading unary operator- overloading binary operator- overloading binary operator using friends-rules for overloading operators- defining derived classes- single inheritance- making a private member inheritable- multilevel inheritance- multiple inheritance- hierarchical inheritance-hybrid inheritance-virtual base classes-abstract classes.

UNIT-V

12 Hours

Pointers-pointer to object- this pointer- pointer to derived classes- virtual function-pure virtual function – class templates- function templates-basics of exception handling-throwing mechanism- catching mechanism- re-throwing an exception-creating (string)objects- manipulating string object-comparing and swapping.

TEXT BOOK(S):

1. E Balagurusamy - Object oriented Programming with C++ - Tata McGraw-Hill Publishing Company- June 2011 (6th Edition).

REFERENCE(S):

1. HM Deitel and PJ Deitel - C++ How to Program - Prentice Hall - 2010 (7th Edition).
2. Herbert Schildt - The Complete Reference in C++ - Tata McGraw Hill - 2003 (4th Edition).
3. Bjarne Stroustrup - The C++ Programming language - Addison-Wesley -2013.
4. D.Ravichandran - Programming with C++ - Tata McGraw Hill -2011(4th Edition).

| | | | | | |
|---|----------------------|---|---|---|---|
| MAT17R152 | DISCRETE MATHEMATICS | L | T | P | C |
| | | 5 | 1 | 0 | 6 |
| Course Category : Program Core - DSC1B – Discipline Specific Core Course Type : Theory | | | | | |

COURSE OBJECTIVE(S):

To enable the students to be familiar with Lattices and Graph theory.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: understand the concept of sets, relations, functions.

CO2: know the methods of proof of theorems and the basic ideas in logic.

CO3: understand the concept of lattices and Boolean algebra.

CO4: understand the concept of Polynomials and Recurrence relations.

Co5: know the representation of graphs.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | M | | | | | |
| CO2 | | S | | | W | |
| CO3 | | | S | | | |
| CO4 | | | | S | | |
| CO5 | | | | | | S |

UNIT-I **12 Hours**

Relations and Functions: Cartesian product of two sets – Relations – Representation of a relation – Operations on relations – Equivalence relations – Functions – one-to-one, onto functions – Special type of functions – Invertible functions – Composition of functions.

UNIT-II **12 Hours**

Logic: Introduction – TF(True/ False) Statements – Connectives – Atomic and Compound statements – Truth table of a formula – Tautology – Tautological implications – Equivalence of formulae – Replacement process – Normal forms – Principal normal forms – Theory of Inference.

UNIT-III **12 Hours**

Lattices and Boolean algebra: Lattices – Hasse Diagrams - Some properties of lattices – Duality principle – Lattice through Algebraic operations - New lattices – Lattice Homomorphisms – Product lattice of two lattices - Modular and Distributive lattices – Boolean Algebras

UNIT-IV **12 Hours**

Recurrence Relations And Generating Functions: Recurrence – Recurrence relations-Solutions to finite order Homogeneous linear relations-Generating functions.

UNIT-V **12 Hours**

Graph theory: Basic Concepts – Graph - Subgraph – Spanning subgraph – Adjacent and Incident matrix and simple theorem – Degree – Complete graph – Bipartite graph –

Connected graphs – Walk - Trail-Paths and Cycles – Isomorphic graphs- Digraph – Spanning tree and algorithms

TEXT BOOK(S):

1. Dr. M.K. Venkataraman, Dr. N. Sridharan and N. Chandrasekaran - Discrete Mathematics - National Publishing Company - October 2001.

Unit I: Chapter II (Sec 1 to 5), Chapter 3 (Sec 1 to 5)

Unit II: Chapter IX (Sec 1 to 13)

Unit III: Chapter X (Sec 1 to 5)

Unit IV: Chapter V (Sec 1 to 3, 5 to 7)

Unit V: Chapter XI (Sec 1)

REFERENCE(S):

1. Rosen, K.H. - Discrete Mathematics and its applications - Tata McGraw-Hill Publishing Company Limited - New Delhi - 1999 (4th Edition).
2. Manohar R. - Discrete Mathematics Structure with Application to Computer Science - Tata McGraw Hill Education -2001.

| | | | | | |
|--|--|----------|----------|----------|----------|
| BCA17R182 | OBJECT ORIENTED PROGRAMMING WITH C++ LABORATORY | L | T | P | C |
| | | 0 | 0 | 3 | 2 |
| Course Category : Program Core - DSC2B – Discipline Specific Core | | | | | |
| Course Type : Laboratory Course | | | | | |

PREREQUISITE:

Basic knowledge of C programming.

COURSE OBJECTIVE(S):

This course is designed to solve the problems using object oriented concepts and implement the concepts for effective coding.

COURSE OUTCOME(S):

After completing this course, the student will be able to

- CO1:** Familiarize the students with the C++ environment.
- CO2:** Code programs using constructors, destructors for effective implementation of object Oriented concepts.
- CO3:** Develop an application using functions, classes, and operators overloading.
- CO4:** Implement the concept of inheritance and virtual functions.
- CO5:** Code programs for Exception handling and file handling mechanism.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | |
| CO2 | | S | | | W | |
| CO3 | | | S | | | M |
| CO4 | | | | S | | |
| CO5 | | | | | | S |

LIST OF PROGRAMS**36 Hours**

1. Programs using Control Structures.
2. Programs using Functions.
3. Programs using Arrays.
4. Programs using Inline Functions.
5. Programs using Classes.
6. Programs using Constructors and Destructors.
7. Programs using Friend Functions.
8. Programs using Operator Overloading.
9. Programs using Inheritance.
10. Programs using Virtual Functions.
11. Programs using Files.
12. Programs using Strings.

| | | | | | |
|--|--------------------------|----------|----------|----------|----------|
| BCA17R201 | OPERATING SYSTEMS | L | T | P | C |
| | | 4 | 0 | 0 | 4 |
| Course Category : Program Core - DSCIC – Discipline Specific Core | | | | | |
| Course Type : Theory | | | | | |

PREREQUISITE:

Basic knowledge of computers.

COURSE OBJECTIVE(S):

This course is designed to provide a comprehensive understanding of principles and technical approaches in operating systems. The emphasis of the course will be placed on understanding how the various elements of operating system interact and provides services for execution of application software.

COURSE OUTCOME(S):

After completing this course, the student will be able to

- CO1:** Understand the basic concepts of operating systems and its types
- CO2:** Gain knowledge on various process management concepts and scheduling algorithms
- CO3:** Understand the synchronization concepts like monitors, semaphores in multi Programming systems.
- CO4:** Demonstrate the design and management concepts along with issues and challenges of main memory and virtual memory
- CO5:** Understand the various file concepts and the disk scheduling

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO 1 | S | | | | | W |
| CO 2 | | | | S | | M |
| CO 3 | M | S | | | | |
| CO 4 | | | S | | W | |
| CO 5 | M | | S | | | |

UNIT I**12 Hours**

Introduction- Operating Systems definition- Types of operating systems- Operating Systems structure- Operating Systems operations- Operating Systems services-System Calls-Types of System calls-Operating System Design and Implementation –Virtual Machine.

UNIT II**12 Hours**

Process concept- process scheduling- operations on processes- Scheduling criteria- scheduling algorithm –Thread scheduling-Multi processor scheduling-Inter process communication

UNIT III**12 Hours**

Process Synchronization- The critical section problem-Semaphores-Monitors-Deadlock –Methods of handling deadlocks-Deadlock prevention, deadlock avoidance, deadlock detection and deadlock recovery.

UNIT IV**12 Hours**

Memory Management strategies-Swapping-Contiguous memory allocation-Paging-Segmentation-Virtual Memory-Demand paging –Page replacement algorithms.

UNITV**12 Hours**

File Concept- Access methods-Directory and disk structure-File system structure-Allocation Methods-Disk Scheduling.

TEXT BOOK(S):

1. Silberschatz, Galvin, Gagne - Operating System Concepts - John Willey & Sons – 2009 (8th Edition).

REFERENCE(S):

1. William Stallings - Operating Systems, Internals and Design Principles- PHI Publications New Delhi -7th Edition .
2. Andrew Tanenbaum - Modern Operating Systems - Prentice Hall – 2009 (3rd edition).
3. Harvey M. Deitel - An introduction to operating systems-Addison-Wesley - 1990 (2nd edition).

| | | | | | |
|--|----------------------------|----------|----------|----------|----------|
| MAT17R253 | OPERATIONS RESEARCH | L | T | P | C |
| | | 5 | 1 | 0 | 6 |
| Course Category : Program Core - DSC2C – Discipline Specific Core | | | | | |
| Course Type : Theory | | | | | |

COURSE OBJECTIVE(S):

To enable the students to acquire the basic knowledge in Operations Research.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Understand the basic concepts of Operations Research and formulation of linear programming problem.

- CO2:** Solve linear programming problem by using graphical method and simplex method.
- CO3:** Analysis the network by PERT and CPM.
- CO4:** Solve transportation using some mathematical techniques.
- CO5:** Understand the solving method of Assignment problem and travelling salesman problem.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | M |
| CO2 | | S | S | | | |
| CO3 | | M | | S | | S |
| CO4 | | | S | | W | |
| CO5 | M | | S | | | S |

UNIT-I

12 Hours

Linear Programming Problem - Mathematical formulation of a problem-Graphical solution.

UNIT- II

12 Hours

The simplex method – Artificial variable technique-Charner's method of penalties –Two phase method.

UNIT-III

12 Hours

Network and basic concepts – Critical path analysis – Probability considerations in PERT – Probability of meeting the schedule time (Simple problem only) – Distinction between PERT and CPM

UNIT – IV

12 Hours

Transportation Problem - Initial solution by North West corner method, Vogel's Approximation method, Matrix Minima method - Assignment problem.

UNIT – V

12 Hours

Game Theory- Two person zero sum game –Some basic terms –The maxima and minima principle (proof of theorems, not expected)- Saddle points- Game with saddle points – Solutions of games without saddle points by the following Method. 1. Using formulae. 2. Graphical Method

TEXT BOOK(S):

1. Kanthi Swarup - Operations Research - Sulthan Chand & Son- 2003 (9th Edition).

Unit I: Chapter 2 (section 2.1 and 2.2) Chapter 3
(Sections 3.1 to 3.3),

Unit II: Chapter 4 (sections 4.1, 4.3, 4.4)

Unit III: Chapter 21 (sections 21.2 - 21.4 and 21.5, 21.6, 21.7)

Unit IV: Chapter 10 (sections 10.1 to 10.4 and 10.8 to 10.11) Chapter 11 (sections 11.1 - 11.3)

Unit V: Chapter 17 (section-17.1 -17.6)

REFERENCE(S):

1. P. R. Vittal - Introduction to operations Research -

| | | | | | |
|--|------------------------------------|----------|----------|----------|----------|
| BCO17R202 | E-COMMERCE TECHNOLOGIES | L | T | P | C |
| | | 5 | 1 | 0 | 6 |
| Course Category : Program Core - DSC3C – Discipline Specific Core | | | | | |
| Course Type : Theory | | | | | |

PREREQUISITE:

Basic knowledge of commerce and internet.

COURSE OBJECTIVE(S):

To understand the opportunity of e-commerce, knowing how to plan, manage, apply processes of e-commerce, analyze and understand the human, technological, business environment associated with e-commerce, how to use technologies to build e-commerce websites.

COURSE OUTCOME(S):

After completing this course, the student will be able to

- CO1:** Understand the principles of E-commerce and basics of World Wide Web.
- CO2:** Development of e-commerce applications and user-friendly websites.
- CO3:** Analyze security issues over the web, the available solutions and future aspects of E-commerce security.
- CO4:** Able to know the concept of E-banking and policy issues.
- CO5:** Design and implement an e-commerce application with a shopping cart.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | M | | M | | | |
| CO2 | | S | | | | |
| CO3 | | | W | S | M | |
| CO4 | | | | | M | S |
| CO5 | | | | S | | S |

UNIT I**12 Hours**

An introduction to Electronic commerce: What is E-Commerce (Introduction And Definition), Main activities E-Commerce, Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, 9 Electronic Commerce and Electronic Business (C2C)(C2G, G2G, B2G, B2P, B2A, P2P, B2A, C2A, B2B, B2C)

UNIT II**12 Hours**

The Internet and WWW: Evolution of Internet, Domain Names and Internet Organization (.edu, .com, .mil, .gov, .net etc.) , Types of Network, Internet Service Provider, World Wide Web, Internet & Extranet, Role of Internet in B2B Application, building own website, Cost, Time, Reach, Registering a Domain Name, Web promotion, Target email, Banner, Exchange, Shopping Bots

UNIT III**12 Hours**

Internet Security: Secure Transaction, Computer Monitoring, Privacy on Internet, Corporate Email privacy,

Computer Crime(Laws , Types of Crimes), Threats, Attack on Computer System, Software Packages for privacy, Hacking, Computer Virus(How it spreads, Virus problem, virus protection, Encryption and Decryption, Secret key Cryptography, DES, Public Key Encryption, RSA, Authorization and Authentication, Firewall, Digital Signature(How it Works)

UNITIV

12 Hours

Electronic Data Exchange: Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model, Electronic Payment System: Introduction, Types of Electronic Payment System, Payment Types, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash(10L)

UNITV

12 Hours

Planning for Electronic Commerce: Planning Electronic Commerce initiates, Linking objectives to business strategies, Measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites

Internet Marketing: The PROS and CONS of online shopping, The cons of online shopping, Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e-commerce. Case study – online purchase.

TEXT BOOK(S):

1. G.S.V.Murthy - E-Commerce Concepts Models, Strategies- Himalaya Publishing House- 2011.
2. Kamlesh K Bajaj and Debjani Nag - E- Commerce - Tata Mc Graw Hill publishing - 2005.

REFERENCE(S):

1. Gray P. Schneider - Electronic commerce - International Student Edition - 2011.
2. Henry chan, raymond lee, tharam dillon, elizabeth chang - E-commerce fundamentals and applications - widely student edition - 2011.

| BCA17R281 | OPERATING SYSTEMS LABORATORY | L | T | P | C |
|---|---------------------------------|---|---|---|---|
| | | 0 | 0 | 3 | 2 |
| Course Category : Program Core - DSC1C – Discipline Specific Core | | | | | |
| Course Type : Laboratory Course | | | | | |

PREREQUISITE:

Basic knowledge of Operating System Concepts.

COURSE OBJECTIVE(S):

This course is designed to have students to understand and appreciate the principles in the design and implementation of operating systems software.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Simulation of CPU Scheduling Algorithms.

CO2: Implement the concept of inter process communication.

CO3: Develop programs for efficient memory management.

CO4: Code programs for page replacement techniques.

CO5: Simulation of deadlock avoidance algorithm.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | M | | S | | | |
| CO2 | | M | | S | | |
| CO3 | | | | | | S |
| CO4 | | S | | S | | |
| CO5 | | M | | | | S |

LIST OF PROGRAMS

36 Hours

1. Implement the following CPU Scheduling Algorithms.
 - i) FCFS
 - ii) Shortest Job First
2. Implement Inter Process Communication Problem.
3. Implement (Producer-Consumer / Reader - Writer Problem) using Semaphores.
4. Implement Best fit, First Fit Algorithm for Memory Management.
5. Implement Memory Allocation with Pages.
6. Implement FIFO page Replacement Algorithm.
7. Implement LRU page Replacement Algorithm.
8. Implement File Locking.
9. Implement Banker's algorithm.

| | | | | | |
|--|--------------------------|----------|----------|----------|----------|
| BCA17R203 | • NET PROGRAMMING | L | T | P | C |
| | | 3 | 1 | 0 | 4 |
| Course Category : Program Core - DSC1D – Discipline Specific Core | | | | | |
| Course Type : Theory | | | | | |

PRE-REQUISITE:

Basic knowledge of programming.

COURSE OBJECTIVE(S):

This course is designed to develop Microsoft .Net windows, console based application and web based application.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Explore Visual Basic's Integrated Development Environment (IDE).

CO2: Understand the basic concepts of .net framework.

CO3: Apply C# concepts in developing applications.

CO4: Developing programs using VB .NET.

CO5: Building website using ASP.NET.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | |
| CO2 | | S | | | | |
| CO3 | | | | S | | S |
| CO4 | | | | S | | S |
| CO5 | | | S | S | W | |

UNIT-I

12 Hours

GUI concept – Data types – GUI Architecture – Message Processing – Keyboard and Mouse Handling Displaying Text and Graphics – File and Printer Handling

UNIT-II

12 Hours

Transactions in .NET, Structures Exception Handling, Code Access Security, Web Controls using the .NET framework, The .NET Framework Class Library.

UNIT-III

12 Hours

C#.NET – Basic features, Arrays and Collections, parameter arrays, Inheritance, Garbage Collection and Resource management.

UNIT-IV

12 Hours

VB.NET – basic features - Inheritance, Value Types, Operator Overloading, Exception Handling, Arrays and Collections, Properties, Delegates and Events, Windows Forms, Dialog Boxes and Controls, Graphical Output, Files, Data access.

UNIT-V

12 Hours

ASP.NET – Validation controls – Accessing Data with web forms – Building ASP.NET applications – Building and XML web service handling XML.

TEXT BOOK(S):

1. Jeff Prosise - Programming Microsoft .NET - Microsoft Press -2009(1st Edition).
2. David S Pla - Introducing Microsoft .NET - Microsoft Press -2003(3rd Edition).

REFERENCE(S):

1. Thuan Thai ,Hoang Q.Lam - .Net Frame Work Essentials- O'Reilly and Associates -2003 (3rd Edition).
2. Paul Yao, David Durant - Programming .NET Compact Framework 3.5 - Pearson Education – 2010(2nd Edition).

| | | | | | |
|--|--------------------------|----------|----------|----------|----------|
| MAT17R254 | NUMERICAL METHODS | L | T | P | C |
| | | 5 | 1 | 0 | 6 |
| Course Category : Program Core - DSC2D – Discipline Specific Core | | | | | |
| Course Type : Theory | | | | | |

COURSE OBJECTIVE(S):

To enable the students to apply the numerical method solutions to real world problems.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Solve by Direct methods and Iteration methods for solving system of equations.

CO2: Know different types of difference operators.

CO3: Solve physical problems using different types of operator.

CO4: Find derivatives of functions using operator.

CO5: Know different rules of Numerical integration.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | S | | |
| CO2 | | M | S | | | |
| CO3 | | S | | | | |
| CO4 | | | | M | | |
| CO5 | M | | | S | W | S |

UNIT-I

12 Hours

Errors in Numerical Computation - Iteration method – Regula Falsi Method - Newton-Raphson Method - Simultaneous Equations-Back Substitution-Gauss Elimination Method-Gauss' Jordan Elimination Method-Iterative methods-Gauss Jacobi Iteration Method – Gauss–Seidel Iteration Method.

UNIT-II

12 Hours

Difference Operators- Forward difference Table- Properties of the Operator -Backward Differences – Central Difference Operator.- Other Difference Operators.

UNIT-III

12 Hours

Newton's Interpolation Formulae-Central Difference Interpolation Formulae – Lagrange's Interpolation Formula - Divided Differences - Newton's Divided Difference Formula.

UNIT – IV

12 Hours

Derivatives using Newton's Forward Difference Formula and Newton's Backward Difference Formula – Derivatives using Central Difference Formulae.

UNIT – V

12 Hours

Numerical Integration- Newton – Cotes quadrature formula – Trapezoidal rule – Simpson's one third rule – Simpson's three eight rule – Weddle's rule – Romberg's method.

TEXT BOOK(S):

1. S. Arumugam, A. Thangapandi Isaac, and A. Somasundaram - Numerical Methods - Scitech Publications Pvt.Ltd - 2012.

Unit-1 Chapter 3 (Sections 3.1, 3.2, 3.3 and 3.5)

Chapter 4 (Sections 4.1 to 4.4, 4.7, 4.8)

Unit II: Chapter 6 (Sections 6.1 and 6.2)

Unit III: Chapter 7 (Sections 7.1 to 7.5)

Unit IV: Chapter 8 (Sections 8.1 to 8.3)

Unit V: Chapter 8 (Section 8.5)

REFERENCE(S):

1. S.S. Sastry - Introduction Methods of Numerical Analysis -, Prentice Hall of India Pvt. Ltd.- 2000.

| | | | | | |
|---|-----------------------------|----------|----------|----------|----------|
| BCO17R204 | PROGRAMMING IN TALLY | L | T | P | C |
| | | 3 | 1 | 0 | 4 |
| Course Category :Program Core - DSC3D – Discipline Specific Core | | | | | |
| Course Type : Theory | | | | | |

PREREQUISITE:

Basic knowledge of accounting, PC software and internet.

COURSE OBJECTIVE(S):

This course is designed to give an opportunity to the student to get acquainted with Tally Accounting Software. This course aims the students to describe the aspects of Tally programming and become expertise in computerized accounting. The course covers the in-depth knowledge in Tally and to make an individual job ready for accounting field.

COURSE OUTCOME(S):

After completing this course, the student will be able to:

- CO1:** Understand the tally screen components.
- CO2:** Able to learn the account groups and Ledgers.
- CO3:** Able to do voucher entries and understand reports of Profit & Loss account, Ratio analysis and Trial Balance.
- CO4:** Apply the process of Stock Items and all inventory voucher types.
- CO5:** Designing a Dynamic Report.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | |
| CO2 | | | | S | | |
| CO3 | | M | | M | | S |
| CO4 | | S | | | | |
| CO5 | | | S | | W | S |

UNIT-I**12 Hours**

Basic Concepts of Accounting, Financial Statements-Financial Statement-Analysis, Cost Centre, Basic concepts of Inventory-Tally Configuration & INI setup, Data Directory & Folders configuration- Single & Multiple User, Tally - Screen Components, Mouse / Keyboard Conventions & Key-Combinations, Switching between screen areas, Quitting Tally-Maintaining Company Data, Basic Company Details-Create/Alter/Select/Load/Close a Company, Chart of Accounts, Company Features, and Configuration.

UNIT-II**12 Hours**

Create, Alter & Display-Groups and Ledgers-All accounting voucher types-Accounting Voucher transactions, Account Invoice transactions- Excise Invoice- Export Invoice-Transactions using Bill-wise details.-Bank Reconciliation-Interest calculations using simple & advance parameters, Interest calculations on outstanding balances & on invoices, Use of voucherclass

UNIT-III

12 Hours

Reports like balance sheet, Profit & Loss account, Ratio analysis Trial Balance.-Accounts books like cash / bankbook, All Ledgers Group summary & vouchers, Sales, purchase & journal registers. Cost centre & category summary, Cost centre breakup ledger & group breakup, outstanding receivables & payables, interest receivable & payable, Statistics, Cash & Fund flow, Day book List of Accounts, Reversing journals, optional vouchers, post-dated vouchers.

UNIT-IV

12 Hours

Create, Alter & Display Stock Groups and Stock Items- All inventory voucher types and transactions Inventory details in accounting vouchers. Reports like Stock summary, Inventory books like Stock item, Group summary, Stock transfers, Physical stock register, Movement analysis, Stock group & item analysis, stock category analysis Ageing analysis, Sales order & Purchase order book, Statement of inventory related to Godowns, categories, stock query, Reorder status, Purchase & Sales order summary, Purchase & Sales bill pending, Exception reports like negative stock& ledger, overdue receivables & payables, memorandum vouchers, optional vouchers, post-dated vouchers, reversing journal

UNIT-V

12 Hours

Cheque Printing, Common printing options, Different printing formats, Multi-Account printing, Dynamic-Report specific options. Creating Group Company, Use of Tally vault, Using Security control & defining different security levels, Use

Export & import of Data, ODBC compliance, use of E-mail, - internet publishing, Upload, web browser & online help, Re-write data.

TEXT BOOK(S):

1. Nandhani - Implementation of TALLY 6.3 - BPB Publications ISBN: 81 7656494X.

| | | | | | |
|---|--|----------|----------|----------|----------|
| BCA17R282 | .NET PROGRAMMING LABORATORY | L | T | P | C |
| | | 0 | 0 | 3 | 2 |
| Course Category :Program Core - DSC1D – Discipline Specific Core | | | | | |
| Course Type :Laboratory Course | | | | | |

PRE-REQUISITE:

Basic knowledge of VB Programming.

COURSE OBJECTIVE(S):

This course is designed to Develop a program using Microsoft .Net windows, console based application and web based application.

COURSE OUTCOME(S):

After completing this course, the student will be able to

- CO1:** Design, create, build, and debug arithmetic operations for displaying numeric output using .NET applications.
- CO2:** Developing a console application in VB .NET.
- CO3:** Compute different operations using looping statements.
- CO4:** Developing applications for banking system.
- CO5:** Develop websites for departmental store.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | W |
| CO2 | | S | | S | | |
| CO3 | W | | | S | | |
| CO4 | | | M | | | S |
| CO5 | | | | S | M | |

LIST OF PROGRAMS**36 Hours**

1. Write a program in which accept four numbers from the user and returns add, subtraction and multiplication of the value using out parameter.
2. Write a C# program to demonstrate command line argument. Accept 2 numbers from the user and calculate area and perimeter of rectangle.
3. Write a console program which reads three separate numbers representing the sides of a triangle, and identifies the triangle as "Equilateral", "Isosceles", "Scalene" or "Not a triangle"; in addition, the program should identify whether the triangle is also "Right Angled".
4. Write a console program which reads a list of numbers, adds them together, and prints the sum. The user should enter each number on a separate line, and should enter -1 (called a sentinel value) to finish the list.
5. Write a console application which reads a list of numbers as before, but this time identifies the highest and lowest numbers in the list.

6. Write a console program which reads a list of numbers and calculates their mean values.
7. Write a console program converts between Celsius and Fahrenheit. Your program should run in a loop and after each conversion should ask the user whether he/she want to go round again.
8. Write a program which runs in a loop calculating the circumference and area of a series of circles, starting from a radius of 0.5 cm to 20.0 cm in steps of 0.5 cm. Your program should print a nicely formatted table of results, with columns for Radius, Circumference and Area. Each column should have a text header and the decimal points of all displayed values should line up.
9. Create VB.net application for Banking Systems.
10. Create ASP.Net application for Departmental Stores to display profit and loss account.

| | | | | | |
|---|--|----------|----------|----------|----------|
| BCO17R283 | PROGRAMMING IN TALLY LABORATORY | L | T | P | C |
| | | 0 | 0 | 3 | 2 |
| Course Category :Program Core - DSC3D – Discipline Specific Core | | | | | |
| Course Type : : Laboratory Course | | | | | |

PRE-REQUISITE:

Basic knowledge of accounting, PC software and internet.

COURSE OBJECTIVE(S):

One of the challenges of assessment is the extra compilation work required to collect and tally results of an entire class only on certain aspects of student work, specific to key learning

outcomes. Entire exam grades generally represent a combination of outcomes and so do not provide good assessment information on specific outcomes.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: To educate the students about the usefulness/importance of Tally ERP-9 software for simplifying the accounting methods & procedures.

CO2: To train the students to create/load the company, group, security control, back-up etc.

CO3: To make the student creating the accounting records and extract the financial statements and other statements related to inventory management, depreciation accounting and VAT procedure and records.

CO4: To impart practical training on this software so that the students could apply its various aspect in their day to day business/professional activities.

CO5: To make the students to create invoice for a company.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | W | |
| CO2 | | M | | S | | |
| CO3 | | | | S | | |
| CO4 | | | | | | S |
| CO5 | | S | S | | | S |

LIST OF PROGRAMS

36 Hours

1. Find all items in Tally data which have alternate units defined.
2. Find all items in Tally data which don't have alternate units defined.
3. Search all items which have a particular primary or alternate unit.
4. Report of all items with Batches set as "No"
5. Identify Purchase Vouchers without Purchase Order No.
6. Stock Items which don't have Part Nos.
7. Items which don't have pricelist defined for a particular date.
8. Employees who have attendance below some benchmark value.
9. Sales invoices with duplicate voucher numbers (if any), in case of manual numbering.
10. Sales invoices where the bill no. in bill wise details is not the same as the Sales voucher no.
11. Filter only deleted/cancelled vouchers in the Tally Audit List.
12. Any invoices which have items with different rates of VAT or Excise Duty.
13. Any invoices in which credit was given for more than 15 days.
14. All invoices/vouchers saved or not saved with a Voucher Class.
15. Any invoices in which discount was given more than

| | | | | | |
|--|--------------------------------|----------|----------|----------|----------|
| BCA17R351 | PROGRAMMING IN JAVA | L | T | P | C |
| | | 4 | 0 | 2 | 6 |
| Course Category : Major Elective - Discipline Specific Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE:

Basic programming knowledge of C and OOPS concepts.

COURSE OBJECTIVE(S):

This course is designed to create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism; use data types, arrays and other data collections.

COURSE OUTCOME(S):

After completing this course, the student will be able to

- CO1:** Demonstrate the principles of object oriented programming.
- CO2:** Implement Java programs comprising more than one class to address a particular software problem.
- CO3:** Gain knowledge about arrays, interfaces and packages.
- CO4:** Understand the concept of multithreading and applets in java.
- CO5:** familiarize with the concepts of file handling in Java.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | |
| CO2 | | S | | | W | |
| CO3 | | | | S | | |
| CO4 | | | | S | | |
| CO5 | M | | | | | S |

UNIT-I**12 Hours**

Introduction-Object Oriented paradigm-Basic concepts of object oriented programming-Benefits of OOP-Applications of OOP- Java Features- How Java differs from C and C++ – Java and Internet – Java and www – simple Java program –Structure – Java Tokens – Statements .

UNIT-II**12 Hours**

Constants, Variables, Data Types - Operators and Expressions – Decision Making and Branching: if, if..else, nested if, switch, ? operator - Decision Making and Looping: while, do, for –Jumps in Loops - Labeled Loops – Classes, Objects and Methods.

UNIT-III**12 Hours**

Arrays- Introduction-One dimensional arrays –Two dimensional arrays-Strings-Vectors-Enumerated types-Interfaces- Defining, Extending and implementing interfaces-Packages –JAVA API packages- creating packages-Accessing packages-Adding a class to a package-Hiding classes.

UNIT-IV

12 Hours

Multithreaded Programming-creating threads-extending thread class- stopping and blocking a thread-life cycle of a thread-synchronization- Implementing a Runnable interface- Inter thread communication-Managing Errors and Exceptions.

UNIT-V

12 Hours

Managing Input/output Files in Java : Concepts of Streams- Stream Classes – Byte Stream classes – Character stream classes – Using streams – I/O Classes – File Class –I/O exceptions – Creation of files – Reading / Writing characters, Byte-Handling Primitive data Types – Random Access Files.

TEXT BOOK(S):

1. E. Balagurusamy Programming with JAVA – APRIMER
- Tata McGraw-Hill - 2010 (4th Edition) .

REFERNCE(S):

1. Patrick Naughton & Hebert Schildt - The Complete Reference Java 2 - TMH publications (3rd edition).
2. John R. Hubbard - Programming With Java - TMH publications - (2nd Edition).
3. Debasish Jana- JAVA and Object-Oriented Programming Paradigm - PHI publications - 2005.

LIST OF PROGRAMS

1. Write a program to find the largest of n natural numbers.
2. Write a program to find whether a given number is prime or not.
3. Write a menu driven program for following:
 - a. Display a Fibonacci series
 - b. Compute Factorial of a number
 - c. Write a program to check whether a given number is odd or even.
 - d. Write a program to check whether a given string is palindrome or not.
4. Write a program to print the sum and product of digits of an Integer and reverse the Integer.
5. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
6. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
7. Write a program in java to input N numbers in an array and print out the Armstrong numbers from the set.
8. Write java program for the following matrix operations:
 - a. Addition of two matrices
 - b. Summation of two matrices
 - c. Transpose of a matrix

9. Write a java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
10. Program using constructors
11. Write a Java for the implementation of Multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
12. Write a program for the following string operations:
 - a) Compare two strings
 - b) Concatenate two strings
 - c) Compute length of a string
13. Create a class called Fraction that can be used to represent the ratio of two integers. Include appropriate constructors and methods. If the denominator becomes zero, throw and handle an exception.

| | | | | | |
|--|--------------|----------|----------|----------|----------|
| BCA17R352 | RDBMS | L | T | P | C |
| | | 4 | 0 | 2 | 6 |
| Course Category : Major Elective - Discipline Specific Elective Course Type : Integrated Course | | | | | |

PREREQUISITE:

Basic knowledge of database concepts.

COURSE OBJECTIVE(S):

This course is designed to educate students with fundamental concepts of Data Base Management System, Data Models, and Different Data Base Languages.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Analyze the basic concepts of database design.

CO2: Acquire knowledge in different data models

CO3: Implement various normal forms in data base design for avoiding data replication

CO4: Write efficient SQLqueries for retrieving the data

Co5: Develop programs using PL/SQL

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | |
| CO2 | | S | | | | |
| CO3 | | | S | | W | |
| CO4 | | M | | S | | |
| CO5 | | | M | | | S |

UNIT – I**12 Hours**

DBMS Definition- Characteristics of DBMS - Application and advantages of DBMS- Data models and schema instances - Three Levels of Architecture - Data Independence- DBMS languages- Data Dictionary- Database system environment

UNIT – II**12 Hours**

Data Models- types and their comparison- Entity Relationship Model- Entity Types- Entity Sets- Attributes and its types- Keys- E-R Diagram- RDBMS –Components and Codd's rules.

UNIT – III

12 Hours

Functional Dependencies- Good and Bad Decomposition- Normalization: 1NF- 2NF- 3NF- BCNF- 4NF 5NF.

UNIT – IV

12 Hours

Introduction to SQL- DDL- DML- and DCL statements- Creating Tables- Adding Constraints- Altering Tables- Update- Insert- Delete & various Form of SELECT- Using Special Operators for Data Access. Aggregate functions- Joins

UNIT – V

12 Hours

Introduction to PL/SQL (blocks of PL/SQL- Variables- constants)- Control Structure -Introduction to Stored Procedures- Functions - Cursor and Triggers

TEXT BOOK (S):

1. Elmasri & Navathe - Fundamentals of Database Systems - Addison Wesley – 2008(5th Edition).
Abraham Silberschatz
2. Henry F. Korth, S. Sudarshan - Database System Concepts – McGraw Hill- 2011(6th Edition)

REFERENCE(S):

1. Benjamin Rosenzweig, and Elena silverstrova , “ Oracle PL/SQL”, Thirth Edition, Prentice Hall of India, 2004.

LIST OF PROGRAMS:

1. Queries Using DDL- DML commands
2. Queries using AND- OR- NOT operation, Union- Intersection and Projection
3. Join Operation
4. Sorting and Grouping
5. Nested queries using SQL
6. Built-in functions of SQL
7. Update operations using SQL
8. Use of SQL forms
9. Use of indexes- creating view and querying in views
10. Use procedures for Income Tax calculation
11. Use Cursor for Pay -roll system
12. Use Trigger for Inventory Processing System

| | | | | | |
|--|---|----------|----------|----------|----------|
| BCA17R353 | DATA STRUCTURES AND ALGORITHMS | L | T | P | C |
| | | 4 | 0 | 2 | 6 |
| Course Category : Major Elective - Discipline Specific Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE:

Basic knowledge on programming.

COURSE OBJECTIVE(S):

This course is designed to know the concepts of data structures through abstract data structures including lists, sorted lists, stacks and queues. The students will be able to understand the algorithms design including greedy, divide-and-conquer, random and backtracking algorithms and dynamic programming.

COURSE OUTCOME(S):

After completing this course, the student will be able to

- CO1:** Apply and implement learned algorithm design techniques and data structures to solve problems.
- CO2:** Understand the different types of linked lists.
- CO3:** Gain knowledge on trees.
- CO4:** Analyze different algorithms and determine the correctness and time efficiency of algorithms.
- CO5:** Understand the different techniques for sorting and searching algorithms.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | |
| CO2 | | S | | | | |
| CO3 | M | | | S | W | |
| CO4 | | | S | | | |
| CO5 | M | | | M | | S |

UNIT-I**12 Hours**

Arrays operations- numbers of elements in an array- representation of array in memory- applications- stack- stack operations- applications.

UNIT-II**12 Hours**

Queues - operations of queue- circular queue- de-queue- priority queue- applications- Linked Lists - Singly- Doubly and Circular Lists- applications.

UNIT-III

12 Hours

Introduction to Tree - Binary Trees traversals - graph-definition- representation of graph- graph traversal.

UNIT-IV

12 Hours

Introduction: what is an algorithm- performance analysis- Divide and Conquer- all pairs shortest path- single source shortest path- travelling salesman problem- Dynamic Programming- binary search – merge sort- finding maximum and minimum - Greedy Algorithms.

UNIT-V

12 Hours

Sorting Techniques: Elementary sorting techniques - Bubble Sort, Insertion Sort, Merge Sort, Advanced Sorting techniques-Heap Sort, Quick Sort, Sorting in Linear Time-Bucket Sort, Radix Searching Techniques: Linear and Binary search. Medians & Order Statistics Sort and Count Sort

TEXT BOOK(S):

1. G.A.Vijayalakshmi Pai - Data structure and algorithms concepts techniques and applications - Tata McGraw hill publication - 2008 (1st Edition).
2. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekara - Fundamentals of computer algorithm-Galgotia publication - 2010.

LIST OF PROGRAMS:

1. Implementation of Insertion Sort (The program should report the number of comparisons).

2. Implementation of Merge Sort(The program should report the number of comparisons).
3. Implementation of Heap Sort (The program should report the number of comparisons).
4. Implementation of Quick sort (The program should report the number of comparisons).
5. Implementation of Radix Sort.
6. Implementation of Searching Techniques.
7. Implementation of Recursive function.
8. Array and Linked list implementation of Stack and Queue.
9. Implementation of Single, Double and circular Linked List
10. Creation and traversal of Binary Search Tree.

| | | | | | |
|--|---------------------------------|----------|----------|----------|----------|
| BCA17R354 | SOFTWARE ENGINEERING | L | T | P | C |
| | | 4 | 0 | 2 | 6 |
| Course Category : Major Elective - Discipline Specific Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE:

Basic knowledge about software

COURSE OBJECTIVE(S):

The aim of the course is to assist the student in understanding the basic theory of software engineering, and to apply these basic theoretical principles to a group software development project.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Select and implement different software development process models.

CO2: Extract and analyze software requirements specifications for different projects.

CO3: Develop some basic level of software architecture.

CO4: Understand concepts and importance of Software project management concepts like cost estimation, scheduling and reviewing the progress.

CO5: Apply different testing and debugging techniques and analyzing their effectiveness.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | W | |
| CO2 | | S | | | | |
| CO3 | | | S | S | | |
| CO4 | M | | | S | W | |
| CO5 | | M | | | | S |

UNIT I**12 Hours**

Software Process: Introduction ,S/W Engineering Paradigm , life cycle models (water fall, incremental, spiral, evolutionary, prototyping, object oriented) , System engineering, computer based system, verification, validation, life cycle process, development process, system engineering hierarchy.

UNIT II

12 Hours

Software requirements: Functional and non-functional , user, system, requirement engineering process, feasibility studies, requirements, elicitation, validation and management, software prototyping, prototyping in the software process, rapid prototyping techniques, user interface prototyping, S/W document. Analysis and modeling, data, functional and behavioral models, structured analysis and data dictionary.

UNIT III

12 Hours

Design Concepts and Principles: Design process and concepts, modular design, design heuristic, design model and document, Architectural design, software architecture, data design, architectural design, transform and transaction mapping, user interface design, user interface design principles. Real time systems, Real time software design, system design, real time executives, data acquisition system, monitoring and control system.

UNIT IV

12 Hours

Software Project Management: Measures and measurements, S/W complexity and science measure, size measure, data and logic structure measure, information flow measure. Estimations for Software Projects, Empirical Estimation Models, Project Scheduling.

UNIT V

12 Hours

Testing: Taxonomy of software testing, levels, test activities, types of s/w test, black box testing testing boundary conditions, structural testing, test coverage criteria based on data flow, mechanisms, regression testing, testing in the large. S/W testing strategies, strategic approach and issues, unit testing, integration testing, validation testing, system testing and debugging.

TEXT BOOK(S):

1. Roger S. Pressman - Software engineering - A Practitioner's Approach - McGraw-Hill publisher – 2007 (5th edition).

REFERENCE(S):

1. Ian Sommerville - Software engineering - Pearson education Asia - 2000 (6th edition).
2. Pankaj Jalote - An Integrated Approach to Software Engineering - Springer Verlag- 1997.
3. James F Peters and Witold Pedrycz - Software Engineering – An Engineering Approach - John Wiley and Sons New Delhi - 2000.

LIST OF PROGRAMS

1. Practical Title
 - Problem Statement,
 - Process Model
2. Requirement Analysis
 - Creating a Data Flow
 - Data Dictionary,
 - Use Cases
3. Project Management
 - Computing FP
 - Effort
 - Schedule, Risk Table, Timeline chart
4. Design Engineering
 - Architectural Design
 - Data Design, Component Level Design

5. Testing

- Basis Path Testing

Sample Projects

- DTC Route Information: Online information about the bus routes and their frequency and fares
- Car Pooling: To maintain a web based intranet application that enables the corporate employees within an organization to avail the facility of carpooling effectively.
- Patient Appointment and Prescription Management System
- Organized Retail Shopping Management Software
- Parking Allocation System
- Wholesale Management System

| | | | | | |
|--|--------------------------|----------|----------|----------|----------|
| BCA17R355 | COMPUTER NETWORKS | L | T | P | C |
| | | 4 | 0 | 2 | 6 |
| Course Category : Major Elective - Discipline Specific Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE:

Basic knowledge of Computer networks

COURSE OBJECTIVE(S):

To be familiar with the basics of data communication, various types of computer networks, designing communication protocols and exposed to the TCP/IP protocol suite.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Define the concept of local area networks, their topologies, protocols and applications.

CO2: Apply hardware and software to make networks more efficient, faster, more secure, Easier to use, able to transmit several simultaneous messages, and able to interconnect with other networks.

CO3: Understand the concept of the frame control, Ethernet standards and wireless LANS

Co4: Understand the layers of OSI and TCP and get knowledge about congestion control.

CO5: Analyze why networks need security and control, what errors might occur, and how to Control network errors.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | W | |
| CO2 | | S | S | | | |
| CO3 | M | | S | | | |
| CO4 | | | | S | M | |
| CO5 | | M | | | | S |

UNIT-I**12 Hours**

Basic concepts: Components of data communication, Networks, standards and organizations, Network Classification, Network Topologies, The OSI model, Layers in the OSI Model, TCP/IP Protocol Suite.

UNIT-II

12Hours

Physical Layer :Guided media, Unguided media, circuit Switched Networks, Datagram Network, Repeater, Bridge, Router and Gateway.

UNIT-III

12 Hours

Data Link LayerIntroduction, Block coding, Framing, Flow and Error Control, HDLC, Point to Point Protocol, IEEE Standards, Standard Ethernet, IEE802.11, Bluetooth.

UNIT – IV

12 Hours

Network Layer:

IPv4 Addressing, IPV6 Addresses, Routing Algorithms, Transport Layer -protocol of TCPand UDP, Congestion Control

UNIT – V

12 Hours

Application layer protocols and services

Domain name space, WWW and HTTP, telnet, FTP, Network Management, E-Mail, Audio Video Compression.

TEXT BOOK(S):

1. B.A. Forouzan - Data Communication and Networking - Tata McGraw Hill, 2007(4th Edition).

REFERENCE(S):

1. D.E. Comer - Internetworking with TCP/IP - Prentice Hall of India- 1998.
2. W. Stalling, Data & Computer Communication - Prentice Hall of India, 2006 (8th edition).
3. D. Bertsekas, R. Gallager - Data Networks- Prentice Hall of India - 1992(2nd edition).

| | | | | | |
|--|------------------------------|----------|----------|----------|----------|
| BCA17R356 | INTERNET TECHNOLOGIES | L | T | P | C |
| | | 4 | 0 | 2 | 6 |
| Course Category : Major Elective - Discipline Specific Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE:

A basic knowledge of HTML and DHTML.

COURSE OBJECTIVE(S):

Design web pages using elements and attributes, creating web pages using JavaScript. Building dynamic web pages using JavaScript, build interactive web applications using JDBC and JSP.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Understand the basic concepts of web design.

CO2: Able to understand JavaScript and java.

CO3: Learning ability in database connectivity.

CO4: Gain knowledge in JSP.

CO5: Well-known in sharing data between JSP pages.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|----------------|-----------|----------|----------|----------|----------|----------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | |
| CO2 | | S | S | | | |
| CO3 | | | S | S | | |
| CO4 | | M | | M | | |
| CO5 | M | | | | | M |

UNIT – I

12 Hours

Introduction to Web Design: Introduction to hypertext markup language (html) document type definition, creating web pages, graphical elements, lists, hyperlinks, tables, web forms, inserting images, frames-Cascading style sheets, (css) for text formatting .

UNIT - II

12 Hours

JavaScript: Data types, operators, functions, control structures, events and event handling. Java: Use of Objects, Array and Array List class, Designing classes, Inheritance, Input/Output, Exception Handling.

UNIT – III

12 Hours

JDBC: JDBC Fundamentals, Establishing Connectivity and working with connection interface, Working with statements, Creating and Executing SQL Statements, Working with Result Set Objects.

UNIT – IV

12 Hours

JSP: Introduction to JavaServer Pages, HTTP and Servlet Basics, The Problem with Servlets, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment, Implicit JSP Objects, Conditional Processing, Displaying Values.

UNIT – V

12 Hours

Using an expression to Set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing Data Between JSPPages, Requests, and Users, Database Access

TEXT BOOK(S)

1. Ivan Bayross - Web Enabled Commercial Application Development Using Html, Dhtml, javascript, Perl CGI - BPB Publications - 2009.

REFERENCE(S):

1. Cay Horstmann - BIG Java - Wiley Publication - 2009 (3rd Edition).
2. Herbert Schildt- Java 7 The Complete Reference - 2009 (8th Edition).
3. Jim Keogh - The Complete Reference J2EE – TMH - 2002.
4. Hans Bergsten - Java Server Pages -, O'Reilly Media December - 2003 (3rd Edition).

LIST OF PROGRAMS

JAVA Script

1. Create a student registration form. Create functions to perform the following checks:
 - a. Roll number is a 7-digit numeric value
 - b. Name should be an alphabetical value(String)
 - c. Non-empty fields like DOB
2. Implement a static password protection.
3. Write a java script
 - a. To change the colour of text using `SetTimeout()`
 - b. To move an image across screen using `SetInterval()`

JDBC

1. Create a table 'Student' and 'Teacher' in 'College' database and insert two rows in this newly created table using JDBC API and do the following:

- a. Update an already created table 'Teacher' in 'College' database by updating a teacher's name, with "Dr." appended before the name, whose name is "Rita".
- b. Repeat the same thing for all the teachers using PreparedStatement.
- c. Delete the student with ID=3 from 'Student' database.
- d. Insert two students to the ResultSet returned by the query which selects all students with FirstName="Ayush". The database must also get updated along with ResultSet.

2. Create a procedure in MySQL to count the number of Rows in table 'Student'. Use Callable Statement to call this method from Java code.

JSP

1. Display the pattern:

```
1
1 2
1 2 3
```

2. Make two files as follows:

- a. main.html: shows 2 text boxes and 3 radio buttons with values "addition", "subtraction" and "multiplication"
- b. operate.jsp: depending on what the user selects perform the corresponding function (Give two implementations: using request.getParameter() and using expression

3. Validate User input entered in a form. The input must include Name, DOB, Email ID, Lucky Number, Favorite food etc. (Refer Chapter 8)
4. Display Good Morning <uname>, Good Afternoon <uname> or Good Evening <uname> based on the current time of the day.
5. Create your custom library which contains two tags: <hello>, <choco>. Usage of the tags:
 - <hello name="Ajay">: Output should be Hello Ajay. It contains a mandatory attribute 'name' which can accept Dynamic value.
 - <choco texture="Chewy">: Output should be FiveStar, BarOne.
 - <choco texture="Crunchy">: Output should be Munch. KitKat.

| | | | | | |
|--|---|----------|----------|----------|----------|
| BCA17R357 | DATA WAREHOUSING AND DATA MINING | L | T | P | C |
| | | 4 | 0 | 2 | 6 |
| Course Category : Major Elective - Discipline Specific Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE:

Basic concept of DBMS/RDBMS

COURSE OBJECTIVE(S):

To interpret the contribution of data warehousing and data mining to the decision support level of organizations, evaluate different models used for OLAP and data pre-processing, categorize and differentiate between situations for applying different data mining techniques, mining frequent pattern, association, correlation, classification, prediction, and cluster analysis.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO 1: Identify the need for data warehousing

CO2: Understand the data warehousing architecture

CO 3: Familiar with basic concepts of data mining

CO4: Applying knowledge using association rule mining algorithms

CO5: Apply classification techniques and prediction methods in real life applications

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | W |
| CO2 | M | S | | | | |
| CO3 | | M | S | | | |
| CO4 | | M | | S | | M |
| CO5 | | | | M | W | S |

UNIT – I**12 Hours**

Data Warehousing: Introduction- Definition and description, need for data ware housing, need for strategic information, failures of past decision support systems, OLTP vs DWH-DWH requirements-trends in DWH-Application of DWH.

UNIT - II**12 Hours**

Data Warehousing Architecture: Reference architecture-Components of reference architecture - Data warehouse building blocks, implementation, physical design process and DWH deployment process. A Multidimensional Data, Model Data Warehouse Architecture.

UNIT – III

12 Hours

Data Mining: Data mining tasks-Data mining vs KDD- Issues in data mining, Data Mining metrics, Data mining architecture - Data cleaning- Data transformation- Data reduction – Data mining primitives.

UNIT – IV

12 Hours

Association Rule Mining: Introduction - Mining single dimensional Boolean association rules from transactional databases - Mining multi-dimensional association rules.

UNIT – V

12 Hours

Classification and Prediction: Classification Techniques - Issues regarding classification and prediction - decision tree - Bayesian classification –Classifier accuracy – Clustering – Clustering Methods - Outlier analysis. Applications and Other Data Mining Methods: Distributed and parallel Data Mining Algorithms, Text mining- Web mining.

TEXT BOOK(S):

1. Jiawei Han and Micheline Kamber- Data Mining Concepts and Techniques - Morgan Kaufmann Publishers USA-2006.
2. Margaret H.Dunham - Data mining Introductory and advanced Topics - Person Education - 2008.

REFERENCE(S):

1. Berson - DataWarehousing, Data Mining and OLAP-

2. Pang-Ning Tan, Michael Steinbach, Vipin Kumar - Introduction to Data Mining - Pearson Education.

LIST OF PROGRAMS

1. Preprocessing
2. Association mining
3. Classification
4. Clustering

| | | | | | |
|--|----------------------------|----------|----------|----------|----------|
| BCA17R358 | MOBILE APPLICATIONS | L | T | P | C |
| | | 4 | 0 | 2 | 6 |
| Course Category : Major Elective - Discipline Specific Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE:

Basic knowledge in mobile applications development.

COURSE OBJECTIVE(S):

This course is designed to develop and implement mobile applications for various purposes.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO 1: Understand the basics concepts of evolution of devices.

CO2: Address the architecture of mobile environment.

CO3: Describe the components and structure of a mobile development framework.

CO4: Demonstrate the working platform of a mobile application.

CO5: Developing applications using android.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | M |
| CO2 | | S | | | W | |
| CO3 | | S | S | | | |
| CO4 | | | | S | | |
| CO5 | | | | M | | S |

UNIT I HISTORY OF MOBILE**12 Hours**

The Evolution of Devices- the mobile ecosystem
 –Operators-Networks-Devices-Platforms-Operating-Systems-
 Application Frameworks-Applications-Services-Size Mobile
 As a Medium-The Eighth Mass Medium.

UNIT – II MOBILE DESIGN**12 Hours**

New Rules- Types of Mobile Applications-Mobile
 Application Medium Types- Mobile Information Architecture –
 Mobile Information Architecture- the mobile design tent-pole-
 designing for the best possible experience-the elements of
 mobile design-mobile design tools-designing for the right
 device-designing for different screen Sizes

UNIT – III MOBILE APPLICATION**12 Hours**

Mobile web apps versus native applications-the ubiquity
 principle -when to make a native application-when to make a
 mobile web application-web standards-designing for multiple
 mobile browsers-device plans-markup-css: cascading style
 sheets-javascript

UNIT - IV INTRODUCTION TO ANDROID 12 Hours

Background-an open platform for mobile development-native android applications-android sdk features-introducing the open handset alliance-what does android run on? -why develop for android?-introducing the development framework.

UNIT - V DEVELOPING APPLICATIONS 12 Hours

Developing for android.-developing for mobile devices-to-do list example -android development tools-what makes an android application? -Introducing the application manifest-using the manifest editor-the android application life cycle-understanding application priority and process states-externalizing resources-a closer look at android activities.

TEXT BOOK(S):

1. Brian Fling Mobile- Design and Development: Practical concepts and techniques for creating mobile sites and web apps Publisher - O'Reilly Media .
2. Reto Meier - Professional Android Application Development –2014.

LIST OF PROGRAMS

1. Create Hello World Application
2. Sample Application about Android Resources
3. Sample Application about Layouts
4. Sample Application about Indents
5. Sample Application about user interfaces
6. Sample Application about Animations
7. Sample Application about Android Data
8. Sample Application about SQLite

| | | | | | |
|--|---|----------|----------|----------|----------|
| BCA17R301 | COMPUTER SYSTEM ARCHITECTURE | L | T | P | C |
| | | 5 | 1 | 0 | 6 |
| Course Category : Major Elective - Discipline Specific Elective | | | | | |
| Course Type : Theory | | | | | |

PREREQUISITE:

Basic knowledge in digital electronics

COURSE OBJECTIVE(S):

Basic principles of computer organization, operation and performance, deals with embedded systems, peripheral devices, memory management, and processor family evolution patterns. The course discusses the role of pipelining and multiple functional units in processor design.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO 1: Understand the basic logic gates.

CO2: Knowledge in data representation and basic computer arithmetic.

CO3: Familiar with basic computer organization and design.

CO4: Perform CPU operations and micro programmed control.

CO5: Learn programming the basic computer.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | M | | |
| CO2 | | S | | | | |
| CO3 | | | S | | | |
| CO4 | | | | S | | |
| CO5 | M | | | | W | S |

UNIT – I**12 Hours**

Introduction: Logic gates, Boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexors, registers, counters and memory units.

UNIT – II**12 Hours**

Data Representation and basic Computer Arithmetic: Number systems, complements, fixed and floating point representation, character representation, addition, subtraction, magnitude comparison.

UNIT – III**12 Hours**

Basic Computer Organization and Design: Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt.

UNIT – IV**12 Hours**

Central Processing Unit: Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control.

UNIT-V**12 Hours**

Programming the Basic Computer: Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming- Input-output Organization: Peripheral devices, I/O interface, Modes of data transfer, direct memory access.

TEXT BOOK(S)

1. M. Mano - Computer System Architecture - Pearson Education -1992.
2. A. J. Dos Reis - Assembly Language and Computer Architecture using C++ and JAVA – Course Technology - 2004
3. W. Stallings - Computer Organization and Architecture Designing for Performance - Prentice Hall of India – 2009 (8th Edition)
4. M.M. Mano - Digital Design - Pearson Education Asia - 1979.

| BCA17R359 | CLOUD COMPUTING | L | T | P | C |
|---|-----------------|---|---|---|---|
| | | 4 | 0 | 2 | 6 |
| Course Category : Major Elective - Discipline Specific Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE:

Basic knowledge in Networking

COURSE OBJECTIVE(S):

At the end of the course, the students must be aware of different cloud service providers and number and types of services they provide and advantages and concerns in adopting cloud computing services.

COURSE OUTCOME(S):

After completing this course, the student will be able to

- CO1:** Understand the basic concepts cloud computing fundamentals.
- CO2:** Familiar with cloud services and files system.
- CO3:** Collaborating on word processing, DB, storing and sharing files.
- CO4:** Need for virtualization in the cloud.
- CO5:** Provide security, standards, and applications.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | M |
| CO2 | | S | | | | |
| CO3 | | S | S | | | |
| CO4 | | M | | S | W | |
| CO5 | | | | | | S |

UNIT – I**12 Hours**

Cloud Introduction: Cloud Computing Fundamentals: Cloud Computing definition, Types of cloud, Cloud services: Benefits and challenges of cloud computing, Evolution of Cloud Computing , usage scenarios and Applications , Business models around Cloud– Major Players in Cloud Computing - Issues in Cloud - Eucalyptus - Nimbus - Open Nebula, Cloud Sim.

UNIT – II**12 Hours**

Cloud Services and File System: Types of Cloud services: Software as a Service - Platform as a Service–

Infrastructure as a Service - Database as a Service - Monitoring as a Service – Communication as services. Service providers- Google App Engine, Amazon EC2, Microsoft Azure, Sales force. Introduction to MapReduce, GFS, HDFS, Hadoop Framework.

UNIT – III

12 Hours

Collaborating With Cloud: Collaborating on Calendars, Schedules and Task Management – Collaborating on Event Management, Contact Management, Project Management– Collaborating on Word Processing , Databases– Storing and Sharing Files- Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Collaborating via Social Networks – Collaborating via Blogs and Wikis. 185 CS-Engg&Tech-SRM-2013

UNIT-IV

12 Hours

Virtualization For Cloud :Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization – System VM, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM, VMWare, Virtual Box, Hyper-V.

UNIT – V

12 Hours

Security, Standards, and Applications Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud.

TEXT BOOK(S):

1. Michael Miller, Cloud Computing: “Web-Based Applications That Change the Way You Work and Collaborate Online”, Que Publishing, August 2008.
2. James E Smith, Ravi Nair, “Virtual Machines”, Morgan Kaufmann Publishers, 2006.

LIST OF PROGRAMS:

1. Create virtual machines that access different programs on same platform.
2. Create virtual machines that access different programs on different platforms.
3. Exploring Google cloud for the following
 - a) Storage
 - b) Sharing of data
 - c) manage your calendar, to-do lists,
 - d) a document editing tool
4. Exploring Microsoft cloud
5. Exploring Amazon cloud

| | | | | | |
|---|-----------------------|----------|----------|----------|----------|
| BCA17R302 | SOFT COMPUTING | L | T | P | C |
| | | 5 | 1 | 0 | 6 |
| Course Category :Major Elective - Discipline Specific Elective | | | | | |
| Course Type :Theory | | | | | |

PREREQUISITE:

To know the basic concepts about the learning algorithms and optimization techniques using neuro fuzzy and genetic algorithm.

COURSE OUTCOMES

After completing this course, the student will be able to

CO1: Apply various soft computing frame works.

CO2: Design of various neural networks.

CO3: know types of learning algorithms

CO4: Use fuzzy logic.

CO5: Apply genetic programming.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | W | |
| CO2 | | S | | | | |
| CO3 | | | S | | | |
| CO4 | | | | S | | |
| CO5 | | | | S | W | S |

UNIT -I INTRODUCTION**12 Hours**

Artificial neural network: Introduction, characteristics-learning methods – taxonomy – Evolution of neural networks-basic models – important technologies – applications. Fuzzy logic: Introduction – crisp sets- fuzzy sets – crisp relations and fuzzy relations: cartesian product of relation – classical relation, fuzzy relations, tolerance and equivalence relations, non-iterative fuzzy sets. Genetic algorithm- Introduction – biological background – traditional optimization and search techniques – Genetic basic concepts.

UNIT - III LEARNING RULES

12 Hours

BAM, Hopfield networks, iterative auto associative memory network & iterative associative memory network – unsupervised learning networks: Kohonen self organizing feature maps, LVQ – CP networks, ART network.

UNIT-IV FUZZY LOGIC

12 Hours

Membership functions: features, fuzzification, methods of membership value assignments- Defuzzification: lambda cuts – methods – fuzzy arithmetic and fuzzy measures, fuzzy measures – measures of fuzziness -fuzzy integrals aggregation of fuzzy rules, fuzzy reasoning-fuzzy inference systems-overview of fuzzy expert system-fuzzy decision making.

UNIT - V GENETICALGORITHM

12 Hours

Genetic algorithm and search space – general genetic algorithm – operators – Generational cycle – stopping condition – constraints – classification genetic programming – multilevel optimization – real life problem- advances in GA.

TEXT BOOK(S):

1. J.S.R.Jang, C.T. Sun and E.Mizutani- Neuro-Fuzzy and Soft Computing -PHI Pearson Education - 2004.
2. S.N.Sivanandam and S.N.Deepa - Principles of Soft Computing - Wiley India Pvt Ltd - 2011.

REFERENCE(S):

1. S.Rajasekaran and G.A.Vijayalakshmi Pai - Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis & Applications - Prentice-Hall of India Pvt. Ltd. -2006.
2. George J. Klir, Ute St. Clair, Bo Yuan - Fuzzy Set Theory: Foundations and Applications - Prentice Hall - 1997.

| | | | | | |
|--|------------------------------------|----------|----------|----------|----------|
| BCA17R303 | SOCIAL NETWORK ANALYSIS | L | T | P | C |
| | | 5 | 1 | 0 | 6 |
| Course Category : Major Elective - Discipline Specific Elective | | | | | |
| Course Type :Theory | | | | | |

PREREQUISITE:

To know about basic knowledge on behavior in social web and related communities

COURSE OBJECTIVE(S):

Understand the concept of semantic web related applications, knowledge representation using ontology, human behavior in social web and related communities, Learn visualization of social networks.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Understand the basic concepts of social networks.

CO2: Develop semantic web related applications.

CO3: Represent knowledge using ontology.

CO4: Predict human behavior in social web and related communities.

CO5: Visualize social networks.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | W | |
| CO2 | | S | | S | | |
| CO3 | | | | S | | |
| CO4 | | | S | | | |
| CO5 | | | | S | | M |

UNIT-I**12 Hours**

Introduction to Semantic Web: Limitations of current Web – Development of Semantic Web – Emergence of the Social Web – Social Network analysis: Development of Social Network Analysis – Key concepts and measures in network analysis.

UNIT - II**12 Hours**

Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities – Web-based networks.

Ontology and their role in the Semantic Web: Ontology-based knowledge Representation – Ontology languages for the Semantic Web: Resource Description Framework – Web Ontology Language.

UNIT – III**12 Hours**

Modeling and aggregating social network data: State-of-the-art in network data representation – Ontological representation of social individuals – Ontological representation of social relationships – Aggregating and reasoning with social network data – Advanced representations.

UNIT-IV

12 Hours

Extracting evolution of Web Community from a Series of Web Archive – Detecting communities in social networks – Definition of community – Evaluating communities – Methods for community detection and mining – Applications of community mining algorithms – Tools for detecting communities social network infrastructures and communities – Decentralized online social networks – Multi – Relational characterization of dynamic social network communities.

UNIT - V

12 Hours

Understanding and predicting human behavior for social communities – User data management –Inference and Distribution – Enabling new human experiences – Reality mining – Context – Awareness – Privacy in online social networks –Trust in online environment –Trust models based on subjective logic – Trust network analysis – Trust transitivity analysis – Combining trust and reputation – Trust derivation based on trust comparisons – Attack spectrum and countermeasures.

TEXT BOOK(S):

1. Peter Mika - Social Networks and the Semantic Web - Springer 2007 (1st Edition).
2. Borko Furht - Handbook of Social Network Technologies and Applications - Springer, 2010 (1st Edition).

| | | | | | |
|--|--|----------|----------|----------|----------|
| BCA17R304 | OBJECT ORIENTED ANALYSIS AND DESIGN | L | T | P | C |
| | | 5 | 1 | 0 | 6 |
| Course Category : Major Elective - Discipline Specific Elective | | | | | |
| Course Type : Theory | | | | | |

PREREQUISITE:

Basic knowledge in Object oriented concepts

COURSE OBJECTIVE(S):

Introducing students to the concepts and terms used in the object-oriented approach to systems analysis and design · Highlighting the importance of object-oriented analysis and design and its limitations.

COURSE OUTCOME(S):

After completing this course, the student will be able to

- CO1:** Develop a working understanding of formal object-oriented analysis and design processes.
- CO2:** Develop an appreciation for and understanding of the risks inherent to large-scale software development.
- CO3:** Learn techniques, processes, and artifacts that can mitigate these risks.
- CO4:** Develop the skills to determine which processes and OOAD techniques should be applied to a given project.
- CO5:** Develop an understanding of the application of OOAD practices from a software project management perspective.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | |
| CO2 | | S | | S | | |
| CO3 | | | | S | | M |
| CO4 | | | | | W | S |
| CO5 | | | | S | | S |

UNIT-I**12 Hours**

Introduction-Object Basics-Objects-Objects or grouped in a class-Object behavior and method-Object respond to message-Encapsulation and information heading-Class Hierarchy-Polymorphism-Object Relationship and association-Aggregation and object containment

UNIT-II**12 Hours**

Object and identity-Static and Dynamic Binding-Object Persistence-Meta Classes-Object oriented system Development Life cycle-Software Development Process-Building a High Quality Software-Object Oriented System Development a use case driven approach

UNIT-III**12 Hours**

Object Oriented Methodology-Booch Methodology-Patterns-Frameworks-The Unified Approach-Unified Model Language-Static and Dynamic Model-UML Diagrams-UML Class Diagrams-Use Case diagrams-UML Dynamic Model and model packages

UNIT-IV

12 Hours

Object Oriented Analysis Process: Identifying Use Cases-Business Process Modeling-Use Case Model-Object Analysis Classification-Common Class Pattern Approach-Use Case Drive Approach: Identifying Classes and their Behaviors sequence/collaboration Modeling-Classes responsibilities and collaborators-Case Study: The Via Net bank ATM System: Decomposing a Use case scenario with a sequence diagram: Object Behavior Analysis

UNIT- V

12 Hours

Identifying Object Relationship, Attributes and methods-Associations-Identifying Associations-Guidelines for Identifying Associations-Super Sub class Relationship-APart of relationship Aggregation-Case study: Relationship Analysis for the Via Net Banking ATM System

TEXT BOOK(S):

1. Ali Bahrami- Object Oriented System Development - McGraw Hill International Edition - 2011.

| | | | | | |
|--|--------------------------|----------|----------|----------|----------|
| BCA17R305 | COMPUTER GRAPHICS | L | T | P | C |
| | | 5 | 1 | 0 | 6 |
| Course Category : Major Elective - Discipline Specific Elective | | | | | |
| Course Type : Theory | | | | | |

PREREQUISITE:

Able to write basic programs in C/C++

COURSE OBJECTIVE(S):

This course is designed to provide a comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO 1: Understand the basic concepts of graphics system.

CO 2: Understand the concepts of 2D transformations.

CO 3: Develop program using windowing and clipping.

CO 4: Apply 3D concepts in real time applications.

CO 5: Gain skills in projections.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|----------------|-----------|----------|----------|----------|----------|----------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | M |
| CO2 | | S | | | | |
| CO3 | | | | S | | |
| CO4 | | | | S | | S |
| CO5 | | | | S | W | |

UNIT – I

12 Hours

Overview of Graphic Systems – Display Devices – hard copy Devices – Interactive Input Devices – Display Processor – Graphic software – Output Primitives – Line Drawing Algorithms – Initializing Lines – Line command – fill areas – circle Generation Algorithms.

UNIT – II

12 Hours

Attributes of output primitives – line style – color and Intensity – area filling algorithms – character Attributes – inquiry functions – bundled attributes – two dimensional transformations – basic and composite transformations – metric representations.

UNIT – III

12 Hours

Windowing and Clipping – Windowing concepts – Clipping Algorithms – Window to view port Transformations – segments – Interactive input methods – Physical input devices – logical classification of input devices – interactive picture construction techniques – input functions.

UNIT – IV

12 Hours

Three dimensional concepts – 3D Display Techniques – 3D representation – polygon and curved surface – 3D transformations.

UNIT – V

12 Hours

3D viewing – projections – viewing transformation – Implementation of viewing operations – Hidden surface and Hidden Line removal – back free removal, depth buffer and scan line methods – shading.

TEXT BOOK(S):

1. Donald Hearn and M.Pualine Baker - Computer Graphics
- PHI - (2nd Edition).

REFERENCE(S):

1. William M.Neuman and Robert F Sproul - Principles of
Interactive computer Graphics - McGraw Hill
International Edition - (2nd Edition).

| | | | | | |
|--|----------------------------------|----------|----------|----------|----------|
| BCA17R306 | PROGRAMMING IN MATLAB | L | T | P | C |
| | | 5 | 1 | 0 | 6 |
| Course Category : Major Elective - Discipline Specific Elective | | | | | |
| Course Type : Theory | | | | | |

PREREQUISITE:

Have knowledge in basic concepts of fourth generation programming language.

COURSE OBJECTIVE(S):

To learn fundamentals of Matlab, numeric computation and visualization environment, apply linear algebra and matrix manipulation using 2-D and 3D plotting and to carry out numerical computations and analyses.

COURSE OUTCOME(S):

After completing this course, the student will be able to

- CO1:** Know overview of MATLAB features, problem solving methodology.
- CO2:** Know about matrices and vector foundation, matrix operations with its functions

CO3: Looping, conditional statements, Arrays, use of files, functions and data structures.

CO4: Numerical methods for calculus and differential equations;

CO5: Programming; plotting, solution of linear algebraic equations, statistics, probability, 2D and 3D visualization of scientific data.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | W | |
| CO2 | | S | S | | | |
| CO3 | | | S | | | M |
| CO4 | | | | S | | |
| CO5 | M | | | | | S |

UNIT-I

12Hours

The MATLAB environment- Menus and the toolbar- Computing with Matlab - Script files and the Editor Debugger - Matlab Help System-Programming in Matlab Basic computer programming -Variables and constants, operators and simple calculations

UNIT-II

12 Hours

Matrices and vectors-Matrix and linear algebra review - Vectors and matrices in MATLAB- Matrix operations and functions in MATLAB-Formulas and functions- MATLAB toolboxes

UNIT-III

12 Hours

Program Design and Development-Relational Operators and Logical Variables -Logical Operators and Functions - Conditional Statements- Loops -The Switch Structure ;Arrays- Multidimensional Arrays -Element by Element Operations- Polynomial Operations Using Arrays- Cell Arrays- Structure Arrays.

UNIT-IV

12 Hours

Function definitions-Function arguments-Function returns- Elementary Mathematical Functions-User Defined Functions - Advanced Function Programming -Working with Data Files- MATLAB graphic functions

UNIT-V

12 Hours

Plot Types-Plot formatting-Multipleplots- XY- plotting functions -Subplots and Overlay plots-Special Plot types- Interactive plotting- Function Discovery-Regression-3-D plots- Plot Fits.

TEXT BOOK(S):

1. G. H. Golub and C. F. Van Loan- Matrix Computations-, Johns Hopkins University Press, 1996 (3rd Edition).

REFERENC(S):

1. B. N. Datta - Numerical Linear Algebra and Applications, Brooks/Cole - 1994.
2. L. Elden- Matrix Methods in Data Mining and Pattern Recognition- SIAM Press -2007.

| | | | | | |
|--|------------------------------------|----------|----------|----------|----------|
| BCA17R251 | OFFICE AUTOMATION TOOLS | L | T | P | C |
| | | 1 | 0 | 2 | 2 |
| Course Category : Major Elective - Skill Enhancement Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE :

Basic knowledge on computers

COURSE OBJECTIVE(S):

This course is designed to become proficient in the use of software applications as used in an office environment. It enables the students receive a strong foundation in software and hardware to record, code, sort, calculate, summarize, store and communicate information.

COURSE OUT COMES

After completing this course, the student will be able to

- CO1:** Demonstrate an understanding of computer hardware and software
- CO2:** Describe the features and functions of the categories of application software
- CO3:** Present conclusions effectively, orally and in writing
- CO4:** Understand the dynamics of an office environment
- CO5:** Demonstrate the ability to apply application software in an office environment

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | |
| CO2 | | S | M | | | |
| CO3 | | | | | S | |
| CO4 | M | | | | | S |
| CO5 | | | | S | | S |

UNIT I**3 Hours**

Introduction to MS office - Word Processing- Editing Text- Document formatting- reusable formatting with styles and templates- tables and columns- advanced page layout in word- automating information with fields- managing long documents- mail merge, labels, and envelopes.

UNIT II**3 Hours**

Spreadsheets- Excel- formatting worksheet and restricting data- calculating with formulas and functions- viewing and manipulating data with charts and Pivot Table- creating excel databases.

UNIT III**3 Hours**

PowerPoint- creating and editing slides- adding graphics, multimedia, and special effects to slides- Showing your PowerPoint presentations.

UNIT IV**3 Hours**

MS access 2007: Introduction- Database in access- defining and developing tables- creating queries- forms and reports- building database applications.

UNITV

3 Hours

Schedule and contact management- outlook- outlook e-mail- outlook calendar and task lists- managing contacts and taking notes- scheduling and planning with others.

TEXT BOOK(S):(S)

1. Jennifer Ackerman Kettell, Guy Hart-Davis and curt simmons - Microsoft office 2003: the Complete Reference - Tata McGraw-Hill Publishing Company Ltd- 2009.
2. Sushila Madan - Introduction to Essential tools – JBA - 2009.
3. Anita Goel - Computer Fundamentals – Pearson - 2012

Computer Lab Based on Office Automation: 30 Hours

MS Word:

1. Create a **telephone directory**.
 - The heading should be 16-point Arial Font in bold
 - The rest of the document should use 10-point font size
 - Other headings should use 10-point Courier New Font.
 - The footer should show the page number as well as the date last updated.
2. Design a time-table form for your college.
 - The first line should mention the name of the college in 16-point Arial Font and should be bold.
 - The second line should give the course name/teacher's name and the department in 14-point Arial.

- Leave a gap of 12-points.
- The rest of the document should use 10-point Times New Roman font.
- The footer should contain your specifications as the designer and date of creation.

3. Create the following one page documents.

- (a) Compose a note inviting friends to a get-together at your house, including a list of things to bring with them.
- (b) Design a certificate in landscape orientation with a border around the document.

4. Create the following document:

A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.

5. Convert following text to a table, using comma as delimiter

Type the following as shown (do not bold).

Color, Style, Item

Blue, A980, Van

Red, X023, Car

Green, YL724, Truck

Name, Age, Sex

Bob, 23, M

Linda, 46, F

Tom, 29, M

6. Prepare a grocery list having four columns (Serial number, the name of the product, quantity and price) for the month of April, 06.
 - Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
 - The headings of the columns should be in 12-point and bold.
 - The rest of the document should be in 10-point Times New Roman.
 - Leave a gap of 12-points after the title.

7. XYZ Publications plans to release a new book designed as per your syllabus. Design the first page of the book as per the given specifications.
 - (a) The title of the book should appear in bold using 20-point Arial font.
 - (b) The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
 - (c) At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
 - (d) The details of the offices of the publisher (only location) should appear in the footer.

8. Create the following one page documents.
 - a) Design a Garage Sale sign.
 - b) Make a sign outlining your rules for your bedroom at home, using a numbered list.

9. Enter the following data into a table given on the next page.

| Name | Dolls | Trucks | Puzzles |
|----------|-------|--------|---------|
| Amit | 1327 | 1423 | 1193 |
| Shivi | 1421 | 3863 | 2934 |
| Om | 5214 | 3247 | 5467 |
| Ananya | 2190 | 1278 | 1928 |
| Anupama | 1201 | 2528 | 1203 |
| Maharshi | 4098 | 3079 | 2067 |

Add a column Region (values: S, N, N, S, S, S) between the Salesperson and Dolls columns to the given table Sort your table data by Region and within Region by Salesperson in ascending order:

MS EXCEL:

Q1. Create a student worksheet containing roll numbers, names and total marks. Open a document in Word and insert the excel worksheet using:-

- I) Copy/Paste
- II) Embedding
- iii) Linking

Q2. The term wise marks for APS class of 20 students are stored in 3 separate sheets named term1, term2 and term3. Create 4th worksheet that contains student names and their total and average marks for the entire year. Give proper headings using headers. Make the column headings bold and italic. The

4th worksheet should contain college name as the first line.
 Make it bold, italic and center it.

Q3. Using a simple pendulum, plot 1-T and 1-T² graph.

| I | t1 | t2 | t3 | Mean(t) | T=t/20 | T ² |
|-----|----|----|----|---------|--------|----------------|
| 70 | | | | | | |
| 80 | | | | | | |
| 90 | | | | | | |
| 100 | | | | | | |

Q4. Consider the following employee worksheet:-

| Full Name (First Last) | Grade 1/2/3 | Basic Salary | HRA | PF | Gross | Net | (VA) Vehicle Allowance |
|---------------------------|----------------|-----------------|-----|----|-------|-----|---------------------------|
| | | | | | | | |
| | | | | | | | |

HRA is calculated as follows:

Grade HRA % (of Basic)

- 1 40%
- 2 35%
- 3 30%

Gross = Basic + HRA + VA

Net = Gross - PF

PF is 8% for all Grades

VA is 15000, 10000 and 7000 for Grades 1, 2 and 3.

- i) Find max, min and average salary of employees in respective Grade
- ii) Count no. of people where VA > HRA
- iii) Find out most frequently occurring grade.

- iv) Extract records where employee name starts with “A” has HRA>10000
 - v) Print Grade wise report of all employees with subtotals of net salary and also grand totals. Use subtotal command.
 - vi) Extract records where Grade is 1 or 2 and salary is between 10000 and 20000 both inclusive.
- Q5. In a meeting of a marketing department of an organization it has been decided that price of selling an item is fixed at Rs40. It was resolved to increase the sell of more of more items and getting the profit of Rs40,000/. Use Goal Seek to find out how many items you will have to sell to meet your profit figure.
- Q6. To study the variation in volume with pressure for a sample of an air at constant temperature by plotting a graph for P– V and P-I/V. Sample observations are:-

| Pressure(P) | Volume (V) | I/V | PV | P/V |
|-------------|------------|-----|----|-----|
| 75 | | | | |
| 78.9 | | | | |
| 83.3 | | | | |
| 88.2 | | | | |

- Q7. Plot the chart for marks obtained by the students (out of 5) vs. frequency (total number of students in class is 50).
- Q8. Create the following worksheet(s) containing an year wise sale figure of five salesmen in Rs.

| Salesman | 2002 | 2003 | 2004 | 2005 |
|----------|-------|-------|--------|-------|
| MOHAN | 10000 | 12000 | 20000 | 50000 |
| MITRA | 15000 | 18000 | 50000 | 60000 |
| SHIKHA | 20000 | 22000 | 70000 | 70000 |
| ROHIT | 30000 | 30000 | 100000 | 80000 |
| MANGLA | 40000 | 45000 | 125000 | 90000 |

Apply the following Mathematical & Statistical functions:

- D) Calculate the commission for each salesman under the condition :-
- a) If total sales is greater than Rs. 3, 00,000/-, then commission is 10% of total sale made by the salesman.
 - b) Otherwise, 4% of total sale.
- ii) Calculate the maximum sale made by each salesman.
 - iii) Calculate the maximum sale made in each year.
 - iv) Calculate the minimum sale made by each salesman.
 - v) Calculate the minimum sale made in each year.
 - vi) Count the no. of sales persons.
 - vii) Calculate the cube of sales made by Mohan in the year 2002.
 - viii) Find the difference in sales by salesman Mitra between the year 2002 and 2003. Find the absolute value of difference.
 - ix) Also calculate the Mode, Stddev, Variance, Median for the sale made by each salesman.
 - ix) Calculate the year wise Correlation coefficient between the sales man Mohan and Mitra year wise
- Q9. The following table gives an year wise sale figure of five salesmen in Rs.

| Salesman | 2000 | 2001 | 2002 | 2003 |
|----------|-------|-------|--------|-------|
| S1 | 10000 | 12000 | 20000 | 50000 |
| S2 | 15000 | 18000 | 50000 | 60000 |
| S3 | 20000 | 22000 | 70000 | 70000 |
| S4 | 30000 | 30000 | 100000 | 80000 |
| S5 | 40000 | 45000 | 125000 | 90000 |

- v) Calculate total sale year wise.
- vi) Calculate the net sales made by each salesman
- vii) Calculate the commission for each salesman under the condition :-
 - c) If total sales is greater than Rs. 4, 00,000/-, then commission is 5% of total sale made by the salesman.
 - d) Otherwise, 2% of total sale.
- viii) Calculate the maximum sale made by each salesman.
- ix) Calculate the maximum sale made in each year.
- x) Draw a bar graph representing the sale made by each salesman.
- xi) Draw a pie graph representing the sale made by salesmen in year 2001.

Q10. Consider the following worksheet for APS 1st year students:-

| S.No. | Name | PH | CH | BY | C | CS | Total Marks | % | Grade |
|-------|------|----|----|----|---|----|-------------|---|-------|
| 1 | | | | | | | | | |
| 2 | | | | | | | | | |

Grade is calculated as follows:-

| | |
|-------------------------|---------|
| If % ≥ 90 | Grade A |
| If % ≥ 80 & < 90 | Grade B |
| If % ≥ 70 & < 80 | Grade C |
| If % ≥ 60 & < 70 | Grade D |

Otherwise students will be declared fail.

- i) Calculate Grade using if function
- ii) Sort the data according to total marks
- iii) Apply filter to display the marks of the students having more than 65% marks.
- iv) Draw a pie chart showing % marks scored in each subject by the topper of the class.
- v) Draw the doughnut chart of the data as in (iv)
- vi) Enter the S.No. of a student and find out the Grade of the student using VLOOKUP.
- vii) Extract all records where name
 - a) Begins with "A"
 - b) Contains "A"
 - c) Ends with "A"

MS Power Point

1. Create five Power point slides. Each slide should support different format. In these slides explain areas of applications of IT. Make slide transition time as 10 seconds.
2. Create five Power Point slides to give advantages/disadvantages of computer, application of computers and logical structure of computer.
3. Create five Power Point slides detailing the process of internal assessment. It should be a self-running demo.

| | | | | | |
|--|-------------------------|----------|----------|----------|----------|
| BCA17R252 | HTML PROGRAMMING | L | T | P | C |
| | | 1 | 0 | 2 | 2 |
| Course Category : Major Elective - Skill Enhancement Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE :

Basic knowledge on computers.

COURSE OBJECTIVE(S):

This course is designed to learn how to combine basic HTML elements to create Web pages. Understand how to use HTML tags and tag attributes to control a Web page's appearance.

COURSE OUTCOME(S):

After completing this course, the student will be able to

- CO1:** Understand some basic principles of Web Development practices.
- CO2:** Understand the difference between HTML, CSS and JavaScript.
- CO3:** Understand basic control of elements with JavaScript.
- CO4:** Apply styles to the page elements. Create, modify, and format content with basic CSS.Link web pages.
- CO5:** Depth knowledge of HTML, CSS and/or JavaScript.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | M | | |
| CO2 | | | S | | | |
| CO3 | | S | | | | |
| CO4 | | M | | S | | |
| CO5 | | | | | W | S |

UNIT I**3 Hours**

Introduction - The Head, the Body - Colors, Attributes - Lists, ordered and unordered - Relative Links - Absolute Links - Link Attributes - Using the ID Attribute to Link within a Document.

UNIT II**3 Hours**

Putting an Image on a Page - Using Images as Links - Putting an Image in the Background - Tables – Create - Table Headers – Captions - Spanning Multiple Columns - Styling Table.

UNIT III**3 Hours**

Forms – creating forms with form elements- form controls- creating labels for controls- structuring the forms with field set with legend elements- focusing controls.

UNIT IV**3 Hours**

Frames- Introducing the Frameset element- attributes- creating links between frames- nested frameset- floating or inline frameset.

UNIT V**3 Hours**

Introducing CSS – CSS Rules- CSS properties – controlling fonts – text formatting – links –positioning with CSS.

TEXT BOOK(S):(S)

1. Jon Duckett - Beginning web programming with HTML, XHTML, CSS & JavaScript- Wiley publication - 2011
2. Introduction to HTMLand CSS - O'Reilly - 2010

LIST OF PROGRAMS

30Hours

Create an HTML document with the following formatting options:

- Bold
- Italics
- Underline
- Headings
- Font
- Paragraph
- Horizontal Rule
- Line Break
- Horizontal Rule
- Pre tag

Create an HTML document which consists of:

- Ordered List
- Unordered List
- Nested List

Create an HTML document which implements Internal linking as well as External linking.

Create a table using HTML which consists of columns for Roll No., Student's name and grade.

| Result | | |
|---------|------|-------|
| Roll No | Name | Grade |
| | | |
| | | |
| | | |

Q.5 Create a Table with the following view:

| | | | | |
|--|--|--|---------------------|--|
| | | | | |
| | | | Place an image here | |
| | | | | |
| | | | | |

Create a form using HTML which has the following types of controls:

Text Box

Option radio buttons. Check boxes

Reset and Submit buttons

Create HTML documents (having multiple frames) in the following three formats:

| |
|--------|
| Frame1 |
| Frame2 |

| | |
|--------|--------|
| Frame1 | |
| Frame2 | Frame3 |

| | | | | | |
|--|---------------------------|----------|----------|----------|----------|
| BCA17R253 | MYSQL (SQL/PL-SQL) | L | T | P | C |
| | | 1 | 0 | 2 | 2 |
| Course Category : Major Elective - Skill Enhancement Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE :

Basic knowledge in MSAccess and HTML

COURSE OBJECTIVE(S):

This course is designed to use PHP and MySQL to effective development of dynamic web sites for user on the Internet.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Write queries using DDL and DML commands.

CO2: Create views and procedures.

CO3: Query using TCL Commands.

CO4: Write stored procedures and functions in MySQL.

CO5: Programs using PL/SQL.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | M |
| CO2 | | S | | | W | |
| CO3 | | | | S | | |
| CO4 | | S | S | | | |
| CO5 | M | | | | W | S |

UNIT – I

3 Hours

Introduction to Databases – An overview of MySQL architecture – MySQL Engine – Connectivity – SQL – Data Integrity – Transactions – Extensibility – Symmetric Multiprocessing with MySQL – Security – Replication – application programming interfaces – add-on tools.

UNIT – II

3 Hours

SQL Basics : MySQL tutorial – MySQL Data types – MySQL Operators – MySQL Functions

UNIT – III

3 Hours

Working with databases and tables- working with data – Inserting, updating, and deleting records – retrieving records – copying, importing, and exporting records.

UNIT – IV

3 Hours

Joins – What is joins – types of joins – Subqueries – Types of query- transactions – what is a transactions? – Life cycle of a transaction – controlling transaction behavior.

UNIT – V

3 Hours

Administration and configuration – basic server administration and configuration tasks- security, access control and privileges – MySQL Grant tables – granting, revoking and viewing user privileges- maintenance and backup and recovery.

TEXT BOOK(S):

1. Vikram Vaswani - The Complete Reference MySQL - McGraw Hill Educations - 2004.

REFERENCE(S):

1. Baron Schwartz - High Performance MySQL - O'Reilly - 2012.

LABORATORYPROGRAMS:

30 Hours

[SQLCOMMANDS]

- 1) SQL* formatting commands
- 2) To create a table, alter and drop table.
- 3) To perform select, update, insert and delete operation in a table.
- 4) To make use of different clauses viz where, group by, having, order by, union and intersection,
- 5) To study different constraints.

[SQLFUNCTION]

- 6) To use oracle function viz aggregate, numeric, conversion, string function.
- 7) To understand use and working with joins.
- 8) To make use of transaction control statement viz rollback, commit and save point.
- 9) To make views of a table.
- 10) To make indexes of a table.

[PL/SQL]

1. Implementation of cursors.
2. Implementation of Triggers
3. Working with PL/ SQL.

| | | | | | |
|--|------------------------------------|----------|----------|----------|----------|
| BCA17R254 | MULTIMEDIA APPLICATIONS | L | T | P | C |
| | | 1 | 0 | 2 | 2 |
| Course Category : Major Elective - Skill Enhancement Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE :

Basic knowledge in designing.

COURSE OBJECTIVE(S):

This course is designed to design, create, build, and debug attractive multimedia applications.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Understand the components of multimedia.

CO2: Analyze the different hardware devices used in multimedia project development.

CO3: Work with different font styles and design tools.

CO4: Develop projects using drawing techniques.

CO5: Implement effective real time multimedia application by including audio and video.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|----------------|-----------|----------|----------|----------|----------|----------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | W | |
| CO2 | | | S | | | |
| CO3 | | S | | | | |
| CO4 | | | | S | | S |
| CO5 | | | S | | | S |

UNIT-I

3 Hours

Introduction to multimedia - Components - Uses of multimedia - Stages of a multimedia project- Requirements to make good multimedia - Multimedia Hardware - Macintosh and Windows production Platforms, Hardware peripherals

UNIT-II

3 Hours

Text - Fonts & Faces- Using Text in Multimedia- Font Editing & Design Tools- Hypermedia – Hypertext - Images – Making Still Images – Bitmaps - Vector Drawing - 3D Drawing & rendering, Color –understanding Natural Light and Colors - Computerized Colors - Color Palettes - Image File Formats

UNIT-III

3 Hours

Sound: Digital Audio- preparing digital audio files – Making MIDI Audio- Audio File Formats -MIDI vs Digital Audio- adding sound to your multimedia project

UNIT-IV

3 Hours

Video - How Video Works- Analog Video- Digital Video- digital video resolution – digital video architectures- digital video compression- Video File Formats- Shooting and Editing Video.

UNIT-V

3 Hours

Animation- Principle of Animations- Animation Techniques- Animation File Formats- Making animations that works – A rolling ball – a bouncing ball – creating an animated scene

TEXT BOOK(S):

1. Tay Vaughan, “Multimedia: Making it work”, Tata McGraw-Hill Publishing, Seventh edition. 2008.
2. Ralf Steinmetz and Klara Naharstedt, “Multimedia: Computing, Communications Applications”, Pearson, 1995.

Laboratory Programs

30 Hours

FLASH: Concept of Frame, Key frames, Frame rate, Timeline, Tween, Layers, Symbols, Embedding audio/video and embedding on the web page

1. Draw an animation to show a bouncing ball.
2. Draw an animation to show a moving stick man.
3. Draw an animation to show a fainting banana.
4. Draw an animation to show sunrise and sunset.
5. Draw an animation to show a disappearing house.
6. Draw an animation to show two boats sailing in river
7. Draw an animation to show a scene of cricket match.
8. Draw an animation to help teach a poem or a song
9. Draw an animation to show cartoon with a message
10. Make a movie showing Shape Tweening.
11. Make a movie showing Motion Tweening.
12. Add sound and button to the movie

| | | | | | |
|--|------------------------|----------|----------|----------|----------|
| BCA17R255 | PHP PROGRAMMING | L | T | P | C |
| | | 1 | 0 | 2 | 2 |
| Course Category : Major Elective - Skill Enhancement Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE :

Basic knowledge on Programming.

COURSE OBJECTIVE(S):

This course is designed to develop skills needed for building interactive, data-driven sites effective usage of cookies and sessions.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Understand the basic concepts of PHP

CO2: Develop programs using arrays and control structures

CO3: Write PHP program using functions

CO4: Understand the concepts of regular expressions and String Manipulation

CO5: Gain knowledge on object oriented concepts in PHP

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|----------------|-----------|----------|----------|----------|----------|----------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | |
| CO2 | | S | | | W | |
| CO3 | | | M | S | | |
| CO4 | | | | S | | |
| CO5 | | M | | | | S |

UNIT–I

3 Hours

Introduction to PHP - Tools and software requirements (like Web Server, Database, Editors etc.) - Embedding PHP in HTML-Scope of PHP - Basic Syntax-PHP variables and constants – Data types in PHP –Expressions-Scope of a variable (local, global) - PHP Operators- PHP operator Precedence and associativity

UNIT–II

3 Hours

Control Structures- Making Decision with Conditionals- Repeating Actions through iterations-Arrays-Numerically Indexed Arrays- Arrays with different indices- Sorting Arrays- Multidimensional Arrays

UNIT–III

3 Hours

Handling HTML form with PHP - Capturing Form Data - GET and POST form methods - Dealing with multi value fields - Redirecting a form after submission -PHP Functions - Function, Need of Function, declaration and calling of a function - PHP Function with arguments, Default Arguments in Function - Scope of Function Global and Local

UNIT–IV

3 Hours

String Manipulation–Formatting Strings-Comparing Strings- Regular Expression –Basics- Character Set and Character Class-Finding, Splitting and Replacing strings with regular expressions –Comparing Regular Expression and String

UNIT – V

3 Hours

Object Oriented PHP-Classes and Objects- Polymorphism
– Inheritance-Exception Handling

TEXT BOOK(S):

1. Luke Weiling and Lara Thomson - PHP and MySQL Development - Sams Publishing – 2004.

LABORATORY PROGRAMS

30 Hours

1. Create a PHP page using functions for comparing three integers and print the largest number.
2. Write a function to calculate the factorial of a number (non-negative integer). The function accept the number as an argument.
3. Write a program to check whether the given number is prime or not.
4. Create a PHP page which accepts string from user. After submission that page displays the reverse of provided string.
5. Write a PHP function that checks if a string is all lower case.
6. Write a PHPscript that checks whether a passed string is palindrome or not? (A palindrome is word, phrase, or sequence that reads the same backward as forward, e.g., madam or nurses run)
7. Write a program to sort an array.
8. Write a PHP script that removes the whitespaces from a string. Sample string : 'The quick " " brown fox'

9. Write a PHP script that finds out the sum of first n odd numbers.
10. Create a login page having user name and password. On clicking submit, a welcome message should be displayed if the user is already registered (i.e.name is present in the database) otherwise error message should be displayed.
11. Write a PHP script that checks if a string contains another string.
12. Create a simple 'birthday countdown' script, the script will count the number of days between current day and birth day.
13. Write a simple PHP program to check that emails are valid.
14. Using switch case and dropdown list display a “Hello” message depending on the language selected in drop down list.
15. Write a PHP program to print Fibonacci series using recursion.
16. Write a PHP script to replace the first 'the' of the following string with 'That'.

| | | | | | |
|--|--|----------|----------|----------|----------|
| BCA17R256 | PROGRAMMING IN VISUAL BASIC | L | T | P | C |
| | | 1 | 0 | 2 | 2 |
| Course Category : Major Elective - Skill Enhancement Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE :

Basic knowledge on Programming

COURSE OBJECTIVE(S):

This course is designed to include Graphical User Interface Concepts in Windows Environment.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Understand the fundamentals of visual programming.

CO2: Be familiar with the essential techniques to build windows applications using visual basic Approach.

CO3: Use practical problems to illustrate application building techniques.

CO4: Take advantages of the many new capabilities of building applications in graphical Environment.

CO5: Designing and creating visual oriented programs, logic flow in visual programming with logical testing and looping.

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | M | | |
| CO2 | | S | | | | |
| CO3 | | | S | | W | |
| CO4 | | | | | | S |
| CO5 | | | S | S | | S |

UNIT – I**3 Hours**

GUI Environment- Introduction to graphical user interface (GUI), programming language (procedural, object oriented, event driven)-Introduction to controls- textboxes, frames, check boxes, option buttons, images, working with multiple controls and their properties, designing the user interface and tab controls

UNIT – II**3 Hours**

Operations-Data types, constants, named & intrinsic, declaring variables, scope of variables function, arithmetic operations, formatting data.

UNIT – III**3 Hours**

Decision Making -If statement, comparing strings, compound conditions (and, or, not), nested if statements, case structure.

UNIT – IV**3 Hours**

Forms Handling : Multiple forms creating, adding, removing forms in project, hide, show method, load, unload statement, me keyword, referring to objects on a different forms. Iteration Handling: Do/loops, for/next loops, using msgbox function, using string function.

UNIT – V

3 Hours

Data base connectivity by using Data Control and DAO-
Generating Data Reports.

TEXT BOOK(S):

1. Visual basic 6.0 programming, Content Development Group, Tata Mcgraw Hill Edition 2008.
2. Programming in Visual Basic 6.0 by Julia Case Bradley, Anita C. Millispangh (Tata Mcgraw Hill Edition 2000 (Fourteenth Reprint 2004)

LABORATORYPROGRAMS

30 Hours

1. Write a VB application to compute the sum of two variables.
2. Write a VB application to make a calculator.
3. Write a VB application to choose your hobbies from a list.
4. Write a VB application to illustrate the use of color radio button.
5. Write a VB application to illustrate the use of color scroll bar form.
6. Write a VB application to illustrate the use of color text box.
7. Write a VB application to show a timer.
8. Develop an application for bank transaction using data base connectivity.
9. Develop an application for student details using data base connectivity.
10. Generate data report for employee details.

| | | | | | |
|--|--|----------|----------|----------|----------|
| BCA17R360 | SYSTEM ADMINISTRATION AND MAINTENANCE | L | T | P | C |
| | | 1 | 0 | 2 | 2 |
| Course Category : Major Elective - Skill Enhancement Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE :

Students must be aware of basic computer concepts

COURSE OBJECTIVE(S):

An examination of windows/Linux/Unix operating systems and applications installation, configuration, and maintenance, including client-server services, content management and deployment, server administration and management, and user/group management.

COURSE OUTCOME(S):

After completing this course, the student will be able to

- CO1:** Able to know the basic operating systems such as Linux/Unix/Windows.
- CO2:** Create scripts to automate common tasks in Unix system, and to guard against malicious intents against the Unix operating system.
- CO3:** Able to Installation and configuration, maintenance of Linux
- CO4:** File Maintenance in windows System
- CO5:** Analyze various Windows and server system functions

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | W | |
| CO2 | | S | S | | | |
| CO3 | | | | S | | |
| CO4 | | | | M | | S |
| CO5 | M | | | S | | |

UNIT-I**3 Hours**

Linux Desktop tour, Configuring desktop environment, desktop settings, Basic Commands: Terminal, shell, Cat, ls, cd, date, cal, man, echo, pwd, Mkdir, rm, rmdir Ps, kill. Package Installation: Synaptic package manager

UNIT-II**3 Hours**

Creating users – Admin and regular, Path of their personal files. Adding and changing passwords.

UNIT-III**3 Hours**

Difference between workgroup and domain. Concept of roles, user profiles – creating and roaming Concept of Active Directory.

UNIT-IV**3 Hours**

Creating active directory in windows 2003/2008. Ipconfig, Ping, tracert, route, hostname, net, netstat, who am i Set manual IP address, check connectivity – ipv4, ipv6.

Linux Desktop tour, Configuring desktop environment, desktop settings, Basic Commands: Terminal, shell, Cat, ls, cd, date, cal, man, echo, pwd, Mkdir, rm, rmdir Ps, kill. Package Installation: Synaptic package manager

UNIT – II **3 Hours**

Creating users – Admin and regular, Path of their personal files. Adding and changing passwords.

UNIT – III **3 Hours**

Difference between workgroup and domain. Concept of roles, user profiles – creating and roaming Concept of Active Directory.

UNIT – IV **3 Hours**

Creating active directory in windows 2003/2008. Ipconfig, Ping, tracert, route, hostname, net, netstat, who am i Set manual IP address, check connectivity – ipv4, ipv6.

UNIT – V **3 Hours**

Computer Management, Local security Policy, Performance Monitor, Task Scheduler, Antivirus and firewall

TEXT BOOK(S):

1. Lars Wirzenius - The Linux System Administrator's Guide Version 0.9.

LABORATORY PROGRAMS **30 Hours**

Part I (Linux/Unix)

- Basics of operating system, services,
- Installation and configuration, maintenance
- What is linux/unix Operating systems, Kernel, API, cli, gui,
- Difference between linux/unix and other operating systems
- Features and Architecture
- Linux features, advantages, disadvantages

Part II (Windows)

- Windows as operating system, history, versions.
- PC hardware, BIOS, Devices and drivers,
- Kernal Configuration and building
- Application installation, configuration and maintenance
- Server services and Client services
- Difference between WindowsXP/windows7 and windows server2003/2008

Lab Programs Based on System Administration and Maintenance

Linux:

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|---|
| Linux Desktop tour. Configuring desktop environment and desktop settings. |
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|--|
| Basic Commands : Terminal, shell,Cat, ls, cd, date, cal, man,echo, pwd, Mkdir, rm, rmdir Ps, kill |
|--|

| |
|--|
| Package Installation : Synaptic package manager |
|--|

Windows:

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| Process and Disk management |
|-----------------------------|

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|---|
| Windows Task manager. File systems – NTFS, FAT. |
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|-----------------|
| Services |
|-----------------|

| |
|---------------|
| Control Panel |
|---------------|

| |
|---|
| C:/program Files, C:/system C:/windows Add /remove new hardware (like printer), Add/remove new programmes. |
|---|

| |
|-------------------------------|
| Network Administration |
|-------------------------------|

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|---|
| Ipconfig,Ping, tracert, route, hostname, net, netstat, whoami |
|---|

| |
|--|
| Set manual IP address, check connectivity – ipv4, ipv6 |
|--|

| |
|----------------------------|
| Administrator Tools |
|----------------------------|

| |
|---------------------------------------|
| Control Panel -> Administrative Tools |
|---------------------------------------|

| |
|---|
| Computer Management, Local security Policy, Performance |
|---|

| |
|--|
| Monitor, Task Scheduler, Antivirus and firewall. |
|--|

Misc

Start->Accessories->System tools -> All options
(Remote desktop, backup/restore etc.)

LAN – sharing printer, files and folder over the network.

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|--|------------------------------------|----------|----------|----------|----------|
| BCA17R361 | PROGRAMMING WITH SCILAB | L | T | P | C |
| | | 1 | 0 | 2 | 2 |
| Course Category : Major Elective - Skill Enhancement Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE :

Students must be aware of basic computer concepts

COURSE OBJECTIVE(S):

This course introduces Scilab, It is an open source software for numerical computations. Its strengths are its built-in matrix data handling capability, rich set of matrix operators and functions, interactive console to quickly get started, built-in programming language, data visualization through 2D and 3D graphs and a rich set of toolboxes for various applications.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Able to know the basics of SCILAB

CO2: Creating Matrices and Some Simple Matrix Operations.

CO3: Able to handles various files and configuration, maintenance of SCILAB functions

CO4: Manipulating the Matrices and processing

CO5: Analyze the various control and conditional statements and functions

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | W | |
| CO2 | | | | S | | M |
| CO3 | | | S | | | |
| CO4 | | | | M | | |
| CO5 | | S | | S | | |

UNIT – I**3 Hours**

Introduction to Programming: Components of a computer, working with numbers, Machine code, Software hierarchy- SCILAB Environment.

UNIT – II**3 Hours**

Workspace, Working Directory, expressions, Constants, Variables and assignment statement, Arrays.

UNIT – III**3 Hours**

Graph Plots: Basic plotting, Built in functions, generating waveforms, Sound replay, load and save.

UNIT – IV**3 Hours**

Matrices - Some Simple Matrix Operations, Sub- Matrices. Procedures and Functions: Arguments and return values.

UNIT – V**3 Hours**

Control Statements- Sorting a list, searching a list- if-else, else-if-Repetition Statement-manipulating text – reading and writing text in a file .

TEXT BOOK(S):

1. M.Affouf- SCILAB by Example - CreateSpace Independent Publishing Platform – 2012.
2. H. Ramchandran, A.S. Nair - SCILAB - S.Chand – 2011.

SCILAB Laboratory

30 Hours

1. Write a program to assign the following expressions to a variable A and then to print out the value of A.
 - a. $(3+4)/(5+6)$
 - b. $2v^2$
 - c. $\sqrt{2}$
 - d. $(0.0000123 + 5.67 \times 10^{-3}) \times 0.4567 \times 10^{-4}$
2. Celsius temperatures can be converted to Fahrenheit by multiplying by 9, dividing by 5, and adding 32. Assign a variable called C the value 37, and implement this formula to assign a variable F the Fahrenheit equivalent of 37 Celsius.
3. Set up a vector called N with five elements having the values: 1, 2, 3, 4, 5. Using N, create assignment statements for a vector X which will result in X having these values:
 - a. 2, 4, 6, 8, 10
 - b. $1/2$, 1, $3/2$, 2, $5/2$
 - c. 1, $1/2$, $1/3$, $1/4$, $1/5$
 - d. 1, $1/4$, $1/9$, $1/16$, $1/25$
4. A supermarket conveyor belt holds an array of groceries. The price of each product (in pounds) is [0.6, 1.2, 0.5, 1.3]; while the numbers of each product are [3, 2, 1, 5]. Use

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|--|-------------------------|----------|----------|----------|----------|
| BCA17R362 | SOFTWARE TESTING | L | T | P | C |
| | | 1 | 0 | 2 | 2 |
| Course Category : Major Elective - Skill Enhancement Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE :

Basic knowledge in project development.

COURSE OBJECTIVE(S):

This course is designed to understand the need for requirements for large-scale systems, understand the stakeholders involved in requirements engineering, understand requirements engineering processes, and understand models of requirements.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Know the Purpose of testing

CO2: Understand the basic concepts of Path testing, Logic based testing

CO3: Implement Data flow testing, domain testing

CO4: Perform Pattern matching using Regular expressions and flow anomaly

CO5: Analyze various Software Testing tools

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|----------------|-----------|----------|----------|----------|----------|----------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | W | |
| CO2 | | S | M | | | |
| CO3 | | | S | | | |
| CO4 | | | | S | | |
| CO5 | M | S | | | | S |

UNIT-I **3 Hours**

Introduction: Strategic Approach to Software Testing, Test Strategies for Conventional Software.

UNIT – II **3 Hours**

Validation Testing, System Testing, Basic Terminologies, V Shaped Software Lifecycle Model

UNIT-III **3 Hours**

Functional Testing\ Black- box Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing

UNIT-IV **3 Hours**

Structural Testing / White- box Testing
Basis Path Testing: Program Graph, DD Path graph, Cyclomatic Complexity, Graph Matrices.

UNIT – V **3Hours**

Control Flow Testing: Statement Coverage, Branch Coverage, Condition Coverage, Path Coverage

TEXT BOOK(S):

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, Sixth Edition, Mc Graw Hill Education, 2005.
2. Yogesh Singh, Software Testing, Cambridge University Press, 2011.

Software Testing Laboratory

30 Hours

1. Write a program that take three inputs (a,b &c) that represent the sides of a triangle, and the output is one of the below four:

- a. Not a triangle
- b. Scalene triangle
- c. Isosceles triangle
- d. Equilateral triangle

Generate test cases using Boundary Value Analysis, Equivalence Class Partitioning and Decision Table Testing.

Generate test cases using Basis path testing.

Run code coverage tool.

2. Write a program that determines the nature of roots of a quadratic equation. Output should be one of the following:-

- Not a quadratic equation.
- Complex roots
- Real roots
- Single roots

I. Generate test cases using Boundary Value Analysis, Equivalence Class Partitioning and Decision Table Testing.

II. Generate test cases using Basis path testing.

III Run code coverage tool

3. Write a program that checks whether the number is even or odd. Run code coverage tool and find the amount of code being covered.

4. Write a program that dynamically allocates memory to 10 integers using malloc() or calloc() and
 - do not free memory leading to memory leaks. Verify the same using Valgrind.
 - Now, free memory using free() at the end of the program to avoid memory leaks. Verify the same using Valgrind.
5. Use LoadUI load testing tool to test the web application performance.

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|--|--------------------------|----------|----------|----------|----------|
| BCA17R363 | LINUX PROGRAMMING | L | T | P | C |
| | | 1 | 0 | 2 | 2 |
| Course Category : Major Elective - Skill Enhancement Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE :

A basic understanding on various computer concepts will also help you in understanding various exercises given in this tutorial.

COURSE OBJECTIVE(S):

An introduction to shell programming in a UNIX/Linux environment, this course is designed for system administrators or technical users with little or no programming background. Understanding shell programming gives a user full power of the UNIX environment. Topics include use of a text editor, the features of the Bash shell, variables, control structures, functions, signal handling, string manipulation, file access and basic programming style. Although the course will introduce various system commands commonly used in shell programming, the student should already be familiar with basic UNIX commands.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Able to write shell scripts effectively.

CO2: Create scripts to automate common tasks in Unix system, and to guard against malicious intent against the Unix operating system.

CO3: Create reports

CO4: File Maintenance System

CO5: Analyze various Unix Utilities & functions

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | M |
| CO2 | | S | | | | |
| CO3 | | | S | | W | |
| CO4 | M | | | | | S |
| CO5 | | | S | S | | |

UNIT I**3 Hours**

Introduction to Unix:- Architecture of Unix, Features of Unix , Unix Commands – PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip.

UNIT II**3 Hours**

Unix Utilities:- Introduction to unix file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp,

ftp, telnet, rlogin. Text processing utilities and backup utilities , detailed commands to be covered are tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, cpio

UNIT III

3 Hours

Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization- Filters - Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count characters, Words or Lines, Comparing Files.

UNIT IV

3 Hours

Grep ,Sed,File Management: Operation, grep Family, Searching for File Content. Scripts, Operation, Addresses, commands, Applications, grep and sed. File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask

UNIT V

3 Hours

awk: Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications, awk and grep, sed and awk.

TEXT BOOK(S):

1. Behrouz A. Forouzan, Richard F. Gilberg.Thomson. Unix and shell Programming TMH, 2nd Edition, 2008.
2. Sumitabha Das, Your Unix the ultimate guide TMH. 2nd Edition, 2006.

REFERENCE(S):

1. Graham Glass, King Ables - Unix for programmers and users - Pearson Education – 2005 (3rd edition).
2. Kernighan and Pike - Unix programming environment, PHI - Pearson Education – 2009(4th Edition).
3. Rosen, Host, Klee, Farber, Rosinski - The Complete Reference Unix – TMH – 2012(6th Edition).

LIST OF PROGRAMS

30 Hours

1. Execution of various file/directory handling commands.
2. Simple shell script for basic arithmetic and logical calculations.
3. Shell scripts to check various attributes of files and directories.
4. Shell scripts to perform various operations on given strings.
5. Shell scripts to explore system variables such as PATH, HOME etc.
6. Shell scripts to check and list attributes of processes.
7. Execution of various system administrative commands
8. Write awk script that uses all of its features.

9. Use seed instruction to process /etc/passwd file.
10. Write a shell script to display list of users currently logged IN
11. Write a shell script to delete all the temporary files.
12. Write a shell script to search an element from an array using binarysearching

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|--|---------------------------|----------|----------|----------|----------|
| BCA17R364 | INTERNET OF THINGS | L | T | P | C |
| | | 1 | 0 | 2 | 2 |
| Course Category : Major Elective - Skill Enhancement Elective | | | | | |
| Course Type : Integrated Course | | | | | |

PREREQUISITE :

Abasic knowledge of Internet

COURSE OBJECTIVE(S):

To understand the fundamentals of Internet of Things, build a small low cost embedded system using Arduino / Raspberry Pi or equivalent boards and apply the concept of Internet of Things in the real world scenario.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Design a portable IoT using Arduino / equivalent boards and relevant protocols

CO2: Develop web services to access/control IoT devices

CO3: Deploy an IoT application and connect to the cloud.

CO4: Analyze applications of IoT in real time scenario

CO5: Developing Real Time Applications

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | M | | | | W | |
| CO2 | | S | | | | |
| CO3 | | | S | | | |
| CO4 | | | | | W | S |
| CO5 | | | | S | | |

UNIT – I**3 Hours**

Introduction-Characteristics-Physical design - Protocols – Logical design – Enabling technologies – IoT Levels – Domain Specific IoTs – IoT vs M2M.

UNIT II**3 Hours**

IoT systems management – IoT Design Methodology – Specifications Integration and Application Development.

UNIT III**3 Hours**

Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web services

UNIT IV**3 Hours**

Intel Galileo Gen2 with Arduino- Interfaces - Arduino IDE – Programming - APIs and Hacks

UNIT V**3 Hours**

Various Real time applications of IoT- Connecting IoT to cloud – Cloud Storage for Iot – Data Analytics for IoT – Software & Management Tools for IoT

TEXT BOOK(S):

1. Arshdeep Bahga, Vijay Madiseti - Internet of Things – A hands-on approach- Universities Press - 2015.

REFERENCE(S):

1. Manoel Carlos Ramon - Intel Galileo and Intel Galileo Gen 2 -API Features and Arduino Projects for Linux Programmers –Apress - 2014.
2. Marco Schwartz - Internet of Things with the Arduino Yun - Packt Publishing - 2014.

LAB PROGRAMS**30 Hours**

1. Protocol Implementation
2. IoT Design
3. Building IoT with Raspberry
4. Building IoT with gallileo / arduino
5. Developing real time application of IoT
6. Data Analytics for IoT

| BCA17R365 | PROGRAMMING IN R | L | T | P | C |
|-----------|------------------|---|---|---|---|
| | | 1 | 0 | 2 | 2 |

Course Category : Major Elective - Skill Enhancement Elective
Course Type : Integrated Course

PREREQUISITE :

Knowledge on programming

COURSE OBJECTIVE(S):

This course is designed to learn how to program in R and how to use R for effective data analysis.

COURSE OUTCOME(S):

After completing this course, the student will be able to

CO1: Recognize and make appropriate use of different types of data structures

CO2: Identify and implement appropriate control structures to solve a particular programming problem

CO3: Understand the concepts of Lists ,vectors

CO4: Gain knowledge on matrices in R

CO5: Develop basic programs using matrices in R

Mapping of Course Outcome(s):

| CO / PO | PO | | | | | |
|---------|----|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| CO1 | S | | | | | M |
| CO2 | | S | | | | |
| CO3 | | | S | S | | |
| CO4 | | | | S | | |
| CO5 | M | | | | W | S |

UNIT-I**3 Hours**

Introduction to R- Installing R- How to Run R
–Functions –Startup Files –Reading and Writing R – Arithmetic operations in R

UNIT-II**3 Hours**

R Programming Structures- Control Statements- Loops- If-Else-Arithmetic and Boolean Operator values- Type Conversions-Functions

UNIT – III

3 Hours

R Data Structures –Lists –Creation-Accessing List Elements-Adding or Deleting List Elements-Recursive Lists-Data Frames

UNIT – IV

3 Hours

Vectors-Declaration –Arithmetic and logic operations –Indexing –Vector Elements-operations on vectors-Filtering –Matrices - Math Functions – Set operations

UNIT – V

3 Hours

Input /Output –Reading from the keyboard- Reading and Writing to a File- Reading a Matrix or Data Frame from a file- Accessing files on Remote Machines – String Manipulations- Interfacing R from other languages

TEXTBOOK(S):

1. Norman Matloff - The Art of R Programming - No Starch Press -2011

LAB PROGRAMS

30 Hours

1. Write a program that prints 'Hello World' to the screen.
2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n
3. Write a program that prints a multiplication table for numbers up to 12.
4. Write a function that returns the largest element in a list.
5. Write a function that computes the running total of a list.

6. Write a function that tests whether a string is a palindrome.
7. Implement the following sorting algorithms: Selection sort, Insertion sort, Bubble Sort
8. Implement linear search.
9. Implement binary search.
10. Implement matrices addition , subtraction and Multiplication