

# ARULMIGU PALANIANDAVAR ARTS COLLEGE FOR WOMEN

(AUTONOMOUS)

Re-accredited with B<sup>++</sup> by NAAC in 3<sup>rd</sup> cycle  
(Run by Hindu Religious and Charitable Board under the Aegis of  
Arulmigu Dhandayuthapani Swamy Thirukovil, Palani)  
(Affiliated to Mother Teresa Women's University, Kodaikanal)  
Chinnakalayamputhur(PO), Palani 624 615.

Curriculum Framework and Syllabus for Outcome Based Education in

## Bachelor of Computer Applications (PROGRAMME CODE: UGBCAS)

Degree Programme for the students admitted from the Academic year  
2019-2020 Onwards



**PG DEPARTMENT OF COMPUTER SCIENCE**

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## **ARULMIGU PALANIANDAVAR ARTS COLLEGE FOR WOMEN INSTITUTION VISION AND MISSION**

### **VISION**

- Enlightenment and Empowerment of Rural Women

### **MISSION**

- To imbibe research activity and collaborative programs with our local communities.
- High quality teaching, providing learning environment with practical exposure.
- Encouragement of a questioning spirit and self-reliance.
- Strong and support education for the students employability

## **DEPARTMENT VISION AND MISSION**

### **VISION**

- Employing women in the field of Information Technology.
- Molding rural women into Future Leaders.

### **MISSION**

- Training students in latest trends in IT Field.
- Motivating students to organize IT related competitions.
- Conducting special lectures for the students to advance the state of the art in computer science and IT Field.
- Training students to do projects in recent technologies.

## **B.C.A**

### **REGULATIONS**

#### **1. Preamble:**

Computer Science department was established in 1988 as self supporting department with the curriculum specifically designed to reflect the depth and breadth of computer science. To encourage young rural women students to adopt higher education, M.Sc Computer Science Programme is added in the department in 2005. To bridge the gap between the studies of computers and its applications, BCA programme is introduced in the year 2008. Expert members from Academia and Industry provide inputs in introducing specialized courses in the curriculum to suit industry needs. To further enhance the quality of the program, the department adheres Outcome Based Education (OBE) 2019-2020 onwards.

#### **2. Eligibility for Admission**

- Candidate should have passed the Higher Secondary Examination conducted by the board of syndicate as equivalent there to with Mathematics .

#### **3. Duration of the course**

- The students will undergo the prescribed course of study for a period of not less than three academic years (Six semesters).

#### **4. Medium of Instruction:**

- English

#### **5. General Framework :**

- Course Study : Part I,II,III,IV,V subjects.

#### **6. Eligibility of the degree:**

- Candidates will be eligible, if they complete the course with the required credits and pass in the prescribed examinations.
- The candidate requires 75% of attendance to attend the end semester examination.
- Two internal tests will be conducted and the average of two tests will be considered for the internal mark consolidation.
- To get Graduation , the students should gain minimum 140 credits.

## 7. Evaluation

### Pattern of Evaluation

	<b>Int.</b>	<b>Ext.</b>	<b>Total</b>
Theory	25	75	100
Practical	40	60	100
Project	40	60	100

### Internal Assessment Components

#### **Theory(25 Marks)**

Test - 15

Assignment - 5

Seminar - 5

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25

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### Content Delivery Methods

1. Lecture method
2. Group Discussion
3. ICT

## 8. Passing Rules

- 75% of marks are allotted for external evaluation and 25% of the marks are allotted for internal evaluation in each of the theory subjects
- 60% of marks are allotted for external evaluation and 40% of the marks are allotted for internal evaluation in each of the practical subjects.
- For each courses there will be Continuous Internal Assessment (CIA) and Final Semester Examination.
- For each paper, passing minimum is 40% in both internal and external

## BLOOM'S TAXONOMY BASED ASSESSMENT PATTERN

**K1**-Knowledge; **K2**- Comprehend; **K3**- Applications; **K4**-Analysis;  
**K5**- Synthesis; **K6**-Evaluation;

### 1.PART I,II,III

#### External Question Pattern : Theory – 75 Marks ( 3 Hours)

Knowledge Level	Section	Marks	Course Outcomes	Description	Total
K1	A (Answer All) Two Questions from each unit	10*1=10	CO1&CO2	One word/ Short Answers	75
K2 & K3	B (Either or Choice) One Questions from each unit	5x 5 = 25	CO2 & CO3	Descriptive / Detailed	
K3&K4	C (Answer 5 out of 8)	5*8 = 40	CO3,CO4 &CO5	Descriptive / Detailed	

#### Internal Question Pattern (30 Marks – 2 Hours Test)

Knowledge Level	Section	Marks
K1	A (Answer All)	6*1=6
K2,K3	B (Answer 2 out of 4)	2x 4 = 8
K4,K5	C (Answer 2 out of 4)	2*8 = 16

#### PART IV (SBC & NME ) – External (75 Marks – 3 Hours)

Knowledge Level	Section	Marks	Description	Total
K1,K2	A(Answer 5 out of 8)	5*3=15	Short Answers	75
K2	B(Answer 5 out of 8)	5*6=30	Descriptive	
K4	C(Answer 3 out of 5)	3*10=30	Detailed	

## **Bloom's Taxonomy in fixing the Learning Objectives:**

Since the Academic year 2019 – 2020, the curriculum of B.Sc., (Computer Science) and M.Sc., (Computer Science) has been designed and the learning objectives and outcomes of the programmes are set, following the Bloom's Taxonomy Cognitive Domain. Accordingly, it is broken into six levels of learning objectives of each course. They are -

K1 / Knowledge = Remember

K2 / Comprehension = Understand

K3 / Application = Apply

K4 / Analysis = Analyze

K5 / Evaluation = Evaluate

K6 / Synthesis = Create

## **Bloom's Taxonomy Action Verbs:**

**K1 / Knowledge:** Arrange, Define, Describe, Duplicate, Identify, Label, List, Match, Memorize, Name, Order, Outline, Recognize, Relate, Recall, Repeat, Reproduce, Select, State

**K2 / Comprehension:** Classify, Convert, Defend, Describe, Discuss, Distinguish, Estimate, Explain, Express, Extend, Generalize, Give example(s), Identify, Indicate, Infer, Locate, Paraphrase, Predict, Recognize, Rewrite, Review, Select, Summarize, Translate

**K3 / Application:** Apply, Change, Choose, Compute, Demonstrate, Discover, Dramatize, Employ, Illustrate, Interpret, Manipulate, Modify, Operate, Practice, Predict, Prepare, Produce, Relate, Schedule, Show, Sketch, Solve, Use, Write

**K4 / Analysis:** Analyze, Appraise, Breakdown, Calculate, Categorize, Compare, Contrast, Criticize, Diagram, Differentiate, Discriminate, Distinguish, Examine, Experiment, Identify, Illustrate, Infer, Model, Outline, Point out, Question, Relate, Select, Separate, Subdivide, Test

**K5 / Evaluation:** Appraise, Argue, Assess, Attach, Choose, Compare, Conclude, Contrast, Defend, Describe, Discriminate, Estimate, Evaluate, Explain, Judge, Justify, Interpret, Relate, Predict, Rate, Select, Summarize, Support, Value

**K6 / Synthesis:** Arrange, Assemble, Categorize, Collect, Combine, Comply, Compose, Construct, Create, Design, Develop, Devise, Explain, Formulate, Generate, Plan, Prepare, Rearrange, Reconstruct, Relate, Reorganize, Revise, Rewrite, Set up, Summarize, Synthesize, Tell, Write

## Mapping COs with POs:

For each programme, the Educational objectives and the Specific objectives are specified. The programme outcomes are designed according to the curriculum, teaching, learning and evaluation process. For each course, the definite outcomes are set, giving challenge to the cognitive domain. The course outcomes are mapped with the programme outcomes. The performance of the stakeholders is assessed and the attainment rate is fixed, by using the measurements 'high', 'medium' and 'low'. The restructuring of the curriculum is done based on the rate of attainment.

## Institutional Objectives:

- Women Education
- Women Empowerment
- Self-reliance and
- Making Model Citizens.

## PROGRAM EDUCATIONAL OBJECTIVES

After few years from the completion of BCA programme, the students will be able to

**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:** Involve in lifelong learning to adapt the technological advancements in the emerging areas of computer applications.

## PROGRAMME SPECIFIC OUTCOMES

Graduate with a BCA will have the ability to

**PSO1:** Able to work as software programmer, system and network administrator, web designer faculty for computer science and computer applications .

**PSO2:** Able to design and develop computer applications for Business problems

**PSO3:** Able to create platforms to become an entrepreneur and a relish for higher studies such as M.C.A.,M.Sc.,etc.,

**Mapping PEOs with IOs:**

Programme Educational Objectives	Institutional Objectives			
	1	2	3	4
<b>BCA., (Computer Applications)</b>				
<b>PEO1:.</b>		*		*
<b>PEO2:</b>	*	*		*
<b>PEO3</b>			*	
<b>PEO4:</b>	*			*

**Measuring: H – High; M – Medium; L – Low**

**BCA., (COMPUTER APPLICATIONS)****PROGRAMME OUTCOMES**

Upon successful completion of the programme, the student will able to

**PO1 :** Understand the Concepts of key areas of Computer Science.

**PO2:** Analyze and apply latest technologies to solve problems in the areas of Computer Applications.

**PO3:** Develop various real-time applications using latest technologies and programming languages.

**PO4:** Possess Strong foundation for their higher studies.

**PO5:** Become employable in various IT companies and Government jobs.

**PO6:** Develop practical skills to provide solutions to industry, society and business.



## COMMON ACADEMIC STRUCTURE

### B.C.A / 2019 – 2022

Part	Sub. Code	Title of Paper	Hours	Marks			Credits	Exam (H)
				INT	EXT	TOT		
<b>Semester – I</b>								
PART I	MUGT1	Tamil	6	25	75	100	3	3
PART II	MUGE1	English	6	25	75	100	3	3
PART III	MUBCC1	<b>Core I–</b> Digital Electronics	5	25	75	100	5	3
	MUBCL1	<b>Core II Practical:I –</b> Multimedia and Animation	5	40	60	100	3	3
	MUBCA1	<b>Allied I-</b> Principles of Management	5	25	75	100	5	3
PART IV	MUBCHL1	<b>Skill Based Course-I</b> Lab	2	40	60	100	2	3
	MUVE	Value Education – Yoga	1	25	75	100	2	3
<b>Total</b>			<b>30</b>			<b>700</b>	<b>23</b>	
<b>Semester – II</b>								
PART I	MUGT2	Tamil	6	25	75	100	3	3
PART II	MUGE2	English	6	25	75	100	3	3
PART III	MUBCC2	<b>Core III :</b> Programming in ‘C’	6	25	75	100	5	3
	MUBCL2	<b>Core IV: Practical II–</b> Programming in ‘C’	5	40	60	100	3	3
	MUBCA2	<b>Allied II: Mathematics-I</b>	5	25	75	100	5	3
PART IV	MUBCEC2	<b>Skill Based Course –II</b>	2	25	75	100	2	3
<b>Total</b>			<b>30</b>			<b>600</b>	<b>21</b>	
<b>Semester – III</b>								
PART III	MUBCC3	<b>Core V –</b> Object Oriented Programming with C++	5	25	75	100	4	3
	MUBCC4	<b>Core VI –</b> Data Structures	6	25	75	100	4	3

	MUBCL3	<b>Core VII – Practical III</b> Object Oriented Programming with C++	5	40	60	100	4	3
	MUBCL4	<b>Core VIII – Practical IV:</b> Office Automation and Tally	5	40	60	100	3	3
	MUBCA3	<b>Allied III-</b> Business Accounting	5	25	75	100	5	3
PART IV	MUBCHR3	<b>Skill Based Course – III</b>	2	25	75	100	2	3
	MUBCN1	<b>Non Major Elective – I</b>	2	25	75	100	2	3
		<b>Total</b>	<b>30</b>			<b>700</b>	<b>24</b>	
<b>Semester – IV</b>								
PART III	MUBCC5	<b>Core IX – Java Programming</b>	6	25	75	100	5	3
	MUBCC6	<b>Core X – Operating System</b>	6	25	75	100	5	3
	MUBCL5	<b>Core XI– Practical V:</b> Web Technology	5	40	60	100	3	3
	MUBCL6	<b>Core XII – Practical VI:</b> Java Programming	5	40	60	100	3	3
	MUBCA4	<b>Allied IV: Mathematics II</b>	6	25	75	100	5	3
PART IV	MUBCNA4	<b>Skill Based Course – IV</b>	2	25	75	100	2	3
PART V	MUEXA4	Extension Activities	-	-	-	100	1	
		<b>Total</b>	<b>30</b>			<b>700</b>	<b>24</b>	
<i>*Internship Training(15 Days)</i>								
<b>Semester – V</b>								
PART III	MUBCC7	<b>Core XIII – Relational</b> Database Management System	5	25	75	100	5	3
	MUBCL7	<b>Core XIV Practical VII–</b> Dot Net Programming	6	40	60	100	3	3
	MUBCL8	<b>Core XV– Practical VIII:</b> Relational Database Management System	5	40	60	100	3	3

	MUBCE1	<b>Elective - I</b>	6	25	75	100	5	3
	MUBCE2	<b>Elective - II</b>	6	25	75	100	5	3
PART IV	MUBCOS5	<b>Skill Based Course – V</b>	2	25	75	100	2	3
		<b>Internship Training</b>	-	-	-	<b>100</b>	<b>Grade</b>	
		<b>Total</b>	<b>30</b>			<b>700</b>	<b>23</b>	
<b>Semester – VI</b>								
PART III	MUBCC8	<b>Core XVI –Data Communication and Networks</b>	6	25	75	100	5	3
	MUBCC9	<b>Core XVII – Computer Graphics</b>	5	25	75	100	4	3
	MUBCPR	<b>Core XVIII – Project Work</b>	7	40	60	100	5	3
	MUBCE3	<b>Elective – III</b>	6	25	75	100	5	3
PART IV	MUBCSS6	<b>Skill Based Course – VI</b>	2	25	75	100	2	3
	MUES6	Environmental Studies	2	25	75	100	2	3
	MUBCN2	<b>Non Major Elective –II</b>	2	25	75	100	2	3
		<b>Total</b>	<b>30</b>			<b>700</b>	<b>25</b>	

**Extra Credit Papers:**

S.No.	Name of the Papers	Sub.Code	Semester	Marks	Credits
1.	Green computing	UGEGC	I	100	2
2.	IPR,Plagiarism,Copyrights and Patents	UGEICP	III	100	2
3.	MOOC Online Courses	UGEMOC	V	100	2

# **SEMESTER I**

**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** I

**Course :** Digital Electronics

**Course Type :** Core I

**Credits :** 4

**Contact Hours:** 5 hours/week

**Course Code :** MUBCC1

**CIA :** 25

**CE :** 75

### **Preamble**

This course facilitate the students to acquire knowledge on Digital Computers and also it enables the students to understand the working principles of computer.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Gain the knowledge of Number System, Simplification Techniques, Combinational and Sequential Circuits.
- Understand the fundamental concepts and techniques used in digital electronics
- Apply the concepts of Boolean Algebra, Logic gates, Logic Variables and Truth tables to simplify equations.
- Analyze combinational logic in terms of Adder , Subtractor and Multiplexer circuits.

### **COURSE CONTENT**

#### **Unit - I:**

**Number Systems:** Introduction – conversion – Floating point representation of Numbers – Binary Arithmetic Operations - 1's & 2's Complement – 9's & 10's complement – Binary Coded Decimal.

**Codes:** Weighted Binary Codes – Non-weighted Codes – Error detecting codes – Error Correcting codes – Alpha numeric codes.

#### **Unit - II:**

**Boolean algebra and Minimization Techniques:** Introduction – Boolean Logic Operations – Basic Laws of Boolean Algebra – Demorgan's Theorems– Sum of Products and Product of Sums – Karnaugh Map.

#### **Unit - III:**

**Logic Gates:** Introduction – Positive and Negative Logic Designation – Logic Gates.

**Arithmetic:** Half Adder – Full Adder –Half Subtractor- Full Subtractor.

#### **Unit - IV:**

**Combinational Circuits: Multiplexer:** Basic Four – Input Multiplexer – 8 to 1 Multiplexer – 16 to 1 Multiplexer.

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**De-Multiplexer:** 1 to 4 De-Multiplexer – 1 to 8 De-Multiplexer – 1 to 16 De- Multiplexer.

**Unit - V:**

**Flip – Flops:** Introduction - S-R Flip-Flops - D Flip- Flops - J-K Flip-Flops - T Flip- Flops.

**PRESCRIBED TEXT :**

- S.Salivahanan and S.Arivazhagan , *Digital Circuits and Design*, Third Edition, Vikas Publishing House Pvt. Ltd. New Delhi, 2007

**REFERENCE BOOK :**

- Anil K.Maini,, *Digital Electronics Principles, Devices, Applications* Wiley Publications, 2007

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** I

**Course :** Multimedia and Animation

**Course Type :** Core II

**Credits :** 3

**Contact Hours:** 5 hours/week

**Course Code :** MUBCL1

**CIA :** 40

**CE :** 60

### **Preamble**

This course helps the students to learn Corel draw, Photoshop and Macromedia Flash and create a simple animation effectively.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Comprehend the knowledge on designing the image in Corel draw.
- Evaluate the appropriate tools used for designing the image in Photoshop
- Design animated movies using Macromedia flash
- Apply various tools available in Macromedia flash and create simple animation

## **COURSE CONTENT**

### **Program List**

#### **Corel Draw**

- Design letter head with logo
- Wedding card design
- Design a brochure
- Design a book cover
- Design a newspaper advertising.

#### **PHOTOSHOP**

- Scenery Creation.
- Banner Design.
- Greeting Card Design.
- Identification Card Design.
- Visiting Card Design.

#### **MACROMEDIA FLASH**

- Motion Tweening.
- Shape Tweening.
- Animation Using Mask Layer.
- Animation Using Guide Layer.

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- Transforming Object Using Buttons.
  - Screen Creation.
  - Greeting Design &Star Blinking.

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** I

**Course :** Principles of Management

**Course Type :** Allied Paper I

**Credits :** 5

**Contact Hours:** 5 hours/week

**Course Code :** MUBCA1

**CIA :** 25

**CE :** 75

### **Preamble**

This course imparts the fundamental knowledge and exposure the concepts, theories and practices in the field of management.

### **Course Outcome**

On successful completion of the course, the students will be able to

- Understand the concept of levels of management, objectives of management, process of planning, types of Organization and leadership quality.
- Summarize the characteristics and situational theories of leadership.
- Discuss the important factor for types of organization and responsibility of authorities.
- Acquire the knowledge on efficient communication in management

## **COURSE CONTENT**

### **Unit - I:**

**Management:** Meaning & Definition – Principles of Management –Management Vs Administration – Functions of Management –Levels of Management – Contribution of F.W Taylor and Henry Fayol

### **Unit - II:**

**Planning:** Meaning and Definition –Objectives – Importance – Advantages –Limitations – Kinds –Process of Planning – Methods of Planning

**Management by Objectives (M.B.O):** Definition of M.B.O – Principles of M.B.O – Benefits of M.B.O – Weaknesses of M.B.O.

### **Unit - III:**

**Organization:** Meaning and Definition – Features – Principles– Process– Merits of Organization – Consequence of Poor Organization-Types of Organization.

**Delegation of Authority:** Authority and Responsibility– Accountability –Process of Delegation – Principles of Delegation – Obstacles to Delegation –Centralization and Decentralization of Authority

**Unit - IV:**

**Motivation:** Meaning and Definition – Characteristics – Theories of Motivation – Maslow's Need Hierarchy Theory.

**Leadership:** Meaning and Definition – Characteristics– Functions of Leader – Leadership Styles –Theories of Leadership.

**Unit - V:**

**Communication:** Meaning and Definition – Nature – Principles – Benefits – Elements – Importance of communication in management – channels or types – barriers to communication – guidelines for ensuring effective communication.

**Control:**

Definition – characteristics of control – benefits of control – steps in controlling – effective control.

**PRESCRIBED TEXT :**

- S.Kathiresan and Dr.V.Radha , *Principles of Management*

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** I

**Course :** HTML programming

**Course Type :** Skill Based Course I

**Credits :** 2

**Contact Hours:** 2 hours/week

**Course Code :** MUBCHL1

**CIA :** 40

**CE :** 60

### **Preamble**

This course obtains the students to acquire the knowledge on design webpage and websites using HTML tags.

### **Course Outcome**

On successful completion of the course, the students will be able to

- Classify various HTML tags.
- Illustrate HTML tags in simple programs.
- Design static webpage using Basic HTML tag.
- Create website by applying all the available HTML tags.

### **COURSE CONTENT**

### **Program List**

- Design a webpage using basic HTML tags
- Create a webpage using formatting tags
- Develop a webpage using list tags
- Create a webpage using physical and logical tags
- Prepare class timetable using table tags.
- Link the webpage internally and externally using anchor tag.
- Split the webpage using frame tag
- Design a webpage by applying various attributes of form tag.
- Create a website for your college
- Design a webpage for your Department

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# **SEMESTER II**

**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** II

**Course :** Programming in C

**Course Type :** Core III

**Credits :** 5

**Contact Hours:** 6 hours/week

**Course Code :** MUBCC2

**CIA :** 25

**CE :** 75

### **Preamble**

This course helps the students to learn C Programming language and develop programming skills in writing simple programs.

### **Course Outcomes**

On successful completion of the course, the students are able to

- Recall and understand the fundamentals of C programming .To acquire the programming logic, use of program instruction, syntax and programming structure.
- Understand the concepts of decision making branching and looping
- Implement different operations on arrays and functions to solve the problem
- Execute file operations to preserve data in physical disk.

### **COURSE CONTENT**

#### **Unit - I:**

History of C – Basic Structure of C Programs – Character Set –C Tokens – Keywords and Identifiers – Constants and Variables – Data Types – Storage Class - Operators and Expressions.

#### **Unit - II:**

**Managing Input and Output Operations** - Decision Making and Branching: IF statement –Simple IF Statement-The IF....ELSE Statements - Nesting of IF.....ELSE Statements – The Switch Statement – The? : Operator - The GOTO Statement – **Decision Making and Looping** – The WHILE Statement – The DO Statement – The FOR Statement-Jumps in LOOPS.

#### **Unit - III:**

**Arrays:** One-dimensional Arrays – Two-dimensional Arrays – Multi-dimensional Arrays – Character Arrays and Strings.

**User - defined Function**– Elements of user defined functions – definition of functions – function calls – Functions declaration – category of functions - Nesting of functions – Passing arrays to functions – Scope, visibility and life time of variables.

**Unit - IV:**

**Structures:** Defining a Structure – Declaring structure variables – Accessing structure members – structure initialization – copying and comparing structure variables- Arrays of structure – Arrays within structure – Structure within structure.

**Union:** introduction- size of structure – Bit fields.

**Pointers:** Accessing the address of a variable – declaration – initialization – accessing a variable through its pointer – pointer expression – pointers & characters string – Array of pointers – pointers as functions arguments – pointers and Structures.

**Unit - V:**

**File Management :** Introduction – Defining and Opening a File – Closing a File – Input / Output Operations on Files - Error Handling During I/O Operation – Random Access to Files – Command Line Arguments.

**PRESCRIBED TEXT**

- E.Balagurusamy *Programming in ANSI 'C'*, Eighth Edition, Tata McGraw – Hill Publishing Company, 2009.

**REFERENCE BOOK**

- Yashwanth Kanetkar *“Let us C”*– BPB Publication

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** II

**Course :** Programming in C

**Course Type :** Core IV

**Credits :** 3

**Contact Hours:** 5 hours/week

**Course Code :** MUBCL2

**CIA :** 40

**CE :** 60

### **Preamble**

This course provide exposure to problem-solving through programming and train the students to the basic concepts of the C-Programming Languages

### **Course Outcomes**

On successful completion of the course, the students are able to

- Read, understand and trace the execution of programs written in C language.
- Write the C code for a given algorithm.
- Implement programs with pointers and arrays, perform pointer arithmetic and use the pre-processor.

## **COURSE CONTENT**

### **Program List:**

- To find the Sum of individual Digits.
- To reverse a given Digit.
- Prime Number Series.
- Armstrong Number Series.
- Matrix Manipulation and Transpose of a Matrix.
- Palindrome using String.
- String Concatenation, Comparison and Length.
- Count number of words, character and lines in a sentence.
- Standard deviation ,Mean
- Fibonacci using Recursion.
- Swapping of numbers using Pointers.
- To prepare student Mark List using Structures.
- To prepare Electricity Bill using Files.

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** II

**Course :** Discrete Mathematics

**Course Type :** Allied Paper II

**Credits :** 5

**Contact Hours:** 5 hours/week

**Course Code :** MUBCA2

**CIA :** 25

**CE :** 75

### **Preamble**

This course helps the students to obtain the knowledge on Matrices, Polynomial equations, set theory, Relations and Graph Theory

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Recall the basic concepts of Mathematics.
- Impart and Comprehend different kinds of Matrices, Equations, Sets, Relations and Graphs.
- Solve the equations to find the roots
- Analyze the real world problems using Graph Theory

### **COURSE CONTENT**

#### **Unit - I:**

**Matrices:** Definition- Types of Matrices- Addition of Matrices-Subtraction of Matrices – Product of Matrices-Transpose of a matrix - Inverse of a matrix –Reciprocal Matrix – Rank of a Matrix.

#### **Unit - II:**

**Theory of Equations:** Nature of roots –Relation between the coefficients and the roots of an algebraic equation-Transformation of equations-Horner’s Method-Newton’s Method.

#### **Unit - III:**

**Set Theory:** Introduction-Basic concepts and Notations-Ordered pairs and Cartesian product-set operations

#### **Unit - IV:**

**Relations:** Introductions –Definition-Types of Relations-Some operations on relations – Composition of Relations –Properties of Relations-Equivalence classes-Partition of a set –Matrix representation of a relation.

#### **Unit - V:**

**Graph Theory:** Introduction- Definitions-Degree of a Vertex-Some special simple graphs-Matrix representation of graphs - Paths, Cycles and connectivity.

### **PRESCRIBED TEXT**



- 
- S.Narayanan ,R.Hanumantha Rao and T.K .Manickavasagam Pillay *Ancillary Mathematics* – *Volume I* Reprint 2015.(UNIT I,II)
  - T.Veerarajan *Discrete Mathematics* Reprint 2015 (**Rest of Units**).

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** II

**Course :** E-commerce

**Course Type :** Skill based Course II

**Credits :** 2

**Contact Hours:** 2 hours/week

**Course Code :** MUBCEC2

**CIA :** 25

**CE :** 75

### **Preamble**

This course helps the students to get the knowledge on electronic data interchange in E-commerce and protect the networks through Information Technology Act.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Recollect the concepts of e-commerce and its types EDI and e-security protection.
- Comprehend the role of EDI in current scenario.
- Deploy the types of firewalls for security in network.
- Categorize the e-commerce and apply in different e-commerce technologies.

### **COURSE CONTENT**

#### **Unit - I:**

An overview of E-Commerce- Definition of E-Commerce-Objects if E-Commerce-Factors promoting E-commerce-Advantages and Disadvantages of E-Commerce.

#### **Unit - II:**

Classification of E-Commerce-Business-to-Business E-Commerce:B2B, B2C,C2C,C2B,B2B-Impact of E-Commerce.

#### **Unit - III:**

Framework and Application of E-Commerce-Anatomy of E-Commerce-Supply Chain Management - Applications of E-Commerce Technologies.

#### **Unit - IV:**

Electronic Data Interchange(EDI)-Process of EDI-EDI components-Benefits of EDI-Value Added Networks-Internet based EDI.

#### **Unit - V:**

E-Security protection-Protecting the network –Firewalls-Types of Firewall-Cyber law-Cyber crime- The Information Technology Act 2000

### **PRESCRIBED TEXT**

- Abirami Devi and Alagammai , *E-Commerce* Margham Publications, Chennai.

### **REFERENCE BOOKS**

- Vijayalakshmi Sundaram, *E-Commerce* S.Madhubala and Company, Chennai.

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➤ C.S.Rayadu *E-Commerce* Himalaya Publishing House,New Delhi.

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## **SEMESTER - III**

**Programme :** BCA.,

**Semester:** III

**Course Type :** Core V

**Contact Hours:** 5 hours/week

**CIA :** 25

**Subject :** Computer Applications

**Course :** Object Oriented Programming  
with C++

**Credits :** 4

**Course Code :** MUBCC3

**CE :** 75

### **Preamble**

This course discuss OOPS concepts, it deals with I/O facilities, control structures and help the students to develop programming skills in writing simple programs.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Get an idea about object oriented paradigm with concepts of streams, classes, functions, data and objects and also recollect the concepts of files.
- Classify difference between object oriented programming and procedural oriented language and data types in C++.
- Apply dynamic memory management techniques using pointers, constructors, destructors, etc .,
- Acquire the concept of polymorphism and apply inheritance with the understanding of early and late binding.
- Validate the use of various OOPs concepts with the help of programs.

## **COURSE CONTENT**

### **Unit - I:**

**Principles of OOP:** OOP Paradigm – Basic Concepts of OOP – Benefits of OOP – Object Oriented Languages – Applications of OOP.

**Token, Expressions and Control Structures:** Introduction – Tokens - Keywords, - Identifiers and Constants – Data Types – Variables – Operators – Manipulators - Expressions - Control Structures in C++.

### **Unit - II:**

**Functions in C++:** Introduction - Main Function – Function Prototyping – Call by Reference –Return by Reference - Inline Functions - Function Overloading – Friend and Virtual Functions.

### **Unit - III:**

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Classes and Objects - Constructors and Destructors - Operator Overloading and Type Conversions.

**Unit - IV:**

**Inheritance:** Introduction - Single Inheritance – Multilevel Inheritance –Multiple Inheritance- Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes – Abstract Classes.

Pointers, Virtual Functions and Polymorphism - Managing Console I/O Operations

**Unit - V:**

**Working with Files** – Classes for File Stream Operations – Opening and Closing a File – Detecting end-of-file – File Pointers – Updating a File – Error handling During File Operations – Command Line Arguments.

**PRESCRIBED TEXT**

- E.Balagurusamy *Object Oriented Programming with C++*, Seventh Edition, Tata McGraw – Hill, New Delhi 2009.

**REFERENCE BOOK**

- Herbert schildt “*C++: The Complete Reference*”, Fourth Edition, McGraw – Hill Publications 2003.

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** III

**Course :** Data Structures

**Course Type :** Core VI

**Credits :** 4

**Contact Hours:** 6 hours/week

**Course Code :** MUBCC4

**CIA :** 25

**CE :** 75

### **Preamble**

This course gives knowledge on data, files, Arrays, Records and Pointers. It helps to understand Stack, Queue, Linked list and Trees

### **Course Outcomes**

On successful completion of the course, the students are able to

- Recognize fundamental concepts of Data structures, space complexity and time complexity.
- Understand linear data structures such as stacks, queues ,linked list and non linear data structures such as trees and Graphs.
- Apply appropriate data structure for a given application.
- Implement different searching and sorting techniques.
- Analyze efficient algorithms by acquiring knowledge about time and space complexities of the algorithms.

## **COURSE CONTENT**

### **Unit - I:**

**Introduction and Overview:** Introduction – Basic Terminology; Elementary Data organization – Data Structures-Data Structure Operations. Algorithms: Complexity - Time-space Tradeoff.

### **Unit - II:**

**Arrays, Records and Pointers:** Introduction – Linear Arrays – Representation of Linear Arrays in Memory – Representation of Linear Arrays in Memory – Traversing Linear Arrays – Inserting and deleting .Sorting :Bubble Sort – Searching : Linear Search – Binary Search.

### **Unit - III:**

**Linked Lists:** Introduction - Linked Lists –Representation of Linked List in Memory – Traversing a Linked Lists – searching a Linked List. Memory allocation: Garbage Collection – Insertion into a Linked List –Deletion from a Linked List – Header Linked List –Two way Lists.

### **Unit - IV:**

**Stacks, Queues:** Stacks – Array Representation of Stacks – Linked Representation of Stacks - Arithmetic expressions: Polish Notation – Queues – Linked Representation of Queues.

**Unit - V:**

**Trees:** Introduction – Binary Trees – Representing Binary Trees in Memory – Traversing Binary Trees – Traversal Algorithms using Stacks – Header Nodes: Threads – Binary Search Trees – Searching and Inserting in Binary Search Trees – Deleting in a Binary Search Tree.

**PRESCRIBED TEXT**

- Seymour Lipschutz *Data Structures* Revised First Edition – McGraw Hill Education Private Limited,2006.

**REFERENCE BOOK**

- Ellis Horowitz, Sartaj Sahini *Fundamentals of Data Structures* – Galgotia Publicaitons, 1998.

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**Programme :** BCA.,

**Semester:** III

**Course Type :** Core VII

**Contact Hours:** 5 hours/week

**CIA :** 40

**Subject :** Computer Applications

**Course :** Object Oriented Programming  
with C++

**Credits :** 4

**Course Code :** MUBCL3

**CE :** 60

### **Preamble**

This course provide understanding of classes, objects, constructors, destructors, and control structures.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Understand and Apply Object oriented features and C++ concepts.
- Practice to solve the real world problems
- Experiment various OOPS concepts using C++

## **COURSE CONTENT**

### **Program List**

- Print the Student Name, Register Number, Marks, Total and Average using Array Of Objects.
- Sum of the given numbers using Function Overloading
  - Two Integer Values
  - Three Integer Values
  - Two double Values
- Banking Operations using Constructors.
- Sum of the two values using '+' operator overloading using
  - Two integer values    b. Two floating values
- Find the Arithmetic operations using Inline function.
- Write a C++ program to apply single inheritance and assume the fields by your own.
- Write a C++ program to apply multiple inheritances and assume the fields by your own.
- Write a C++ program to apply the 'this' pointer to greatest age among them.
- Write a C++ program to apply run time polymorphism to display the book details.

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- Create a sequential file with fields with student name, register number C++ Mark, Maths mark, Science mark and write another program to access the file and calculate total mark, average and result.

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** III

**Course :** Office Automation and Tally

**Course Type :** Core VIII

**Credits :** 3

**Contact Hours:** 5 hours/week

**Course Code :** MUBCL4

**CIA :** 40

**CE :** 60

### **Preamble**

This course trains the students to acquire knowledge on Ms-Office and helps to create, alter and account entries in tally

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Practice MS-Office package and do the documentation, calculation, presentation and manipulating the tables.
- Get idea about creation and alteration of company profile and Balance sheet.
- Apply various accounting voucher entries.
- Acquire the knowledge in bank reconciliation statement preparation and stock summary

## **COURSE CONTENT**

### **Office Automation**

#### **Program List**

#### **1 Format the document using**

- i. Bulleted & Numbered List
- ii. Adding Headers and Footers
- iii. Find and Replace the word.

#### **2 Create a Business Letter using Mail Merge concept.**

#### **3 Create a document News Paper format in MS- word.**

#### **4 Create a worksheet to**

- i. Find, delete and add records,
- ii. Formatting columns, row height, merging, splitting columns.
- iii. Sort the contents in ascending and descending order

#### **5 Create the worksheet in MS-EXCEL to store the following information:**

**Reg. no, Name, Mark1 , Mark2, Mark3 , Total, Average**

- a) Using formula and function find the total, average, maximum, minimum and total marks
- b) Create the bar chart for average mark with proper title for axes, legend and gridlines.

- 6 Create, display and interact with data using Pivot Tables and Pivot Charts of excel feature.**
  
- 7 Create 3 slides for a Seminar Lecture on introduction to computer and do the following**
  - (a) Numbering the Slides
  - (b) Moving the Frames and Inserting Clipart
  - (c) Inserting New Slide
  - (d) Deleting Slide
  - (e) Copying a Slide.
  
- 8 Create 5 Slide presentation of your own and do the following**
  - (a) Inserting Pictures
  - (b) Copying picture form previous slide
  - (c) Copying text from previous slide

**TALLY****UNIT - I:**

Creation of Company-Alteration of company-Creation of ledger account-Group of accounting

**UNIT - II:**

Voucher entries – Purchase – Sales – Expenses – cash – journal.

**UNIT - III:**

Preparation of Balance Sheet-Profit and Loss Account - Trading account-Variou accounting statements – Alteration - Adjustment

**UNIT - IV:**

Stock maintenance - Stock entries-Stock registers - Purchase registers-Sales registers- Godown registers-Reorder level registers

**Program List**

- Company Creation & Accounts master creation
- Voucher Entry ( 2 Programs)
- Day Book preparation
- Preparation of Trial Balance
- Preparation of Final Accounts ( Profit & Loss A/c & Balance Sheet)
- Stock Group & Stock item creation
- Making voucher entries with Inventory details (3 programs)

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** III

**Course :** Business Accounting

**Course Type :** Allied Paper III

**Credits :** 5

**Contact Hours:** 5 hours/week

**Course Code :** MUBCA3

**CIA :** 25

**CE :** 75

### **Preamble**

This course provide the knowledge on basic Accounting Frame work and to understand the concepts and conventions of Accounting.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Understand the accounting concept, conversion, methods and its rules.
- Acquire knowledge for preparation of journal and Ledger.
- Summarize the ledger balance and check the arithmetical accuracy of books of accounts.
- Prepare financial statement of sole trading concern with accounting principles.

### **COURSE CONTENT**

#### **Unit - I:**

Accounting –Definition and functions-Accounting Conventions Concepts- System of Accounting – Rules of double – Entry System of Book Keeping- Preparation of Journal and Ledger Accounting

#### **Unit - II:**

Subsidiary books - Purchase book - sales book - Purchase return book - Sales return book – Bills payable, Bills receivable.

#### **Unit - III:**

Cash book – Single, Double, Triple column cash book.

#### **Unit - IV:**

Preparation of trial balance - Final accounting – trading, profit & Loss accounting of balance sheet with simple adjustments.

#### **Unit - V:**

Budget preparation of Cash Budget - Flexible budget.

### **PRESCRIBED TEXT**

- K.L.Nagarajan,N.Vinayakam,P.L.Mani, *Principles of Accountancy*, Eurasia PublicationHouse(Pvt)Ltd.,New Delhi.

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** III

**Course :** Human Rights

**Course Type :** Skill based course III

**Credits :** 2

**Contact Hours:** 2 hours/week

**Course Code :** MUBCHR3

**CIA :** 25

**CE :** 75

### **Preamble**

This course provides an introduction to basic human rights philosophy, principles and also an overview of current issues.

### **Course Outcome**

On successful completion of the course, the students are able to

- Know the basic rights and freedoms, regardless of their political, economical and cultural systems.
- Understand the importance and historical growth of the Human Rights
- Demonstrate the awareness of international context of human rights
- Categorize the modern issues regarding child and women.

### **COURSE CONTENT**

#### **Unit - I:**

Definition of Human Rights - Nature, Content, Legitimacy and Priority - Theories on Human Rights- Historical Development of Human Rights.

#### **Unit - II:**

International Human Rights - Prescription and Enforcement up to World War II - Human Rights and the U.N.O. - Universal Declaration of Human Rights - International Covenant on Civil and Political Rights - International Covenant on Economic, Social and Cultural Rights and Optional Protocol.

#### **Unit - III:**

Human Rights Declarations - U.N. Human Rights Declarations - U.N. Human Commissioner.

#### **Unit - IV:**

Amnesty International - Human Rights and Helsinki Process - Regional Developments - European Human Rights System - African Human Rights System - International Human Rights in Domestic courts.

#### **Unit – V:**

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Contemporary Issues on Human Rights: Children's Rights - Women's Rights -Dalit's Rights - Bonded Labour and Wages - Refugees - Capital Punishment. Fundamental Rights in the Indian Constitution - Directive Principles of State Policy -Fundamental Duties - National Human Rights Commission.

**PRESCRIBED TEXT**

- *International Bill of Human Rights*, Amnesty International Publication, 1988.

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** III

**Course :** Internet and its Applications

**Course Type :** Non Major Elective - I

**Credits :** 2

**Contact Hours:** 2 hours/week

**Course Code :** MUBCN1

**CIA :** 25

**CE :** 75

### **Preamble**

This course helps the students to use Internet and its applications.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Classify the types of networks and function of computers.
- Practice mailing in internet.
- Criticize the applications of internet.

## **COURSE CONTENT**

### **Unit - I:**

Introduction to Computers: Introduction – Types of Computer – Characteristics of Computers – Generation of Computers – Anatomy of a Digital Computer: Functions and Components of a Computer.

### **Unit - II:**

Computer Networks : Introduction – Types of Networks – Internet and World Wide Web: Introduction – What's special about internet – Web browsers – Searching the Web: Search Engine – Meta Search Engines.

### **Unit - III:**

E-Mail : Introduction – E-Mail Names and Address – Mailing Basics: Address Book – Signature – File Attachments – Setting Priority – Replaying and Forwarding E-Mail Messages – Spamming – E-Mail advantages.

### **Unit - IV:**

Internet Application : Computers in Business and Industry – Office Automation – People-Ergonomics – Office Automation Technologies – Office Automation Systems.

### **Unit - V:**

Computer In Education and Training – Computers in Entertainment, Science, Medicine and Engineering.



**PRESCRIBED TEXT**

- Alexis Leon and Mathews Leon, *Fundamentals of Information Technology* .

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## **SEMESTER - IV**

**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** IV

**Course :** Java Programming

**Course Type :** Core IX

**Credits :** 5

**Contact Hours:** 6 hours/week

**Course Code :** MUBCC5

**CIA :** 25

**CE :** 75

### **Preamble**

This course helps the students to inculcate knowledge on Concepts of Java Programming and to create wide range of Applications and Applets using Java.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Recollect the OOPs concepts such as Class, Inheritance, Encapsulation and Polymorphism
- Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Implement programs using more advanced features such as Interface, Packages and Multithreading
- Analyze differences between application program and applets, applet lifecycle and graphics programming
- Validate Java Programs using Stream Classes and files

### **COURSE CONTENT**

#### **Unit - I:**

**Fundamentals of Object Oriented Programming:** Introduction – Object Oriented Paradigm – Basic concepts of OOP – Benefits of OOP – Applications of OOP. Java Evolution.

**Overview of Java Language:** Introduction-Simple Java Program – Java Program Structure - Java Tokens - Java Statements - Implementing a Java Program - Java Virtual Machine - Command Line Arguments - Constants, Variables and Data Types.

#### **Unit - II:**

**Classes, Objects and Methods:** Introduction-Defining a Class- Static Members-Overriding Methods-Final Variables and Methods-Final Classes- Finalizer Methods-Abstract Methods and Classes –Visibility Control.

**Interfaces:** Introduction-Defining Interfaces-Extending Interfaces - Implementing Interfaces-Accessing Interface Variables.

#### **Unit - III:**

**Packages:** Java API Packages-Using System Packages-Creating Packages-Accessing a Package-Using a Package-Adding a Class to Package-Hiding Classes.

**Multithreading Programming:** Creating Threads - Extending the Thread Class-Stopping and Blocking a Thread - Life Cycle of a Thread-Thread Exceptions-Thread Priority-Synchronization-Implementing the 'Runnable' Interface - Managing Error and Exceptions.

**Unit - IV:**

**Applet Programming:** Introduction-Preparing to Write Applets-Applet Life Cycle-Designing a web page-Passing Parameters to Applets. Event Handling.

**Graphics Programming:** The Graphics Class-Lines and Rectangles-Circle and Ellipses-Drawing Arcs-Drawing Polygons-Line Graphs-Using Control Loops in Applets.

**Unit - V:**

**Managing Input/Output Files in Java:** Introduction - Concept of Streams - Stream Classes - Byte Stream Classes - Character Stream Classes - Input/Output Exceptions - Creation of Files - Reading/Writing Characters - Reading/Writing Bytes - Random Access Files.

**PRESCRIBED TEXT**

- E.Balagurusamy *Programming with JAVA* –, sixth Edition. Tata McGraw – Hill, New Delhi 2010.

**REFERENCE BOOK**

- Herbert Schildt *“Java 2: The Complete Reference”* , Fifth Edition, Tata McGraw – Hill 2002.

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** IV

**Course :** Operating System

**Course Type :** Core X

**Credits :** 5

**Contact Hours:** 6 hours/week

**Course Code :** MUBCC6

**CIA :** 25

**CE :** 75

### **Preamble**

This course learns the fundamental aspect of operating system and give sufficient knowledge on various system Resources.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Recollect the concept of fundamental aspect of operating system
- Understand the concept of scheduling algorithms, Deadlock, process management and memory management
- Sketch the Threats , Memory management and production policies
- Acquire the knowledge about file management

### **COURSE CONTENT**

#### **Unit - I:**

**Introduction:** What is an Operating System – Mainframe Systems – Distributed Systems

**Processes:** Process Concept – Process Scheduling – Interprocess Communication.

#### **Unit - II:**

**Threads:** Overview – Multithreading Models. **CPU Scheduling:** Basic Concepts – Scheduling Criteria – Scheduling Algorithms.

#### **Unit - III:**

**Process Synchronization:** Background – The Critical Section Problem – Synchronization Hardware – Semaphores.

**Deadlock:** System Model – Deadlock Characterization – Methods For Handling Deadlocks – Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from deadlock

#### **Unit - IV:**

**Memory Management:** Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging – Virtual Memory: Demand Paging

#### **Unit - V:**

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**Security:** User Authentication – Cryptography

**File System Interface:** File Concept – File Access Methods – Directory Structure.

**PRESCRIBED TEXT**

- Silberschatz , Galvin, Gagne *Operating Systems Concepts –*, Sixth Edition, John Wiley & Sons, Inc.

**REFERENCE BOOK**

- Milan Milenkovic *Operating Systems (Concepts and Design)*, Second Edition, Tata McGraw -Hill

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** IV

**Course :** Web Technology

**Course Type :** Core XI

**Credits :** 3

**Contact Hours:** 5 hours/week

**Course Code :** MUBCL5

**CIA :** 40

**CE :** 60

### **Preamble**

This course helps the students to learn JSP, PHP and Java script and to create a dynamic webpage.

### **Course Outcomes**

On successful completion of the course, the student will be able to

- Discuss the core concepts of web programming such as Java script, JSP and PHP.
- Design interactive web pages using Java Script.
- Validate server side scripting using JSP and PHP

### **COURSE CONTENT**

#### **Program List:**

- Design a web page using CSS
- Prepare a resume using forms
- Website Design for a Department (or) College (or) Company etc.
- Java Script for a Mathematical Calculator
- Java Script – Number Puzzle
- Java script-Games using Random number generation
- Validation of name, mobile number, date of birth, email id using Java Script
- Online Quiz using JSP
- Perform Arithmetic operations using JSP
- Generate Fibonacci series using PHP
- PHP program to check whether the given number is prime or not
- Online ticket booking using PHP

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** IV

**Course :** Java Programming

**Course Type :** Core XII

**Credits :** 3

**Contact Hours:** 5 hours/week

**Course Code :** MUBCL6

**CIA :** 40

**CE :** 60

### **Preamble**

This course helps the students to inculcate knowledge on Concepts of Java Programming and to create wide range of Applications and Applets using Java.

### **Course Outcomes**

On successful completion of the course, the student will be able to

- Sketch the Oops concepts and gain the knowledge of Java and Applet
- Implement core java concepts.
- Create simple stand alone application using Core Java and remote applications using Applet

## **COURSE CONTENT**

### **PROGRAMMING LIST**

- To perform addition of complex numbers using class and objects.
- To perform multiplication of matrices using class and objects.
- To perform volume calculation using method overloading.
- Using command line arguments, test if the given string is palindrome or not.
- Using multilevel inheritance process student marks.
- Implement multiple inheritance for payroll processing.
- Package illustration.
- To illustrate built-in exceptions (any four).
- To create multiple threads
  - Using Thread class
  - Using Runnable interface
- String manipulation using string methods.
- Applet – Graphical methods.

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**Programme :** BCA.,

**Semester:** IV

**Course Type :** Allied Paper – IV

**Contact Hours:** 6 hours/week

**CIA :** 25

**Subject :** Computer Applications

**Course :** Resource Management  
Techniques

**Credits :** 5

**Course Code :** MUBCA4

**CE :** 75

### **Preamble**

This course gives basic ideas about operation Research and solve the LPPs using various methods of operation Research.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Recall and describe the concept of Operation Research .
- Apply transportation and assignment problem to allocate resources
- Acquire the knowledge about game theory
- Validate network scheduling by PERT and CPM

### **COURSE CONTENT**

#### **Unit - I:**

Operation Research: Introduction – Origin and development – Nature and features – Modeling – Advantages and Limitations of Models – Applications of Operation Research.

#### **Unit - II:**

Linear Programming Problem: Mathematical Formulation - Graphical Solution Method: Exceptional Cases – Canonical and Standard forms of LPP. Simplex methods (Excluding Non standard LPPs)optimal solutions.

#### **Unit - III:**

Transportation problem : Introduction – LP Formulation of the Transportation Problem- Solution of a TP – Finding an I.B.F.S – Test for Optimality - Degeneracy in TP – MODI Method .

Assignment Problem: Mathematical Formulation of the problem – Solution methods of AP – Special cases in AP – Travelling Salesman Problem.

#### **Unit - IV:**

Game Theory –Maximin and Minimax principles –Mixed strategy – Dominance property- Graphical method – Simplex method..

**Unit - V:**

Network Scheduling by PERT / CPM : Introduction – Network – Logical Sequencing – Rules of Network Construction - Critical Path Analysis – Probability considerations in PERT – Distinction between PERT and CPM.

**PRESCRIBED TEXT**

- kanti swarup P.K Gupta, Manmohan sultan chand & sons “*Operations Research*”, Newdelhi

**REFERENCE BOOKS**

- P.K. Gupta & D.S. Hira, chand & sons *Introduction to operations research* , Newdelhi
- Ganapathy *Resource management techniques*.
- Arumugam *Linear Programming*, New Gamma Publishing House, Palayamkottai

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** IV

**Course :** Numerical Aptitude

**Course Type :** Skilled Based Course IV

**Credits :** 2

**Contact Hours:** 2 hours/week

**Course Code :** MUBCNA4

**CIA :** 25

**CE :** 75

### **Preamble**

This course helps the students to improve their employability skills.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Recollect and describe the basic concepts of logical reasoning
- Discuss problem solving and reasoning ability.
- Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.
- Critically evaluate various real life situations by resorting to analysis of key issues and factors.

### **COURSE CONTENT**

#### **Unit - I:**

Operations on Numbers – H.C.F & L.C.M of Numbers (Solved Examples ).

#### **Unit - II:**

Problems on Numbers- Problems on Ages — Problems on Trains(Solved Examples )

#### **Unit - III:**

Percentage – Profit & Loss – Ratio & Proposition(Solved Examples ).

#### **Unit - IV:**

Time & Work –Time & Distance(Solved Examples )

#### **Unit - V:**

Simple Interest-Compound Interest-Permutations & Combinations

### **PRESCRIBED TEXT**

- R.S.AGGARWAL *Quantitative Aptitude for Competitive Examination*, Revised Edition

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## **SEMESTER V**

**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** V

**Course :** Relational Database Management  
System

**Course Type :** Core XIII

**Credits :** 5

**Contact Hours:** 5 hours/week

**Course Code :** MUBCC7

**CIA :** 25

**CE :** 75

### **Preamble**

This course facilitate the students to know the Core concepts of RDBMS and helps the students to create and connect the multiple tables and to have knowledge on Normalization Techniques.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Remember and understand the basic concepts and applications of database system
- Get the idea about various data models which describes the structure of database
- Design principles using ER models and Normalization approach
- Interpret SQL interface of a RDBMS package to create, secure, maintain and query a database and PL/SQL programming using Triggers and Cursors

## **COURSE CONTENT**

### **Unit - I:**

**Introduction:** Database System Applications – Purpose of Database Systems – View of Data – Database Languages – Transaction Management – Database users and Administrators – Overall System Structure.

### **Unit - II:**

**Relational Model:** Entity – Relationship Model: Basic Concepts – Design Issues – Mapping cardinalities – Keys – E – R Diagrams – Weak entity sets – Extended E – R feature

### **Unit - III:**

**Data Normalization:** Pitfalls in Relational Database Design- Entity – Decomposition – Functional Dependencies – Normalization – First Normal Form – Second Normal Form – Third Normal Form – Boyce – Codd Normal Form – Fourth Normal Form – Fifth Normal Form – Denormalization

### **Unit - IV:**

**PL/SQL: A Programming Language:** History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators.

**Control Structures and Embedded SQL:** Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control statements.

**Unit - V:**

**PL/SQL Cursors and Exceptions:** Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT...FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions (Predefined Oracle Server Exceptions, User Defined Exceptions).

**PL/SQL Composite Data Types:** Records – Tables – Varrays . **Named Blocks:** Triggers

**PRESCRIBED TEXT**

- Abraham Silberschatz, Henry F.Korth, S.Sudarshan *Database System Concepts*, TMH 5th Edition (*UNIT s – I, II,III- Chapter – 7(7.1,7.2,7.3)*)
- Alexis Leon, Mathews Leon , Lieon Vikas *Database Management Systems (UNIT – III – Chapter -11)*
- Nilesh Shah *Database Systems Using Oracle*, 2nd edition, PHI.  
(*UNIT – IV: Chapters 10 & 11 UNIT – V: Chapters 12, 13 & 14*)

**REFERENCE BOOK**

- Gerald V. Post *Database Management Systems*, 3<sup>rd</sup> Edition, TMH.

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** V

**Course :** Dot Net Programming

**Course Type :** Core XIV

**Credits :** 3

**Contact Hours:** 6 hours/week

**Course Code :** MUBCL7

**CIA :** 40

**CE :** 60

### **Preamble**

This course helps the students to acquire the knowledge on .NET framework and to develop web based and application based software.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Demonstrate the database connectivity with application programming.
- Design and execute different kinds of tasks in real time application.
- Validate the results for the given input data.

### **COURSE CONTENT**

#### **Program List:**

- Write a program to find a grade of students.
- Write a program to find factorial of given number using functions.
- Write a program to arrange names in alphabetical order.
- Write a program to display the user information.(personal details)
- Calculator.
- Notepad
- Employee Details.
- Hospital Management system.
- Sales Transaction System.
- News Paper Vendor Details

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** V

**Course :** Relational Database Management  
System

**Course Type :** Core XV

**Credits :** 3

**Contact Hours:** 5 hours/week

**Course Code :** MUBCL8

**CIA :** 40

**CE :** 60

### **Preamble**

This course facilitate the students to know the Core concepts of RDBMS and helps the students to create and connect the multiple tables and to have knowledge on Normalization Techniques.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Apply constraints in tables
- Figure out the need and use of database in application development
- Evaluate the concepts of triggers and cursors.

### **COURSE CONTENT**

#### **Program List**

- DDL, DML, DCL Commands
- Logical, Comparison, Conjunctive & Arithmetic Operators.
- **Retrieving rows with Characters functions:**
  - CONCAT (Concatenation)
  - REPLACE
  - SUBSTR (Substring)
  - LENGTH
- **Retrieving rows with Aggregate functions:**
  - GROUP BY
  - HAVING
- **Retrieving rows with date functions & number function:**
  - SYSDATE
  - ABS, FLOOR, CEIL, ROUND, POWER
- **JOINS:**
  - Union, Intersection & Union all
  - Simple Join
  - Self-Join
  - Outer Join



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- **CONSTRAINTS:**
    - Domain Integrity (Not Null, Check)
    - Entity Integrity (Unique & Primary Key)
    - Referential Integrity (Foreign Key)
  - **VIEW: PL/SQL**
  - PL/SQL Programs with Control Structures
  - PL/SQL Programs with Exception Handling
  - PL/SQL Programs with Cursors
  - Creating & Calling Procedures

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** V

**Course :** Software Engineering

**Course Type :** Elective 1.1

**Credits :** 5

**Contact Hours:** 6 hours/week

**Course Code :** MUBCE1

**CIA :** 25

**CE :** 75

### **Preamble**

This course imparts the skills of developing software for various applications and systems. It discusses the various software development life cycle models and testing methodologies.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Remember and Understand the stages of software development life cycle
- Examine various Software development life cycle models
- Analyze the role of project management including requirement gathering, planning, designing and maintenance
- Evaluate various testing principles on software project for risk management

### **COURSE CONTENT**

#### **Unit - I:**

The Evolving Role of Software – Definition of Software Engineering – The Changing Nature of Software – Software Myths – Terminologies – Software Life Cycle Models: Build and Fix Model – Evolutionary Process Models – Selection of a Life Cycle Model.

#### **Unit - II:**

**Requirements:** Analysis and Specifications: Type of Requirements – Feasibility Studies – Requirement Elicitation: interviews, brain storming sessions, FAST – Requirement analysis: Data flow diagram, Data Dictionaries - Requirements Validation

#### **Unit - III:**

**Project Planning:** Size Estimation – The Constructive Cost Model (COCOMO) – The Putnam Resource Allocation Model.

#### **Unit - IV:**

**Software Design:** Design: Conceptual and Technical designs, Objectives of design – Modularity - Function Oriented Design – Software reliability: Basic concepts, software reliability, maturity levels - **Software Testing:** A Strategic Approach to Software Testing – Testing – Functional Testing – Structural Testing – Levels of Testing – Validation Testing.

**Unit - V:**

**Software Maintenance:** Categories of Maintenance – Problems during Maintenance – Maintenance is Manageable – Potential Solutions to maintenance problems – Maintenance process – Estimation of maintenance cost

**PRESCRIBED TEXT**

- K.K.Agarwal, “*Software Engineering*”, Third Edition 2008

**REFERENCE BOOK**

- Richard e.Fairley, “*Software Engineering Concepts*”, McGrawHill,

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** V

**Course :** Cloud Computing

**Course Type :** Elective 1.2

**Credits :** 5

**Contact Hours:** 6 hours/week

**Course Code :** MUBCE1

**CIA :** 25

**CE :** 75

### **Preamble**

This course enables the students to learn and understand the fundamental concepts of Cloud and its services, and helps the students to understand the service oriented architecture in cloud database.

### **Course Outcomes**

On successful completion of the course, the student will be able to

- Define cloud computing and get the idea about cloud architecture
- Understand different cloud services
- Interpret Cloud Services ,security, and architecture
- Examine cloud mail services

### **COURSE CONTENT**

#### **Unit - I:**

Introduction – Definition of Cloud – Cloud types – Characteristics of Cloud – Cloud standards – Measuring cloud's value – Early adopters and new applications - Laws of cloudonomics – Cloud obstacles – Cloud adoption – Cloud computing costs – Service level agreements – Licensing model - Cloud architecture: Cloud computing stack – Composability – Infrastructure – Platforms – Virtual appliances – Communication protocol – Applications – Connecting to cloud.

#### **Unit - II:**

Cloud Services: IaaS – PaaS – SaaS – IaaS – CaaS - Abstraction and Virtualization: Virtualization technologies – Load balancing – Hypervisors – Machine imaging – Porting applications – Capacity planning: Baseline and Metrics – Measurements – System metrics – Load testing – Resource ceilings – Servers and Instance types – Network Capacity – Scaling

#### **Unit - III:**

Exploring Platform as a Service (PaaS) : Service model – Development – Sites and tools – Application features - Exploring Cloud Infrastructures: Administrating the clouds – Management responsibilities – Life cycle management - Cloud management products – Cloud management standards – Cloud Security: Securing the Cloud – Securing the Data – Establishing identity and presence

**Unit - IV:**

Service oriented architecture – Introduction – SOA communications – Managing and Monitoring SOA – Relating SOA and Cloud - Applications to the cloud : Functionality mapping – Applications attributes – Cloud service attributes – System abstraction – Cloud bursting – Applications and Cloud APIs – Cloud Storage: Measuring digital universe – Provisioning cloud storage – Cloud backup solutions – Cloud storage interoperability.

**Unit - V:**

Exploring cloud mail service – Syndicate services – Instant messaging – Collaboration technologies using social networking – Audio and Video streaming – VoIP applications – Mobile market – Smart phones with the cloud - Mobile Web service : Service types – Service discovery – SMS – Protocols – Synchronization

**PRESCRIBED TEXT**

- Barrie Sosinsky, *Cloud Computing Bible*, Wiley Publications, 2011 (Unit I to V)

**REFERENCE BOOKS**

- Rountree, Castrillo, *The Basics of Cloud Computing - Understanding the Fundamentals of Cloud Computing in Theory and Practice*, First Edition, Syngress Publication, 2013
- Michael Miller, *Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online*, Que Publishing, 2008
- Srinivasan. S, *Cloud Computing Basics*, Springer, 2013

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** V

**Course :** PC Maintenance and Trouble  
Shooting

**Course Type :** Elective 1.3

**Credits :** 5

**Contact Hours:** 6 hours/week

**Course Code :** MUBCE1

**CIA :** 25

**CE :** 75

### **Preamble**

This course Facilitate the students to know the peripheral of computer and helps to do simple trouble shooting techniques.

### **Course Outcomes**

On successful completion of the course, the student will be able to

- Keep in mind the peripherals, processors, configuration and trouble shoot the problem to the system.
- Get an idea of installation, working principle and maintenance of secondary storage device.
- Deploy the different kinds of equipment for diagnose the problem and trouble shoot it.
- Acquire the knowledge on servicing the switches, cables and connectors.

### **COURSE CONTENT**

#### **Unit - I:**

The Basic Microcomputer System – Processor subsystem – 8086 processor – clock generator 8284 - Bus subsystem Bus controller 8288 – Latch 74LS373 – Transceiver 74LS245 – Memory subsystems – Decoder 74LS138 – DMA Controller 8237 – I/O subsystem – PPI 8255 – PIC 8259 – PIT 8253 – Tips and Trouble Shootings.

#### **Unit - II:**

Inside the IBM PC system unit - power supply - cabling and connectors - system board functions – system configuration.

#### **Unit - III:**

Peripherals – Memory peripherals - Floppy disk drive – working principle – Removal and Installation – Cleaning and preventive maintenance – Floppy disk format – Winchester disk - CRT working principle – IBM PC display adapter – printers – interface standards – Modems and Acoustic couplers – Trouble shooting keyboards.

#### **Unit - IV:**

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Servicing – Switch Settings – Cables and connectors – Operation – post – preventive maintenance.

**Unit - V:**

Diagnostics and Trouble shooting – Test equipment – Login problem – oscilloscope.

**PRESCRIBED TEXT**

- Stuert M.Asser. Vincent J.Stlgliano, Richard F.Bahrenburg, “*Microcomputer servicing practical system and Trouble Shooting*”, A Bell & Howell Information Company Columbus, 1990.

**REFERENCE BOOK**

- B.Govindrajalu , *IBM PC & CLONES*, Tata McGrawhill Publishers, IBM PC & CLONES

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** V

**Course :** Organizational Behaviour

**Course Type :** Elective 2.1

**Credits :** 5

**Contact Hours:** 6 hours/week

**Course Code :** MUBCE2

**CIA :** 25

**CE :** 75

### **Preamble**

This course provides the students to develop the personalities, attitudes and resolve the conflicts in organization.

### **Course Outcomes**

On the successful completion of the course, the students able to

- Remember the organizational behaviours like attitudes, personality and communication.
- Understand the learning principles, motivation theories and organizational conflicts.
- Deploy the stress management by avoiding job frustration.
- Acquire the knowledge on resolve the conflicts by efficient communication

### **COURSE CONTENT**

#### **Unit - I:**

Introduction: Elements of OB – Nature and Scope of OB - Contributing Disciplines to OB.

Organisational Behaviour in Historical Perspective - Foundations of Individual Behaviour:

Introduction – The Individual and Individual Differences – Human Behaviour and its Causation.

#### **Unit - II:**

Personality – Perception - Attitudes: Concept of Attitudes – Formation of Attitudes – Types of Attitudes – Measurement of Attitude – Change of Attitude. Values: Concept of Value – Types of Values – Formation of Values – Values and Behaviour Job Satisfaction.

#### **Unit - III:**

Learning: Meaning and Definition – Determinants of Learning – Learning Theories – Learning Principles – Reinforcement – Punishment – Learning and Behaviour. Motivation: Concepts – Meaning of Motivation – Nature of Motivation – Motivation Cycle or Process – Need for Motivation – Theories of Motivation – Motivation and morale. Group Behaviour.

#### **Unit - IV:**



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Organisational Conflicts: Definition of Conflict – Organisational Sources of Conflict – Types of Conflicts – Aspects of Conflicts – Functional Conflict – Dysfunctional Conflict – Conflict Process – Conflict Management. Job Frustration - Stress Management.

**Unit - V:**

Communication Channel – Communication Networks – Communication Barriers – Effective Communication. Leadership - Organisational Structure – Organisational culture

**PRESCRIBED TEXT**

- S.S Khanka, “*Organizational Behaviour*”, S.Chand & Company Ltd, 2002 (Unit 1 to 5).

**REFERENCE BOOKS**

- John W Newstorm and Keith Davis – “*Organizational Behaviour*” – TMH, 2001.
- Hugh J Arnold and Daniel C Fieldman – “*Organizational Behaviour*” MC Graw Hill, 1996.

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** V

**Course :** Information Security

**Course Type :** Elective 2.2

**Credits :** 5

**Contact Hours:** 6 hours/week

**Course Code :** MUBCE2

**CIA :** 25

**CE :** 75

### **Preamble**

This Course enables the student to understand various methodology available for securing information and to learn about various Security Models.

### **Course Outcomes**

On successful completion of the course, the student will be able to

- Get an idea about Information Security Basis, Security Investigation, Security Analysis, Security Models and Security Physical Design
- Understand Security Investigation and Security Analysis
- Analyze Security Models
- Figure out the physical design of the security.

### **COURSE CONTENT**

#### **Unit - I:**

Information Security Basics: INTRODUCTION -History, What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC

#### **Unit - II:**

Security Investigation :SECURITY INVESTIGATION - Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues.

#### **Unit - III:**

Security Analysis :SECURITY ANALYSIS-Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk.

#### **Unit - IV:**

Security Models :LOGICAL DESIGN-Blueprint for Security, Information Security Policy, Standards and Practices, ISO 17799/BS 7799, NIST Models, VISA International Security Model, Design of Security Architecture, Planning for Continuity.

#### **Unit - V:**

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Security Physical Design :PHYSICAL DESIGN-Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control Devices, Physical Security, Security and Personnel.

**PRESCRIBED TEXT**

- Michael E Whitman and Herbert J Mattord, "*Principles of Information Security*", Vikas Publishing House, New Delhi, 2003

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** V

**Course :** Big Data Analytics

**Course Type :** Elective 2.3

**Credits :** 5

**Contact Hours:** 6 hours/week

**Course Code :** MUBCE2

**CIA :** 25

**CE :** 75

### **Preamble**

This course offers knowledge about concepts and challenge of big data. It also the helps students to acquire knowledge about Hadoop, MapReduce, Pig and Hive technology.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Recall and Understand the concept of Big data techniques, environment, framework and Hadoop ecosystem
- Apply Statistical data analysis and tools to manage and analyze the big data
- Analyze Hadoop components and their uses for big data processing
- Examine the impact of big data for business decisions and strategy
- Manage large-scale analytics tools to solve some open big data problems

### **COURSE CONTENT**

#### **Unit - I:**

**INTRODUCTION TO BIG DATA:** Introduction to Big Data Platform – Challenges of Conventional Systems - Intelligent data analysis Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools

#### **Unit - II:**

**STATISTICAL DATA ANALYSIS:** Parameter and Statistic- Sampling Distribution- Meaning-Standard Error and its uses - Tests of Significance- Null and Alternative Hypotheses - Type-I and Type-II Error- Critical Region and Level of Significance - One tailed and Two tailed Tests. Critical values or Significant values - Tests of Significance for Large Samples - Test of Significance for Single Proportion - Test of Significance for Difference of Proportions-Test of Significance for Single Mean- Test of Significance for Difference of Means - Chi-Square Distribution – Definition- Applications of Chi-Square Distribution -To test the goodness of fit.- To test the independence of Attributes - Student's" t" - Distribution-Definition- Applications of Student's "t" –Distribution- To test for Single Mean- To test for Difference of Means- Paired t-test for Difference of Means F-Distribution- Definition- To Test for Equality of Two Population

variances - Meaning of Resampling and its uses. Basic ideas of Randomization, Exact Test, Cross Validation Jackknife and Bootstrap. Prediction Error and its uses.

### **Unit - III:**

**HADOOP:** History of Hadoop- The Hadoop Distributed File System – Components of Hadoop-Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFS- How MapReduce Works-Anatomy of a MapReduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution – MapReduce Features

### **Unit - IV:**

**HADOOP ENVIRONMENT:** Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance

### **Unit - V:**

**FRAMEWORKS:** Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper.

### **PRESCRIBED TEXT**

- Michael Berthold, David J. Hand, (2007), “*Intelligent Data Analysis*”, Springer.  
(For Unit I to III)
- Tom White (2012), “*Hadoop:The Definitive Guide*” Third Edition, O’reilly Media (For Unit IV to V)

### **REFERENCE BOOKS**

- Anand Rajaraman and Jeffrey David Ullman, (2012), “*Mining of Massive Datasets*”, Cambridge University Press.
- Viktor Mayer, Schonberger, Kenneth Cukier,(2013), “*Big Data : A Revolution That Will Transform How We Live, Work and Think*”, Houghton Mifflin Harcourt publishing company.

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** V

**Course :** Open Source Technology

**Course Type :** Skill based course V

**Credits :** 2

**Contact Hours:** 2 hours/week

**Course Code :** MUBCOS5

**CIA :** 25

**CE :** 75

### **Preamble**

This course helps the students to acquire knowledge on open source software and to create interactive web platform applications.

### **Course Outcomes**

On successful completion of the course, the student will be able to

- Recall and describe the concepts of Open Source, Linux, Apache Web server and web browser
- Demonstrate the basics of Open Source Software
- Examine and design various applications using Open Source Software

### **COURSE CONTENT**

#### **Unit - I:**

**OPEN SOURCE:** Introduction - Open Source – Open Source vs. Commercial Software .

#### **Unit - II:**

**LINUX:** What is Linux? - Free Software – Where I can use Linux? Linux Kernel – Linux Distributions - Linux Essential Commands – File system Concept – Standard Files –The Linux Security Model – Vi Editor – Partitions Creation.

#### **Unit - III:**

Shell Introduction – String Processing –Investigation and Managing Processes – Network Clients – Installing Application

#### **Unit - IV:**

**Web Browsers : Mozilla Firefox** – Introduction - Browsing with Tab - Create, close, and select tabs - Customization - Multiple home pages - Bookmark Groups - Searching and finding within documents - Quick searches and keywords - Find Toolbar-Plug-ins -What is a Plugin?- Available Plugins .- Uninstalling Plugins .

#### **Unit - V:**

**Apache Web Server :** : Introduction - Starting, Stopping, and Restarting Apache - Configuration - Securing Apache - Create the Web Site - Apache Log Files

### **PRESCRIBED TEXT**

- 
- James Lee and Brent Ware, “*Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP*”, Dorling Kindersley(India) Pvt. Ltd, 2008
  - [https://upload.wikimedia.org/wikipedia/commons/5/5c/Using\\_Firefox.pdf](https://upload.wikimedia.org/wikipedia/commons/5/5c/Using_Firefox.pdf)-Unit-IV

#### **REFERENCE BOOKS**

- Eric Resebrook, Eric Filson, “*Setting Up LAMP: Getting Linux, Apache, MySQL, and PHP and Working Together*”, Published by John Wiley and Sons, 2004.
- J. Jaworski, *Mastering Javascript*, BPB Publications, 1999 5. T. A. Powell, *Complete Reference HTML* (Third Edition),TMH, 2002
- Ivon Bayross , “*Teach yourself Web Technologies*”, BPB publications.

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# **SEMESTER VI**



**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** VI

**Course :** Data Communication and  
Networks

**Course Type :** Core XVI

**Credits :** 5

**Contact Hours:** 6 hours/week

**Course Code :** MUBCC8

**CIA :** 25

**CE :** 75

### **Preamble**

This Course imparts knowledge on network concepts like layers wireless concepts, transmission and security .It gives knowledge on networking technologies like broadband and Bluetooth.

### **Course Outcomes**

On successful completion of the course, the student will be able to

- Recall the networking concepts, Transmission media and OSI layers of Network
- Compare OSI & TCP/IP models.
- Deploy the Internetworking devices.
- Review transport service and Transmission control protocol like DNS, Email.

### **COURSE CONTENT**

#### **Unit - I:**

**Introduction to Data Communications and Networking:** Data Communications- Protocols - Analog and Digital Signals. Analog and Digital Transmission Methods – Modes of Data Transmission and Multiplexing.

#### **Unit - II:**

**Transmission Errors:** Detection and Correction. **Transmission Media:** Guided Media, Unguided Media. **Network Topologies:** Mesh, Star, Tree, Ring, Bus. Switching Basics- Circuit switching - Packet switching - Message switching - Router and Routing.

#### **Unit - III:**

**Network Protocols and OSI Model:** OSI layer Functions. Local Area Networks (LAN), Metropolitan Area Networks (MAN) and Wide Area Networks (WAN) – Integrated Services Digital Network (ISDN) – Frame Relay.

#### **Unit - IV:**

**Internetworking Concepts, Devices, Internet Basics, History and Architecture:** Internetworking Devices, Repeaters, Bridges, Routers and Gateways.

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**An Introduction to TCP / IP, IP:** TCP/IP Basics, TCP/IP Example, The concept of IP Address.

**Unit - V:**

**TCP/IP Part II:** User Datagram Protocol (UDP) - UDP Packet, Difference between UDP and TCP – Domain Name System (DNS) – Electronic Mail (Email) – Introduction – E-Mail Transfer protocols – MIME

**PRESCRIBED TEXT**

- Achyut S.Godbole, (2010), “*Data Communications and Networks*”, Tata McGraw-Hill Publishing Company Limited, ISBN-13: 978-0-07-047297.

**REFERENCE BOOKS**

- Behrouz A. Forouzan, (2007), “*Data Communications and Networking*”, 2nd Edition TataMcGraw-Hill Publishing Company Limited, ISBN-13: 9780070499355.
- Andrew S. Tanenbaum, (2002), “*Computer Networks*”, 4thEdition, Prentice Hall, ISBN-13:978817781652.

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** VI

**Course :** Computer Graphics

**Course Type :** Core XVII

**Credits :** 4

**Contact Hours:** 5 hours/week

**Course Code :** MUBCC9

**CIA :** 25

**CE :** 75

### **Preamble**

This course offers Concepts on basic Graphical Techniques and learn 2D and 3D Transformations.

### **Course Outcomes**

On the successful completion of the course, the students will be able to

- List the display devices and recognize the Viewing and clipping algorithms.
- Comprehend the attributes of output primitives and geometric Transformation.
- Demonstrate the algorithms for drawing lines & circle.
- Analyze the 2D and 3D viewing and clipping algorithms.

### **COURSE CONTENT**

#### **Unit - I:**

**Video Display Devices:** Refresh Cathode Ray tubes – Raster Scan Displays – Random Scan displays – Color CRT Monitors – Raster Scan System – Random Scan System.

#### **Unit - II:**

**Output Primitives:** Points and Lines – Line –Drawing Algorithms – Loading frame Buffer – Line function – Circle – Generating Algorithms.

#### **Unit - III:**

**Attributes of Output Primitives:** Line Attributes – Curve Attributes – Color and Grayscale Levels – Area – Fill Attributes – Character Attributes.

#### **Unit - IV:**

**Geometric Transformations:** Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations

#### **Unit - V:**

**Viewing:** The Viewing Pipeline – Viewing Co – ordinate Reference Frame – Window – to – Viewport Co – ordinate Transformation – 2D Viewing Functions – **Clipping Operations :**Point Clipping – Line Clipping : Cohen – Sutherland Line Clipping ,Liang – Barsky Line Clipping – Curve Clipping – Text Clipping.

### **PRESCRIBED TEXT**

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➤ M.Pauline Baker , *Computer Graphics* – Donald Hearn, 2<sup>nd</sup> Edition

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** VI

**Course :** Project Work

**Course Type :** Core XVIII

**Credits :** 5

**Contact Hours:** 7 hours/week

**Course Code :** MUBCPR

**CIA :** 40

**CE :** 60

### **Preamble**

This course motivates the students to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

### **Course Outcomes**

On successful completion of the course the students will be able

- To understand the problem.
- To implement & execute the real time application.
- To analyze various testing methods.
- To verify the expected results in real time applications.

### **COURSE CONTENT**

The project is of 7 hours/week for one (semester VI) semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:

- ***Title***
- ***Objectives***
- ***Details of modules and process logic***
- ***Limitations of the project***
- ***Tools/Platforms, Languages to be used***
- ***Sample Coding and Screenshots***
- ***Conclusion***

For the project work, the guide (internal) evaluate the work for 40 marks based on the performance of the candidates during the development of the project and the external examiner will evaluate the project work for 60 marks.

The Project work should be either an individual one or group of not more than two members

**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** VI

**Course :** Data Mining and Warehousing

**Course Type :** Elective 3.1

**Credits :** 5

**Contact Hours:** 6 hours/week

**Course Code :** MUBCE3

**CIA :** 25

**CE :** 75

### **Preamble**

This course provides the fundamentals of data warehousing, Data mining Concepts and Data Mining Techniques.

### **Course Outcomes**

On successful completion of the course the students will be able to

- Understand the basic concepts of data mining and data warehousing.
- Analyze various data mining techniques like classifications, clustering, association rule mining, prediction and related algorithm.
- Choose appropriate data mining techniques to carry out simple data mining task.
- Develop data mining algorithm to store heterogeneous data.

### **COURSE CONTENT**

#### **Unit - I:**

**Data Warehousing:** Introduction – Definition – Multidimensional Data Model - OLAP Operations – Warehouse Schema – Data warehousing Architecture – Metadata – OLAP Engine - Data Warehouse Backend Process.

#### **Unit - II:**

**Data Mining:** Definition – Comparison with other fields – DM Techniques – Issues Application Areas.

#### **Unit - III:**

**Association Rules:** Methods – A Priori algorithm – Partition Algorithm – Pincer-Search Algorithm – Border Algorithm – Generalized Association Rules with Item constraints.

#### **Unit - IV:**

**Clustering Techniques:** Clustering Paradigms – Partitioning Algorithms – CLARA – CLARANS- Hierarchical Clustering – DBSCAN – Categorical Clustering Algorithms – STIRR.  
**Decision Trees:** Tree Construction Principle – Best Split – Splitting Indices – Splitting Criteria CART – ID3.

#### **Unit - V:**

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**Web Mining:** Introduction – Web Content Mining – Web Structure Mining – Web Usage Mining – Text Mining – Hierarchy of Categories – Text Clustering.

**PRESCRIBED TEXT**

- Arun K. Pujari , *Data Mining Techniques* – Universities Press – 2001.

**REFERENCE BOOKS:**

- Jewie Han, Michelins Kamber, “*Data Mining :Concepts and Techniques*”
- Pang-Ning Tan, Michael Steinbach, Vipin Kumar, “*Introduction to Data Mining*” 2007.

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** VI

**Course :** Digital Image Processing

**Course Type :** Elective 3.2

**Credits :** 5

**Contact Hours:** 6 hours/week

**Course Code :** MUBCE3

**CIA :** 25

**CE :** 75

### **Preamble**

This course understand the fundamentals steps in Digital image processing, image compression and image segmentation.

### **Course Outcomes**

On successful completion of the course the students will be able to

- Recognize the fundamental elements of DIP and representation of an image in multi dimensional aspects
- Apply arithmetic and logical operations on image enhancement process
- Interpret the knowledge on compression techniques for security of an image
- Verify various deduction mechanisms in image segmentation

## **COURSE CONTENT**

### **Unit - I:**

**Digital Image Processing:** Definition – The Origin of Digital Image Processing – Elements of digital image processing – Steps involved in DIP – Fundamental Steps in DIP – Structure of the Human Eye – Brightness Adaptation and Discrimination – Image Acquisition using a single sensor – Image Acquisition using sensor arrays.

### **Unit - II:**

Basic concepts in image sampling and Quantization – Representing Digital Images – Spatial and Gray level resolution – Zooming and shrinking digital images – Neighbors of a pixel – Adjacency, Connectivity – Regions and Boundaries – Distance Measures, Image Operations on a pixel basis.

### **Unit - III:**

Image Enhancement in Spatial Domain – Gray level transformation – Image Negatives – Log Transformations – Enhancements using arithmetic/logical operations – Image Subtraction – Image Averaging.



**Unit - IV:**

**Image Compression:** Coding Redundancy – Inter pixel redundancy – Psycho visual redundancy – Image compression models – The source encoder and decoder – The channel Encoder and Decoder.

**Unit - V:**

**Image Segmentation:** Detection of discontinuous – Point detection – Line Detection – Edge Detection – Representation of Images: Chain Codes – Polygonal approximation – Signatures – Boundary segments – Skeletons.

**PRESCRIBED TEXT**

- Rafael C. Gonzalez & Richard. E. Woods , *Digital Image Processing*– Addison Wesley publishing Company Inc.(Third Indian Reprint, 2000).

**REFERENCE BOOKS**

- Anil K.Jain, "*Fundamentals Digital Image Processing*", Pearson Education.
- B.Chandra and D.Dutta Majundar, "*Digital Image Processing and Analysis*", Prentice Hall of India private Ltd., New Delhi.

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** VI

**Course :** Software Testing

**Course Type :** Elective 3.3

**Credits :** 5

**Contact Hours:** 6 hours/week

**Course Code :** MUBCE3

**CIA :** 25

**CE :** 75

### **Preamble**

This course impart the Knowledge on software development Life Cycle Models and various testing Concepts.

### **Course Outcomes**

- Recollect the concept various testing methods
- Get the idea of White box testing, Black box testing and Integration testing
- Figure out testing process by Test Planning, Management, execution and Reporting.
- validate the project by using test metrics and measurements.

### **COURSE CONTENT**

#### **Unit - I:**

**Software Development Life Cycle Models:** Phases of Software Project – Quality, Quality Assurance and Quality Control – Testing, Verification and Validation-Process Model to Represent Different Phases – Life cycle Models

**White Box Testing:** What is White Box Testing – Static Testing – Structural Testing – Challenges in White Box Testing.

#### **Unit - II:**

**Black Box Testing:** What is Black Box Testing? – Why Black Box Testing? – When to do Black Box Testing? – How to do Black Box Testing?

**Integration Testing:** What is Integration Testing? – Integration Testing as a Type of Testing– Integration Testing as a Phase of Testing – Scenario Testing – Defect Bash.

#### **Unit - III:**

**System and Acceptance Testing:** System Testing Overview – Why is System Testing Done? – Functional versus Non-Functional Testing – Functional Testing – Non-Functional Testing – Acceptance Testing – Summary of Test Phases.

#### **Unit - IV:**

**Performance Testing:** Introduction – Factors Governing Performance Testing – Methodology for Performance Testing – Tools for Performance Testing – Process for Performance Testing – Challenges.

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**Regression Testing:** What is Regression Testing? Types of Regression Testing – When to do Regression Testing? – How to do Regression Testing? – Best Practices in Regression Testing.

**Unit - V:**

**Test Planning, Management, Execution and Reporting:** Introduction – Test Planning – Test Management – Test Process – Test Reporting – Best Practices.

**Test Metrics and Measurements:** Project Metrics – Progress Metrics – Productivity Metrics-Release Metrics.

**PRESCRIBED TEXT**

- Srinivasan Desikan,Gopaldaswamy Ramesh, *Software Testing Principles and Practices*.

**REFERENCE BOOK**

- C.Kaner,J.Bach and Pettichord , *Lessons Learned in Software Testing*, 2001.

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** VI

**Course :** Soft Skills

**Course Type :** Skill based course VI

**Credits :** 2

**Contact Hours:** 2 hours/week

**Course Code :** MUBCSS6

**CIA :** 25

**CE :** 75

### **Preamble**

This course offers the students to develop the reading, writing, understanding and communication skills for employment.

### **Course Outcomes**

On successful completion of the course the students will be able to

- Discuss the reading, writing, listening and communication skills.
- Dramatize the day today activities with the help of soft skills.
- Analyze and improve the skills for employability.

### **COURSE CONTENT**

#### **Unit - I:**

- 1.1. Skills in Listening and Writing
- 1.2. Skills in Reading and Understanding

#### **Unit - II:**

- 2.1. Skills to Read and Respond to Instructions
- 2.2. Skills of Interpretation and Transcoding Information

#### **Unit - III:**

- 3.1. Skills in Seeking and Responding to Information
- 3.2. Skills of Day-to-Day communication

#### **Unit - IV:**

- 4.1. Grammatical skills and Spelling rules
- 4.2. Career skills

#### **Unit - V:**

- 5.1. Skills of formal and in-formal expressions
- 5.2. Skills of non-verbal communication

### **PRESCRIBED TEXT**

- *Soft Skills for Linguistic Communication* by Trinity Publication in Thiruvalluvar University

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** VI

**Course :** Web Designing

**Course Type :** Non Major Elective II

**Credits :** 2

**Contact Hours:** 2 hours/week

**Course Code :** MUBCN2

**CIA :** 25

**CE :** 75

### **Preamble**

This course obtain the students to acquire the knowledge on design webpage and websites using HTML tags.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Classify various HTML tags.
- Illustrate HTML tags in simple programs.
- Design websites using HTML tag.

## **COURSE CONTENT**

### **Unit - I:**

Basics of Internet and World Wide Web : Network – History of internet – E-mail – WWW – Browser – Search Engines.

### **Unit - II:**

Introduction to HTML: Introduction to HTML – Homepage – HTML documents – Anchor tag – Hyperlinks.

### **Unit - III:**

Web Page Design: **Header Section:** Prologue – Links – Colorful webpage – Comment lines – Sample HTML.

### **Unit - IV:**

**Body Section:** Heading printing – Aligning Heading – Horizontal rule – Paragraph – Formatting Tags – Logical style – Physical style – Images and Pictures

### **Unit - V:**

**Ordered And Unordered List:** List – Unordered list – Heading Inner List – Type attribute – Nested List – **Table Handling:** Table – Table Creation – Width – Cells spanning – Cell alignment – Coloring Cells – Column specifications – Sample Tables

### **PRESCRIBED TEXT**

- C.Xavier , *World wide web design with HTML*, Tata McGraw- Hill Publishing , New Delhi.

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** VI

**Course :** Green Computing

**Course Type :**Extra Credit Paper

**Credits :** 2

**Contact Hours:** 2 hours/week

**Course Code :** UGEGC

**CIA : -**

**CE : 100**

### **Preamble**

This course obtain the students to acquire the knowledge on green computing in IT.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Describe basic concepts of green computing
- Analyze the role of Electric Utilities

### **COURSE CONTENT**

#### **Unit - I:**

The Importance of Green IT: The Growing Significance of Green IT and Green Data Centers - All Companies Can Take Basic Steps-Toward Green IT. The Basics of Green IT: Important Steps for Green IT - Tools for IT Energy Measurement, Monitoring, and Management.

#### **Unit - II:**

Collaboration Is Key for Green IT : IT Technology Vendors – Data Center Design and Build Businesses - Collaboration of Building Energy Management and IT Energy Management - IT Vendors and Collaboration - Energy Manager Software - Global Significance of Energy - Efficiency Certificate Program- Al Gore and Green Collaboration.

#### **Unit - III:**

The Role of Electric Utilities: The Significant Role of Electric Utilities and IT Energy Ratings in Green IT- Energy Utility Rate Case Incentives - Using Utility Rebates to Minimize Energy Costs in the Data Center- Power Company Incentives for Companies to Go Green - Energy - Efficiency Ratings for IT - IT Vendors Help Lead the Charge Virtualization.

#### **Unit - IV:**

Chillers, Cooling Tower Fans and Cooling Equipments: Starting with the Data Center Cooling Basics -Data Center Stored Energy Including Stored Cooling - Back to the Future - Water-Cooled Servers - Strategies for Increasing Data Center Cooling Efficiency - Fuel Cells for Data Center Electricity - Other Emerging Technologies for Data Centers.

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**Unit - V:**

Case Study Green IT Energy Utilities - Universities and a Large Company - Worldwide Green IT.

**PRESCRIBED TEXT**

- John Lamb, *“The Greening of IT: How Companies Can Make a Difference for the Environment”*

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** VI

**Course :** IPR, Plagiarism, Copyrights and Patents

**Course Type :** Extra Credit Paper

**Credits :** 2

**Contact Hours:** 2 hours/week

**Course Code :** UGEICP

**CIA :** -

**CE :** 100

### **Preamble**

The course provides the fundamental aspects of Intellectual property Rights and to play a major role in development and management of innovative projects in industries.

### **Course Outcomes**

On successful completion of the course, the students will be able to

- Understand and use the basic concepts of Intellectual property Rights
- Examine the Concepts of Intellectual property Rights such as Plagiarism, Copyrights, Infringement, Patents and Licensing

### **Unit - I**

Introduction to IPR, Overview, Importance, IPR in India and IPR abroad

### **Unit – II**

Plagiarism, Etymology, Legal aspects, Academic plagiarism, Journalism, Self plagiarism

### **Unit - III**

Copyrights, Infringement: Searching, Filing, Distinction between related and copy rights, Trademarks, Role in commerce, Importance, Protection, Registration, Domain names, Trademark Protection Vs. Domain Name Protection, Protection of Domain Names in India

### **Unit -IV**

Patents, Granting, Industrial Designs, Design Patents, Scope, Protection, Filing infringement, Difference between Designs, Patents, International Treaties - Geographical Indications, International protection

### **Unit - V**

Licensing, Commercialization, Advantages and Disadvantages of a Licensing Agreement, Criminal laws, Case studies in IPR

### **PRESCRIBED TEXT**

- T. M Murray and M.J. Mehlman, Encyclopedia of Ethical, Legal and Policy issues in Biotechnology, John Wiley Sons 2000



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- S.Sasikala, Inculcating Ethics on “IPR, Plagiarism, Copyrights and Patents”, Teachers Publishing House, 2018

### **REFERENCE BOOKS**

- Ajit Parulekar and Sarita D’ Souza, Indian Patents Law – Legal; Business Implications; Macmillan India ltd , 2006
- B.L.Wadehra; Law Relating to Patents, Trade Marks, Copyright, Designs; Geographical Indications; Universal law Publishing Pvt. Ltd., India 2000

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**Programme :** BCA.,

**Subject :** Computer Applications

**Semester:** VI

**Course :** MOOC

**Course Type :**Extra Credit Paper

**Credits :** 2

**Contact Hours:** 2 hours/week

**Course Code :** UGEMOC

**CIA : -**

**CE : 100**

**Preamble**

This course motivate the students to learn online course

**Course Outcomes**

At the end of the course ,the students will able to gain the knowledge in the specific area and get a online certificate

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