KALASALINGAM UNIVERSITY

(KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION)

(Under Section 3 of the UGC Act 1956)

Anand Nagar, Krishnankoil - 626126

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

(www.kalasalingam.ac.in)

B.Sc(Computer Science)

(Bachelor of Science)

CURRICULUM AND SYLLABUS - 2017

KALASALINGAM UNIVERSITY
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Anand Nagar, Krishnankoil-626126
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DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

VISION

To become a Center of excellence offering quality education and innovation in Computer Science and Information Technology.

MISSION

- To prepare the students to excel in the field of Computer Science and IT industry
- To prepare the students to pursue higher studies and develop sustainable innovative solutions for the society.

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DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

B.Sc (Computer Science)

Programme Educational Objectives (PEOs)

PEO 1	Graduates of the program will become technically competent to pursue higher studies.
PEO 2	Graduates of the program will utilize modern and advanced technological tools for performing Investigation, analysis and synthesis by identifying various computer solutions.
PEO3	Graduates of the program will collaborate with multi disciplinary teams and will be able to become leaders in their organization, their profession and in society.

Programme Outcomes (POs)

PO1: Ability to apply knowledge in mathematics, science fundamentals to solve problems.

PO2: Ability to use a range of programming languages and tools to develop computer programs to solve problems effectively.

PO3: Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.

PO4: Ability to communicate effectively in both verbal and written form in industry and society.

PO5: Ability to work in teams to build software systems and apply the technologies in various fields of Computer Science, including Mobile applications, Web site development and management, databases, and computer networks

PO6: Ability to select appropriate techniques to tackle and solve problems in the discipline of information security management.

PO7: Understand the basic concepts of system software, hardware and computer graphics.

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Department of Computer Science & Information Technology
B.Sc(Computer Science) Programme
(Those who joined 2017 onwards)

I Semester

Category	Subjects	C
BAE17R112	Tamil	3
BAE17R106	Communicative English	2
BCS17R101	Problem Solving Using Computer	4
MAT17R151	Probability and Statistics	6
BCS17R102	Digital Principles and Applications	4
BCS17R181	Software Lab Using Python	2
BCS17R182	Digital Design Lab	2
	TOTAL	**23**

II Semester

Category	Subjects	C
BAE17R111	English	3
CHY17R103	Environmental Science	2
BCS17R103	Computer System Architecture	4
MAT17R152	Discrete Mathematics	6
BCS17R104	Programming in C++	4
BCS17R183	Computer System Architecture Lab	2
BCS17R184	Programming in C++ Lab	2
	TOTAL	**23**

III Semester

Category	Subjects	C
BCS17R201	Data Base Management Systems	4
MAT17R253	Operations Research	6
BCS17R202	Computer Networks	4
BCS17R281	Data Base Management Systems Lab	2
BCS17R282	Networking Lab	2
SEC-I	Skill Enhancement Elective-I	2
	TOTAL	**20**

IV Semester

Category	Subjects	C
BCS17R203	Operating Systems	4
BCS17R204	Internet and Multimedia	4
BCS17R205	Software Engineering	6
BCS17R283	Operating Systems Lab	2
BCS17R284	Multimedia Lab	2
SEC-II	Skill Enhancement Elective-II	2
	TOTAL	**20**

V Semester

Subject Code	Subjects	C
DSE-1	DSE Elective-I	6
DSE-2	DSE Elective-II	6
DSE-3	DSE Elective-III	6
SEC-III	Skill Enhancement Elective-III	2
	Total	**20**

VI Semester

Subject Code	Subjects	C
DSE-1	DSE Elective-IV	6
DSE-2	DSE Elective-V	6
BCS17R399	Project Dissertation	6
SEC-IV	Skill Enhancement Elective-IV	2
	TOTAL	**20**

List of Discipline Specific Electives

Subject Code	Subjects	C
BCS17R301	System Software	6
BCS17R302	Client Server Computing	6
BCS17R303	Big Data Analytics	6
BCS17R304	Data Mining And Data Warehousing	6
BCS17R305	Cloud Computing	6
BCS17R306	Digital Image Processing	6
BSI17R301	Information Security and Cyber Laws	6
BCS17R321	E-Commerce	6
BCS17R322	Enterprise and Resource Planning	6
BCS17R323	Management Information Systems	6
BCS17R371	JAVA Programming	6(4+4)
BCS17R372	Data Structures and Algorithms	6(4+4)
BCS17R373	Object Oriented Analysis and Design	6(4+4)
BCS17R374	Web Technologies	6(4+4)
BCS17R375	Web Design using HTML5	6(4+4)
BCS17R376	Visual Programming	6(4+4)
BCS17R377	Computer Graphics	6(4+4)

List of Skill Enhancement Electives

Subject Code	Subjects	C
BCS17R251	Office Automation Tools	2
BCS17R252	XML Programming	2
BCS17R253	Quantitative Aptitude Development	2
BCS17R254	Working with Corel Draw	2
BCS17R255	System Administration and Maintenance	2
BCS17R256	Search Engine Optimization	2
BCS17R351	PHP Programming	2
BCS17R352	Programming in SCILAB	2
BCS17R353	Software Testing Concepts	2
BCS17R354	Android Programming	2
BCS17R355	R Programming	2
BCS17R356	Open Source Software	2

Consolidated CGPA Credits

Semester	Credits
I – Semester	23
II – Semester	23
III – Semester	20
IV – Semester	20
V – Semester	20
VI – Semester	20
Total Credits	**126**

Semester – I

BAE17R112	TAMIL	L	T	P	Credit
		3	1	0	3
		Course Category: Language			
		Course Type: Theory			

கூறு-1

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

கூறு-2

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

கூறு-3

சங்கம் மருவிய காலம்-பதிணெண் கீழ்க்கணக்கு நூல்கள்-வகைகள்-காப்பிய இலக்கிய வரலாறு-ஐம்பெருங்காப்பயங்கள்-சிறு காப்பியங்கள்-காப்பியக்கூறுகள்

கூறு-4

புதினம் தேடல்

கூறு-5

அடிப்படை இலக்கணம் முதல்,சார்பு எழுத்துக்கள்,மொழி முதல்,இறுதி எழுத்துக்கள்,வல்லினம் மிகும் மிகா இடங்கள்

பாட நூல்:

1. தமிழ் இலக்கிய வரலாறு முனைவர் ச.வே.சுப்பிரமணியன் மணிவாசகர் பதிப்பகம் 31,சிங்கர் தெரு,பாரி முனை, சென்னை-600 108
2. நன்னூல்-எழுத்ததிகாரம் முனைவர் சு.அழகேசன் உரை சுதன் பதிப்பகம் தூத்துக்குடி
3. தேடல் பொன்னீலன் ஒன்பதாம் பதிப்பு நியூபுக் ஹவூஸ் வெளியீடு சென்னை-98

BAE17R106	**COMMUNICATIVE ENGLISH**	L	T	P	C
		2	1	0	2
		Course Category: Ability Enhancement Course			
		Course Type: Theory			

COURSE OBJECTIVES:

- To help the learner compose CVs , Emails, Business Letters and Job Applications.
- To introduce the learner to diverse official communications like Circulars, Notices, Minutes, and also Manuals.
- To help the learner prepare power point presentations and deliver short lectures.

- To facilitate the learner to compose Welcome address, Vote of Thanks, Farewell Speeches with appropriate Body Language.
- To enable the learner compose and speak situational Dialogues.

COURSE OUTCOMES:

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

CO1: Understand the types of Communication

CO2: Analyze the Verbal Communication and Non Verbal Communication

CO3: Practice dynamics of Professional presentations

CO4: Know how to translate the foreign language

CO5: Know how to write letters both personal and professional

MAPPING OF COURSE OUTCOME(S)

CO / PO	PO						
	1	2	3	4	5	6	7
CO1				S			
CO2				S			
CO3				S			
CO4				S			
CO5				S			

UNIT-I

Introduction: Theory of Communication, Types and modes of Communication

UNIT-II

Language of Communication:

- Verbal and Non-verbal
  (Spoken and Written)
- Personal, Social and Business
- Barriers and Strategies
- Intra Personal, Inter Personal and Group Communication

UNIT-III

Speaking Skills:

- Monologue
- Dialogue
- Group Discussion
- Effective Communication/ Mis- Communication
- Interview
- Public Speech

UNIT-IV

    Reading and Understanding

- CloZe Reading
- Comprehension
- Summary Paraphrasing
- Analysis and Interpretation
- Translation (from Indian language to English and vice-versa) Literary/Knowledge Texts

UNIT-V

    Writing Skills

- Documenting
- Report Writing
- Making notes
- Letter Writing

Text Books:

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

BCS17R101	PROBLEM SOLVING USING COMPUTER	L	T	P	C
		3	1	0	4

Pre-requisite: : Basic Knowledge about Computers
Course Category: Program Core
Course Type: Theory

COURSE OBJECTIVES:

    The main objective of the course is to provide basic knowledge for solving problems using computers and to impart the necessary skills for the development of applications. This course enables the students to design an algorithmic solution to a problem, create and execute Python programs.

COURSE OUTCOMES:

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

    CO1: Be able to identify computer hardware and peripheral devices.

    CO2: Examine and analyze alternative solutions to a problem.

    CO3: To learn how to identify Python object types.

    CO4: To learn how to write loops and decision statements in Python.

    CO5: To learn how to read and write files in Python.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	**2**	**3**	**4**	**5**	**6**	**7**
CO1	M				M		S
CO2	S	S		L	S	M	
CO3		S	M		S	L	
CO4		M	S			S	
CO5	L	S			S	M	

UNIT-I   **12 Hours**

Introduction to Digital Computers: Introduction- Von Neumann concept-Storage-Programming languages-Translators-Hardware and Software-Operating System-Problem Analysis-Algorithms-Flow Charts.

UNIT-II   **12 Hours**

Introduction to Python: Introduction-Python Overview-Comments-Identifiers-Reserved Keywords-Variables-Standard Data type-Operators-Statements and Expressions-String Operations-Boolean Expressions-Control Statements-Iteration Statements-Input from Keyboard.

UNIT-III   **12 Hours**

Function, String, Lists: Introduction-Built-in Functions-User defined Functions- Python Recursive Function- Writing Python Scripting-Strings: Introduction-String handling functions-String Formatting operator and functions-Lists: Value & Accessing Elements-Deleting elements from List-Built-in List Operators and methods

UNIT-IV   **12 Hours**

Tuple, Files & Exceptions: Introduction-Creating Tuple-Accessing Tuple-Tuple Assignment - Tuple as Return Value-Basic Tuple Operations and Functions-Files: Text File-Directories- Exceptions: Exception with arguments-User-Defined Exceptions.

UNIT-V   **12 Hours**

Classes & Objects: Introduction-class Definition-creating Objects-Objects as a Arguments-Object as Return Values-Built-in Class Attributes-Inheritance-Method Overriding-Data Encapsulation-Data Hiding.

TEXT BOOKS:

Balagurusamy, "Introduction to Computing & Problem Solving Using Python", Mc Graw Hill Education, 2016.

Unit I   : Chapter I, II
Unit II   : Chapter III
Unit III   : Chapter IV, V
Unit IV   : Chapter VI, VII
Unit V   : Chapter VIII

REFERENCES:
1. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
2. T. Budd, Exploring Python, TMH, 1st Ed, 2011.
3. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012

MAT17R151	PROBABILITY AND STATISTICS	L	T	P	C
		5	1	0	6

Pre-requisite: : Basic Knowledge about Probability and Statistics

Course Category: Program Core

Course Type: Theory

COURSE OBJECTIVE:
The main objective of the course is students will be enabling to have the knowledge about probability and correlation.

COURSE OUTCOMES:
Upon successful completion of this course, Students will be able to
CO1: Understand the basic concept of Probability and Conditional probability.
CO2: Know the concept of random variables, expectations and moment generating functions.
CO3: Know about some standard distributions.
CO4: Know about correlation and regression.
CO5: Understand the concept of testing of hypothesis.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1	S		L				
CO2	S						
CO3	S	M					
CO4	M						
CO5	S						

UNIT -I:

Probability - Conditional Probability –Baye's Theorem.

UNIT -II:

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

UNIT- III:

Binomial Distribution- Poisson Distribution- Normal Distribution.

UNIT-IV:

Correlation- Rank Correlation- Regression lines.

UNIT -V:

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

TEXT BOOK:

S.Arumugam and A. Thangapandi Isaac, *Statistics,*New Gamma Publishing Houses,Edition, Year 2009.

Unit I:Chapter 11
Unit II: Chapter 12 (Except cumulant generating functions)
Unit III: Chapter 13
Unit IV:Chapter 6 (6.1, 6.2, 6.3)
Unit V: Chapter 14 and Chapter 15

REFERENCES:

1. S.C.Gupta, V.K.Kapoor, **Elements of Mathematical Statistics,** Sultan Chand and Sons, Third Editon, 2001

BCS17R102	DIGITAL PRINCIPLES AND APPLICATIONS	L	T	P	C
		3	1	0	4

Pre-requisite: : Basic Knowledge about Electronics and Computers

Course Category: Program Core

Course Type: Theory

COURSE OBJECTIVES:

The main objective of the course is to lay the foundation for the study of hardware organization of digital computers. It brings out the interplay between various building blocks of computers, without being specific to any particular computer. At the end of the course, the student is expected to gain a fair idea about the functional aspects of each building block in computer design.

COURSE OUTCOMES:

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

CO1: Apply the principles of number system, binary codes and Boolean algebra to minimize logic expressions

CO2: Develop K-maps to minimize and optimize logic functions up to 5 variables

CO3: Acquire knowledge about various logic gates and logic families and analyze basic circuits of these families.

CO4: Design various combinational and sequential circuits such as encoders , decoders and counters using multiplexers, and flip - flops

CO5: Describe and compare various memory systems, shift registers and analog to digital and digital to analog conversion circuits

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1	S	S					M
CO2		S	S			M	
CO3			S	L			S
CO4	M	S				L	S
CO5	M	S			L	L	S

UNIT- I   **12 Hours**

Introductory concepts, Number Systems: Decimal number system, binary number system, octal number system , hexadecimal number system, BCD number system, Excess 3 code, Gray code, Alpha numeric code, error detecting and error correcting codes.

UNIT- II   **12 Hours**

Logic circuits : OR, AND,NOT,NOR,NAND,EX-OR, EX-NOR, Describing Logic Circuits Algebraically , Evaluating Logic-Circuit Outputs, Implementing Circuits from Boolean Expressions Boolean Theorems , DeMorgan's Theorems , Basic theorem of Boolean Algebra

UNIT- III   **12 Hours**

Sum-of-Products Form, Simplifying Logic Circuits, Algebraic Simplification , Designing Combinational Logic Circuits , Karnaugh Map Method , Exclusive-OR and Exclusive-NOR Circuits, Parity Generator and Checker

UNIT- IV   **12 Hours**

Flipflop and Latch: SR latch, JK flip-flop, T flip-flop, D flipflop and latch, Master slave RS flipflop, Master slave JK flipflop, asynchronous inputs.

UNIT –V   **12 Hours**

Arithmetic: Arithmetic number representation, Binary arithmetic, Hexadecimal arithmetic, BCD arithmetic.Registers & Counters: Shift registers (SISO, SIPO, PISO, PIPO), universal shift register. Counters-Asynchronous/Ripple counters, Synchronous counters, Modulus-n Counter, Ring counter.

TEXT BOOK :
Ronald J. Tocci, "Digital System Principles and Applications", Pearson education 10th edition, 2009

Unit I	: Chapter 1,2
Unit II	: Chapter 3
Unit III	: Chapter 4
Unit IV	: Chapter 5
Unit V	: Chapter 6,7

REFERENCES:
1. Donald P Leach,Albert Paul Malvino,Goutam Saha ,"Digital Principles and Applications".Tata Mcgraw Hill,6th Edition , 2008.
2. John F. Wakerly, "Digital Design Principles and Practices", Fourth Edition, Pearson Education, 2007.
3. Charles H. Roth Jr, "Fundamentals of Logic Design", Fifth Edition – Jaico Publishing House, Mumbai, 2003.

BCS17R181	SOFTWARE LAB USING PYTHON	L	T	P	C
		0	0	3	2

Pre-requisite: Basic knowledge about Computer
Course Category: Program Core
Course Type: Laboratory course

COURSE OBJECTIVES:

The main objective of the course is to learn core Python scripting elements such as variables, flow control structures, mapping. This course enables the students to work with the Python standard library, explore Python's object-oriented features and more advanced features such as file operations, regular expressions, working with binary data.

COURSE OUTCOMES:

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

CO1: Apply appropriate problem-solving strategies to the design, implementation, and debugging of simple programs.

CO2: Apply fundamental data structures such as strings, lists, sets, and dictionaries to solve appropriate problems.

CO3: Learn how to write loops and decision statements in Python.

CO4: Learn how to read and write files in Python.

CO5: Apply elementary object-oriented concepts to decompose a problem into small, self contained components.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1	M	S			S		
CO2		S			S	M	
CO3		S	S		S		
CO4		S		M	S		L
CO5	S	S			S	L	

45 Hours

CYCLE-I

1. Write a program that displays the following information: Your name, Full address, Mobile number, College name, Course subjects.
2. Write a program to find square root and area of a rectangle.
3. Write a program to swap two numbers
4. Write a program to convert kilogram into pound
5. Write a program to find largest among given three numbers
6. Write a program to check if the input year is a leap year or not
7. Write a program to display the Fibonacci sequence for *n* terms.
8. Write a program to print prime numbers for a user provided range

CYCLE-II

1. Write recursive and non-recursive functions for the following:
   a. To find GCD of two integers.

           b. To find the factorial of positive integer

           c. To print Fibonacci sequence up to given number n

2. Write a function program to find HCF of some given numbers
3. Write a function program to display the factors of a given number
4. Write a function to find the ASCII value of the character.
5. Write a function program to convert a decimal number to its binary,octal and hexa decimal equivalents
6. Write a function program to find sum of several natural numbers using recursion
7. Write a program to find duplicate characters in a given string.
8. Write a program to check whether a string is palindrome or not.
9. Write a program to remove punctuations from a string
10. Write a program to transpose a matrix
11. Write a program to add and subtract two matrices
12. Write a program to demonstrate various strings functions and operations.
13. Write a program to multiply two matrices.

.

CYCLE-III

1. Write a function to print the resolution of an image file.
2. Write a program to catch on divide by zero exception .Add a finally block too.
3. Write a program to write data in a file for both write and append modes.\
4. Write a program to demonstrate file I/O operations.
5. Write a program that defines a class named Employee.Define two sub classes :Engineer and Manager.Every class should have a method named printDesignation() that prints Engineer for Engineer class and Manager for Manager class
6. Write a program to demonstrate classes and their attributes
7. Write a program to demonstrate Inheritance and overriding.

BCS17R182	DIGITAL DESIGN LAB	L	T	P	C
		0	0	3	2

Pre-requisite: Basic Knowledge about Electronics

Course Category: Program Core

Course Type: Laboratory course

COURSE OBJECTIVES:

     The main objective of the course is to understand the various logic gates and be familiar with various combinational circuits. This course enables the students to understand the various components used in the design of digital computers

.

COURSE OUTCOMES:

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

CO1: Study of logic gates and realization of OR,AND,NOT AND XOR Functions using universal gates

CO2: Design and implement combinational circuits like half adder/full adder, half subtractor/full subtractor, code converters, comparators, MUX/DEMUX

CO3: Design and implement sequential circuits like flip-flops, counters and shift registers

CO4: Study of 8-bit DAC and 8-bit ADC.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1	S	S				S	
CO2		S	M	M		S	
CO3		S	M	M		S	
CO4		S				S	M

45 Hours

CYCLE-I

1. To study the function of basic logic gates and verify the truth table of AND, OR, NOT,X OR, NAND, NOR.
2. To study applications of AND, OR, NAND, X-OR gates for gating digital signals.
3. To develop the different Arithmetic Circuits:

CYCLE-II

4. Half-Adder and Subtractor.
5. Full-Adder and Subtractor.
6. To study the BCD to binary and binary to BCD Code converter.

CYCLE-III

7. Study of Decoder Circuits:
8. BCD-to-Decimal Decoder
9. BCD-to-7-Segment Decoder
10. Study of Encoder Circuits:
11. BCD-to-Decimal Encoder
12. Octal-to-Binary Encoder

Semester – II

BAE17R111	ENGLISH	L	T	P	C
		3	1	0	3

Pre-requisite: Basic knowledge in English

Course Category: Language

Course Type: Theory

COURSE OBJECTIVE:

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

COURSE OUTCOMES:

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

CO1: To introduce World renowned poets to students.

CO2: To make them understand the nuances of Short stories.

CO3: To acquaint students with the writings of Nobel laureates.

CO4: To excel in Grammar.

CO5: To excel in Composition.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1				S			
CO2				S			
CO3				S			
CO4				S			
CO5				S			

UNIT –I

Poetry

Nissim Ezekiel – Night of the scorpion

Robert Frost – Road Not Taken

Percy Bysshe Shelley – Ode to the West Wind

UNIT II

Short Stories

Jesse Owens - My Greatest Olympic Prize

R.K.Narayan – An Astrologer's Day

Stephen Leacock – My Financial Career

UNIT III

Fiction

Ernest Hemingway – The Old man and the Sea

UNIT IV

Grammar

- Tenses
- Nouns – Countable and Uncountable
- Kinds of Sentences
- Articles
- Prepositions

UNIT-V

Composition and Vocabulary

1. **Composition**
   - Letter Writing (Formal and Informal)
   - Curriculum Vitae
   - Situational Conversation

2. **Vocabulary**

   One Word Substitutes:

   alimony, amateur, amnesty, anaesthesia, anarchist, anatomy, anonymous, archive, atheist, autobiography, cannibal, carcinogen, cardiologist, carnivorous, centenarian, contemporary, connoisseur, cosmopolitan, crew, detective, (21 – 40) emigrant, epitaph, extempore, fauna, feminist, fleet, flora, forgery, gymnasium, gynaecologist, herbivorous, hypocrisy, incorrigible, kleptomania, lexicographer, manuscript, mercenary, misanthrope, mortuary, novice, (41 – 60) obituary, omniscient, ophthalmologist, optimist, omnipotent, orphan, panacea, parasite, pedestrian, pessimist, philanthropy philatelist, polygamy, posthumous, post-mortem, secular, somnambulist , theology, unanimous, utopia.

REFERENCES:

1. Sadanand Kamalesh. & Punitha, Susheela. Spoken English: A Foundation Course. Part 2 Orient Black Swan, New Delhi, 2011
2. Taylor, Grant. English Conversational Practice. New Delhi. Tata McGraw- Hill, 1975

CHY17R103	ENVIRONMENTAL SCIENCE	L	T	P	C
		2	1	0	2

Pre-requisite: Basic knowledge about Biology, Physics and Chemistry

Course Category: Ability Enhancement   Course

Course Type: Theory

COURSE OBJECTIVES:

The main objective of the course is to create awareness among students about the

Importance of environment and to understand the effect of technology on the environment and ecological balance

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to

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

CO2: Identity the values and conservation of bio-diversity.

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

CO4: Select the appropriate methods for waste management.

CO5: Recall social issues and legal provision

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1	S						
CO2	S						
CO3	S						
CO4	S						
CO5	S						

UNIT-I

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

UNIT-II

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

UNIT-III

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

UNIT-IV

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

UNIT-V

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

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

REFERENCES:
1. Gilbert M. Masters, Introduction to Environmental Engineering and Science, Pearson Education Pvt., Ltd., 2nd edition, 2004.
2. Erach Bharucha, Textbook for Environmental Studies, UGC, New Delhi, 2004.
3. Miller T.G. Jr., "Environmental Science", Wadsworth Publishing Co. USA, 2nd edition 2004.
4. Erach Bharucha, "The Biodiversity of India", Mapin publishing Pvt. Ltd., Ahmedabad India, 2002.
5. Trivedi R.K., "Handbook of Environmental Laws", Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro media, 2003.
6. Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publ., House, Mumbai, 2001.
7. Wager K.D., "Environmental Management", W.B. Saunders Co., Philadelphia, USA, 1998.
   Sawyer C. N, McCarty P. L, and Parkin G. F., Chemistry for Environmental Engineering, McGraw-Hill, Inc., New York, 1994.

BCS17R103	COMPUTER SYSTEM ARCHITECTURE	L	T	P	C
		3	1	0	4

Pre-requisite: Problem Solving Using Computers**(BCS17R101)**

Course Category: Program Core

Course Type: Theory

COURSE OBJECTIVES:

The main objective is to study the basic structure of a digital computer and the organization of the Arithmetic and Logical unit, the Memory unit, Control unit and I/O unit.

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to

CO1: Able to understand architecture of a modern computer.
CO2: Able to understand instruction formats and instruction types.
CO3: To study the memory organization including cache memories and virtual memory.
CO4: To study the different types of I/O devices.
CO5: To understand system software concepts and parallel processing

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	**2**	**3**	**4**	**5**	**6**	**7**
CO1	M	L					S
CO2		S	L			S	M
CO3	M			M	L		
CO4		L					S
CO5	L	M				S	S

UNIT-I   **12 Hours**

Digital and analog computers - Components of a digital computer – Computer Classification - Memory addressing capability of a CPU - Word length of a computer – user interface -Hardware, Software, Firmware, Middleware and Freeware - RISC and CISC and EPIC processors

UNIT-II   **12 Hours**

CPU organization – Intel 8086 Register Organization – Instruction –Intel 8086 instructions -Addressing modes – Interrupts and exceptions –Instruction cycle.

UNIT-III   **12 Hours**

Main memory , secondary memory and back up memory –Cache memory – Real and virtual memory - Semiconductor Memory - Magnetic Memories - Optical Disks –Direct access storage devices.

UNIT-IV   **12 Hours**

Input devices –Output Devices - Printers –Plotters –Input and Output Port - Serial data transfer – I/O processor – Arithmetic processor-Graphics processor.

UNIT-V   **12 Hours**

Machine Language – Assembly language – Low level and high level languages – Compiler – Interpreter- Stack-Subroutine -Debugging of programs – Macro –Macro processor –Parallel processing – Pipelined processor –Array processors –Vector Processors.

TEXT BOOK

1. B. Ram, Computer Fundamentals: Architecture and Organization, 5th edition, New Age International Publishers, New Delhi,2014

REFERENCES:

1. M. Morris Mano, "Computer System Architecture", Third Edition, Prentice Hall of India,2003.
2. William stallings , "Computer Orgainization and Architecture",Tenth edition, Pearson Education,2015

> Unit I: Chapter 1.1 to 1.6, 1.9 to 1.11, 1.20
> Unit II: Chapter 5.1-5.5, 5.13, 5.13.9, 5.8
> Unit III:Chapter 6.1 to 6.7,6.9
> Unit IV:Chapter 7.1-7.7,7.13,7.14,7.15
> Unit V:Chapter 8.1 to 8.8 , 11.1 to 11.4

MAT17R152	DISCRETE MATHEMATICS	L	T	P	C
		5	1	0	6

Pre-requisite: Basic knowledge about algebra and polynomial
Course Category: Program Core
Course Type: Theory

COURSE OBJECTIVE:

The main objective of the course is to enable the students to be familiar with Lattices and Graph theory.

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to

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

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

CO3: Understand the concept of lattices and Boolean algebra.

CO4: Understand the concept of Polynomials and Recurrence relations.

CO5: Know the representation of graphs.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1	S	M					
CO2	S		M				L
CO3	M	S	S	S	M		M
CO4	S						
CO5	S	L					L

UNIT- I:

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

UNIT- II:

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

UNIT -III:

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

UNIT- IV:

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

UNIT- V:

Graph Theory: Basic Concepts – Graph - Subgraph – Spanning subgraph – Adjacent and Incident matrix and simple theorem – Degree – Complete graph – Bipartite graph – Connected graphs – Walk - Trail-Paths and Cycles – Isomorphic graphs- Digraph – Spanning tree and algorithms

TEXT BOOKS:

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

> Unit I: Chapter II (Sec 1 to 5), Chapter 3 (Sec 1 to 5)
> Unit II:Chapter IX (Sec 1 to 13)
> Unit III: Chapter X(Sec 1 to 5)
> Unit IV:Chapter V (Sec 1 to 3, 5 to 7)
> Unit V:Chapter XI (Sec 1)

REFERENCES:

1. Rosen, K.H., Discrete Mathematics and its applications, Tata McGraw-Hill Publishing Company Limited, New Delhi, 4th Edn., 1999.

2. Manohar , R., Discrete Mathematics Structure with Application to Computer Science, Tata McGraw Hill Education, 2001.

BCS17R104	PROGRAMMING IN C++	L	T	P	C
		3	1	0	4

Pre-requisite :Problem Solving Using Computers(BCS17R101)

Course Category: Program Core

Course Type: Theory

COURSE OBJECTIVES:

The main objective of the course is to learn the fundamentals of Object Oriented Programming and Methodologies which are essential to building good Object Oriented Applications using C++.

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to

CO1: Describe the Procedural and Object Oriented Paradigm with Concepts of Streams, Classes, Functions, Data and Objects.

CO2: Demonstrate Adeptness of Object Oriented Programming in Developing Solutions to Problems Demonstrating Usage of Classes, Objects, Constructors and Destructors.

CO3: Apply the Concept of Function Overloading, Operator Overloading and Classify Inheritance with the understanding of Early and Late Binding.

CO4: Develop Efficient Applications using Exception Handling Techniques, Generic Programming and String Functions in C++ Applications

CO5: Understand the Console I/O Operations and Create/Update Basic Data Files.

Mapping of Course Outcome(s):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S	M				L
CO2		S	S		S	L	
CO3	M	S	M		M	S	
CO4			S	L	L	L	
CO5		M	M	S	L		

UNIT- I   **12 Hours**

Basic Concepts of Object Oriented Programming – Procedural Approach Vs Object-Oriented Approach, Benefits of OOP - Applications of OOP – Structure of C++ Program - Tokens, Expressions and Control Structures – Functions in C++, Inline Functions, Default Arguments.

UNIT -II   **12 Hours**

Classes And Objects – Specifying a Class, Defining Member Function, Private Member Functions, Memory Allocation for Objects, Static Data Member, Static Member Function, Array of Objects, Objects as Arguments, Friend Functions, Const Member Functions, Pointers to Members, Const Objects. Constructors - Parameterized Constructor, Constructor with Default Arguments, Copy Constructor, Dynamic Constructor, Destructors.

UNIT- III   **12 Hours**

Inheritance – Defining Derived Classes, Types of Inheritance, Pointer to Objects, this Pointer, Pointer to Derived Class. Polymorphism – Function Overloading and Function Overriding, Operator Overloading – Overloading of Binary and Unary Operators. Virtual Base Class, Abstract Class, Virtual Functions, Pure Virtual Functions, Virtual Constructors and Destructors, Type Conversions.

UNIT- IV   **12 Hours**

Templates – Class Template, Class Template with Multiple Parameters, Function Template Function Template with Multiple Parameters.Exception Handling - Basics of Exception Handling, Exception Handling Mechanism, Throwing Mechanism, Catching Mechanism, Rethrowing an Exception, Specifying Exceptions.Manipulating Strings – Creating and Manipulating String Objects, String Characteristics

UNIT -V   **12 Hours**

Console I/O Operations – Formatted Console I/O, Unformatted I/O Operations, Managing Output with Manipulators,Working With Files – Classes for File Stream Operations,Opening and Closing Files, Detecting End of File, File Modes, File Pointer and Their Manipulations, Sequential I/O Operations, Random Access.

TEXT BOOK
1. Balagursamy E, Object Oriented Programming with C++, Tata McGraw Hill Publications, Sixth Edition, 2013
   CHAPTERS
   > Unit I -1.3 - 1.6, 1.8, 2.6, 3.2 - 3.6, 3.8, 3.11 - 3.14, 3.20 - 3.22, 3.25, 4.2, 4.3, 4.6, 4.7, 4.10
   > Unit II - 5.3, 5.4, 5.8 - 5.18,   6.1 - 6.8, 6.10, 6.11
   > Unit III - 4.10, 7.1 - 7.4, 7.9, 8.1 - 8.10, 9.2 - 9.8
   > Unit – IV -, 12.1 - 12.5, 13.1-13.7, 15.1-15.5
   > Unit V - 10.4, 10.5, 10.6, 11.1 - 11.8

REFERENCE BOOKS
1. Ashok Kamthane, Programming in C++, Pearson Education, 2013.
2. Bjarne Stroustrup, The C++ Programming Language, Pearson.
3. Herbert Scildt, C++, The Complete Reference, Tata McGraw-Hill.
4. Robert Lafore, Object Oriented Programming in C++, PHI.

BCS17R183	COMPUTER SYSTEM ARCHITECTURE LAB	L	T	P	C
		0	0	3	2

Pre-requisite: Problem Solving Using Computers(BCS17R101)

Course Category: Program Core

Course Type: Laboratory Course

COURSE OBJECTIVES:

This laboratory is designed to provide students with an introductory but comprehensive knowledge on computer systems, computer organization, and assembly language programming.

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to

CO1: To understand basic assembly language instructions.
CO2: To understand assembly language logic operation instructions.
CO3: Able to write a program in assembly language to solve problems.
CO4: Understand the internal organization of a computer system through practicing with an assembly language.
CO5: Apply concepts and skills to solve real life problems using a low level programming language.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S	M				L
CO2		S	S		S	L	
CO3	M	S	M		M	S	
CO4			S	L	L	L	
CO5		M	M	S	L		

45 Hours

CYCLE 1

1. Program to Find 1's Complement of 8-bit Number
2. Program to Find 2's Complement of 8-bit Number
3. Program to Add Two 8-bit Numbers Without Carry
4. Program to Add Two 8-bit Numbers With Carry
5. Program to Find Sum of Series of 8-bit Numbers
6. Program to Subtract Two 8-bit Numbers Without Borrow
7. Program to Subtract Two 8-bit Numbers With Borrow

CYCLE 2

1. Program to Multiply Two 8-bit Numbers
2. Program to Find Square of an 8-bit Number
3. Program to Shift Left 8-bit Number by 1 Bit
4. Program to Shift Left 8-bit Number by 2 Bits
5. Program to Shift Right 8-bit Number by 1 Bit
6. Program to Shift Right 8-bit Number by 2 Bits
7. Program to Mask the Lower Nibble of an 8-bit Number
8. Program to Mask the Higher Nibble of an 8-bit Number

CYCLE 3

1. Program to Find Largest of Two 8-bit Numbers
2. Program to Find Smallest of Two 8-bit Numbers
3. Program to Find Largest from an Array
4. Program to Find Smallest from an Array

BCS17R184	PROGRAMMING IN C++ LAB	L	T	P	C
		0	0	3	2

Pre-requisite: Problem Solving Using Computers(BCS17R101)

Course Category: Program Core

Course Type: Laboratory Course

COURSE OBJECTIVES:

The main objective of this course is to implement the Object Oriented Concepts to solve problems and to develop applications using Object Oriented Concepts

COURSE OUTCOME:

At the end of this course, Student will be able to

CO1: Strengthen their problem solving ability by applying the characteristics of an Object Oriented Approach.

CO2: Design algorithms for different scenarios and Apply Object Oriented Approach to developing applications of varying complexities

CO3: Develop solutions for a range of problems using Class, Objects, Typecasting, Inheritance, Polymorphism, Templates, and File Handling Methods

CO4: Compile and debug programs in C++ language

CO5: Display the output to the world with neat format using Output Functions/Manipulators

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S	M				L
CO2		S	S		S	L	
CO3	M	S	M		M	S	
CO4			S	L	L	L	
CO5		M	M	S	L		

45 Hours

CYCLE-I

1. Write a C++ Program to create a class to implement the Data Structure STACK.
2. Write a constructor to initialize the TOP of the STACK. Write a member function PUSH() to insert an element and member function POP() to delete an element check for overflow and underflow conditions..
3. Write a C++ Program to create a class ARITHMETIC which consists of a FLOAT and an INTEGER variable. Write a Member function ADD(), SUB(), MUL(), DIV() to perform addition, subtraction, multiplication, division respectively. Write a member function to get and display values.
4. Write a C++ Program to read an integer number and find the sum of all the digits until it reduces to a single digit using constructors, destructors and inline member functions.
5. Write a C++ Program to create a class FLOAT that contains one float data member. Overload all the four Arithmetic operators so that they operate on the object FLOAT.

CYCLE-II

1. Write a C++ Program to create a class STRING. Write a Member Function to initialize, get and display strings. Overload the Operator + to concatenate two Strings, == to compare two strings

2. Write a C++ Program to create class, which consists of EMPLOYEE Detail like E_Number, E_Name, Department, Basic, Salary, and Grade. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade.

3. Write a C++ Program to create a class SHAPE which consists of two VIRTUAL FUNCTIONS Calculate_Area() and Calculate_Perimeter() to calculate area and perimeter of various figures. Derive three classes SQUARE, RECTANGLE, TRIANGE from class Shape and Calculate Area and Perimeter of each class separately and display the result.

4. Write a C++ Program to create two classes each class consists of two private variables, an integer and a float variable. Write member functions to get and display them. Write a FRIEND Function common to both classes, which takes the object of above two classes as arguments and the integer and float values of both objects separately and display the result.

CYCLE-III

1. Write a C++ Program using Function Overloading to read two Matrices of different Data Types such as integers and floating point numbers. Find out the sum of the above two matrices separately and display the sum of these arrays individually.

2. Write a C++ Program to check whether the given string is a palindrome or not using Pointers.

3. Write a C++ Program to create a File and to display the contents of that file with line numbers.

4. Write a C++ Program to merge two files into a single file.

Semester – III

BCS17R201	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	1	0	4

Pre-requisite: Basic knowledge about Information systems

Course Category: Program Core

Course Type: Theory

COURSE OBJECTIVES:

The aim of this course to design database for different applications, an important area of program development. This course provides the students to understand the problems with file processing system and how it can be handled effectively in Database System through various design tools, design techniques and algorithms.

COURSE OUTCOMES:

CO1: To analyze Data Base Management System design methodology.

CO2: Acquire knowledge about data modeling using entity and relation.

CO3: Design data base and normalize data and Understand how query are being processed and executed.

CO4: Draw various data models for Data Base and Write queries mathematically and understanding of normalization theory and apply such knowledge to the normalization of a database

CO5: Formulate, using SQL, solutions to a broad range of query and data update problems.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S	M				L
CO2		S	S		S	L	
CO3	M	S	M		M	S	
CO4			S	L	L	L	
CO5		M	M	S	L		

UNIT- I   **12 Hours**

Databases and Database Users: Characteristics of database approach, Actors behind the scene, Workers behind the scene. Advantages of using the DBMS approach, Database application, Disadvantages. Database System-Concepts and Architecture:

UNIT- II   **12 Hours**

Data Models, Schema, and Instances, Three schema architecture and data Independence, Database languages and interfaces, The database system environment, Centralized and client/server architecture for DBMS, Classification of DBMS.

UNIT- III   **12 Hours**

Data modeling using the E-R Model: Entity types, Entity sets, Attributes, and Keys, Relationship types, Weak entity types, The Relational Data Model and Relational Database Constraints.

UNIT- IV   **12 Hours**

Relational database design-informal guidelines for relation schema-functional dependencies-normal forms based on primary key-Boyce codd normal form- Properties of relational decompositions- Algorithms for relational database schema design, Multi-valued dependencies and forth normal form, Join dependencies and fifth normal form.- file organization and indexes-secondary storage device-buffering of blocks .

UNIT –V   **12 Hours**

Translating SQL Queries into Relational Algebra- Algorithms for External Sorting- Algorithms for SELECT and JOIN Operations- Algorithms for PROJECT and Set Operations- Implementing Aggregate Operations and OUTER JOINs- Combining Operations Using Pipelining- Using Heuristics in Query Optimization- Overview of Query Optimization in Oracle- Semantic Query Optimization

TEXT BOOK:
1. R Elmasri, S B Navathe, D V L N Somayajulu, S K Gupta, "Fundamentals of Database Systems", 6th Edition, Pearson Education, 2010. (Chapter I,II,III,IV,VIII,IX,X)

REFERENCE BOOKS:
1. H.F. Korth, A Silberschatz and S. Sudarasan, "Database System Concepts", Computer Science Series, McGraw-Hill, 2010
2. C.J.Date, "An Introduction to Data Base Systems," Volume L Addison Wesley, Reading, MA, 1990

MAT17R253	OPERATIONS RESEARCH	L	T	P	C
		5	1	0	6

Pre-requisite: Basic knowledge about Optimization

Course Category: Program Core

Course Type: Theory

COURSE OBJECTIVES:

The main objective of the course is to enable the students to acquire the basic knowledge in Operations Research.

COURSE OUTCOMES:

Upon successful completion of this course, Students will be able to
CO1: Understand the basic concepts of Operations Research and formulation of linear programming problem.
CO2: Solve linear programming problem by using graphical method and simplex method.
CO3: Analysis the network by PERT and CPM
CO4: Solve transportation using some mathematical techniques.
CO5: Understand the solving method of Assignment problem and travelling salesman problem

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1	M		L			M	L
CO2		S				L	
CO3	M	S	M		M		
CO4				L		L	
CO5		M		S			

UNIT- I

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

UNIT- II

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

UNIT- III

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

UNIT- IV

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

UNIT -V

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

TEXT BOOK:

1.   Kanthi Swarup and others, Operations Research, Sulthan Chand & Sons, Ninth Edition, Reprint 2003.

Unit I: Chapter 2 (section 2.1 and 2.2) Chapter 3 (Sections 3.1 to 3.3),
Unit II: Chapter 4(sections 4.1 ,4.3 4.4)
Unit III: Chapter 21 (sections 21.2 - 21.4 and 21.5, 21.6, 21.7)
Unit IV: Chapter 10(sections 10.1to 10.4 and 10.8 to 10.11) Chapter 11 (sections 11.1 - 11.3)
Unit V: Chapter 17(section-17.1 -17.6)

REFERENCE BOOK:

1.   P. R.Vittal, Introduction to operations Research, MarGham Publications, 2013.

BCS17R202	COMPUTER NETWORKS	L	T	P	C
		3	1	0	4

Pre-requisite: Basic knowledge about networks

Course Category: Program Core

Course Type: Theory

COURSE OBJECTIVES:

The main objective of the course is to understand the fundamental concepts of computer networking with the basic taxonomy and terminology of the computer networking area. This course enables the students to introduce the student to advanced networking concepts and to allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

COURSE OUTCOMES:

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

CO1: Understand the concepts of networks, types and architectures.

CO2: Apply addressing entities of network with implementation of TCP and UDP protocols.

CO3: Identify the networks technologies for error free transmission of data

CO4: Apply various routing protocols in data communication to select optimal path.

CO5: Develop real time applications of networks

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S	M				L
CO2		S	S		S	L	
CO3	M	S	M		M	S	
CO4			S	L	L	L	
CO5		M	M	S	L		

UNIT-I   **12 Hours**

Introduction: Uses of Computer Networks- Network Hardware-Network Software-Reference   Models. Example Networks: The Internet-Third-Generation Mobile Phone Networks-Wireless LANs-RFID and Sensor Networks - Network Standardization.

UNIT-II   **12 Hours**

The Physical Layer: The Theoretical basis for Data Communication-Guided Transmission Media-Wireless Transmission – Communication Satellites-Digital Modulation and Multiplexing-The Public Switched Telephone Network-The Mobile Telephone System.

UNIT -III   **12 Hours**

Data Link Layer Design Issues: Error Detection and Correction-Elementary of Data Link Protocols- Sliding Window Protocols. The Medium Access Control Sublayer:The Channel Allocation Problem

UNIT-IV   **12 Hours**

The Network Layer: Network Layer Design Issues-Routing Algorithms: The Optimality Principle Shortest Path Algorithm-Flooding-Distance Vector Routing-Link State Routing-Hierarchical Routing-Broadcast Routing-Multicast Routing-Congestion Control Algorithms

UNIT-V   **12 Hours**

The Transport Layer: The Transport Service-Elements of Transport Protocols- The Internet Transport   Protocols: User Datagram Protocol (UDP)-Transmission Control Protocol (TCP).The Application Layer: The Domain Name System (DNS)-Electronic mail-The World Wide Web. Network Security: Cryptography-Symmetric Key Algorithms Public Key Algorithms.

TEXT BOOK

Tanenbaum and Wetherall, "Computer Networks", Fifth Edition, Prentice Hall of India, New Delhi, 2010.

> Unit I : Chapter 1
> Unit II : Chapter 2
> Unit III: Chapter 3
> Unit IV: Chapter 5
> Unit V: Chapter 6,7

REFERENCES:

1.   James F. Kurose, "Computer Networking- a top-down approach featuring the internet" , Edition, Person Education, ISBN 81- 7808-787-1.
2.   Leon-Garcia-Wadjaja,"Communication Networks- Fundamental Concepts and Key Architectures" Tata McGraw-Hill Publications, ISBN 0-07-040235-3.
3.   Comer D.,"Computer Networks and Internet", 2ND Edition, Pearson Education, ISBN 81 –7808 – 086 – 9.

BCS17R281	DATABASE MANAGEMENT SYSTEMS LAB	L	T	P	C
		0	0	3	2

Pre-requisite: Basic knowledge about SQL
Course Category: Program Core
Course Type: Laboratory course

COURSE OBJECTIVES

The major objective of this lab is to provide a strong formal foundation in database concepts, technology and practice to the participants to groom them into well-informed database application developers. Rather than imparting isolated knowledge/experience fragments in each of database concepts

COURSE OUTCOMES

> **CO1:** Design and implement a database schema for a given problem-domain
> **CO2:** Normalize a database

CO3: Populate and query a database using SQL DML/DDL commands.
CO4: Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS programming PL/SQL including stored procedures.
CO5: Write PL/SQL Programs using triggers, stored functions, cursors, packages.
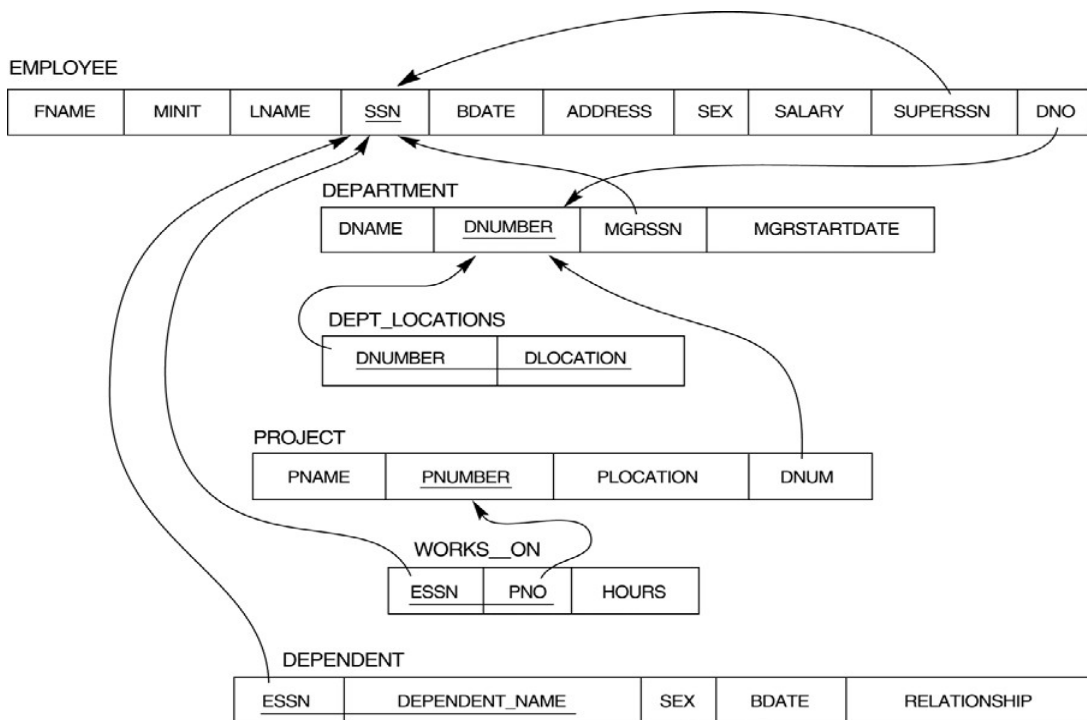
MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S	M				L
CO2		S	S		S	L	
CO3	M	S	M		M	S	
CO4			S	L	L	L	
CO5		M	M	S	L		

45 Hours

CYCLE-I

Programs using MyAccess/MySQL:
Consider the Relational Database Schema - COMPANY

1. Create tables with relevant foreign key constraints

2. Populate the tables with data

3. Perform the following queries on the database:

   a) Display all the details of all employees working in the company.

   b) Display ssn, lname, fname, address of employees who work in department no7.

   c) Retrieve the birthdate and address of the employee whose name is 'Franklin T. Wong'

   d) Retrieve the name and salary of every employee

   e) Retrieve all distinct salary values

CYCLE-II

1. Retrieve all employee names whose address is in 'Bellaire'

2. Retrieve all employees who were born during the1950s

3. Retrieve all employees in department 5 whose salary is between

    50,000and 60,000(inclusive)

4. Retrieve the names of all employees who do not have supervisors

5. Retrieve SSN and department name for all employees

CYCLE-III

1. Retrieve the name and address of all employees who work for the 'Research' department

2. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.

3. For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.

4. Retrieve all combinations of Employee Name and Department Name

5. Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan' either as a worker or as a manager of the department that controls the project.

6. Retrieve all employees who were born during the1950s Retrieve all employees in department 5 whose salary is between 50,000and 60,000(inclusive)

BCS17R282	NETWORKING LAB	L	T	P	C
		0	0	3	2

Pre-requisite: Basic knowledge about Unix Commands

Course Category: Program Core
Course Type: Laboratory course

COURSE OBJECTIVES:

The main objective of the course is to understand basic Unix Commands and fundamental services provided by TCP and UDP and how information is sent between TCP and UDP ports. This course enables the students to understand the basic techniques of design and to design basic network services with sockets.

COURSE OUTCOMES:

Upon the completion of this course, the students will be able to
CO1: Demonstrate the client server communication.
CO2: Implement data link layer operations.
CO3: Develop applications with RMI.
CO4: Aware of UNIX commands for Networking.
CO5: Implement Application layer functions

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S	M				L
CO2		S	S		S	L	
CO3	M	S	M		M	S	
CO4			S	L	L	L	
CO5		M	M	S	L		

45 Hours

CYCLE-I

1. Simulate Checksum Algorithm.
2. Simulate CRC Algorithm
3. Simulate Stop & Wait Protocol.
4. Simulate Go-Back-N Protocol.

CYCLE-II

5. Data Link Layer Operations
6. Domain name service
7. Getting the MAC Address
8. HTTP Download

CYCLE-III

9. Cryptography
10. Remote Command Execution
11. Remote Method Invocation

Semester – IV

BCS17R203	OPERATING SYSTEMS	L	T	P	C
		3	1	0	4

Pre-requisite: Problem Solving Using Computer(**BCS17R181**)

Course Category: Program Core

Course Type: Theory

COURSE OBJECTIVES:
The course familiarizes the student with basic knowledge of computer operating systems. The objective of the course is to provide basic knowledge of computer operating system structures and functions.

COURSE OUTCOMES:
- **CO1:** Understand the operating systems objectives and functionality along with system programs and system calls.
- **CO2:** Design deadlock, prevention and avoidance algorithms and various Scheduling algorithms.
- **CO3:** Compare and contrast various memory management schemes.
- **CO4:** Design and Implement a prototype file systems.
- **CO5:** Perform administrative tasks on Linux Servers.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S	M				L
CO2		S	S		S	L	
CO3	M	S	M		M	S	
CO4			S	L	L	L	
CO5		M	M	S	L		

UNIT- I   **12 Hours**
Operating system overview-objectives and functions-Evolution of Operating System.- Computer System Organization and Architecture-Operating System Structure and Operations- Distributed System-System Calls, System Programs, OS Generation and System Boot.

UNIT- II   **12 Hours**
Processes-Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication-Communication in client server ssystem –Threads- CPU Scheduling- Process Synchronization - Critical Section Problem, Mutex Locks, Semophores, Monitors- Deadlocks.

UNIT- III   **12 Hours**
Main Memory-Contiguous Memory Allocation, Segmentation, Paging, 32 and 64 bit architecture Examples; Virtual Memory- Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory.

UNIT- IV **12 Hours**

Mass Storage Structure- Overview, Disk Scheduling and Management; File System Storage- File Concepts, Directory and Disk Structure, Sharing and Protection; File System Implementation- File System Structure, Directory Structure, Allocation Methods, Free Space Management; I/O Systems.

UNIT- V **12 Hours**

Linux history- Design principles-Kernel models- process management- Scheduling-memory management-File systems-Input & Output-interprocess communication.

TEXT BOOK:

1. Silberschatz P.B.Galvin, Gange, "Operating System Concepts", 9th Edition., John Wiley & Sons., 2013. (Chapter I,II,III, IV,V,VI, VII,VIII)

REFERENCES:

1. H.M. Deitel, "An Introduction to Operating System", 2th Edition, Addison Wesley, 1990.
2. A.S. Tanenbaum, Modern Operating Systems, 3th Edition, Pearson Education 2007.

    Unit I : Chapter I
    Unit II : Chapter II
    Unit III: Chapter III, IV
    Unit IV: Chapter V, VI
    Unit V: Chapter VII, VIII

BCS17R204	INTERNET AND MULTIMEDIA	L	T	P	C
		3	1	0	4
Pre-requisite: Basic knowledge about Internet					
	Course Category: Program Core				
	Course Type: Theory				

COURSE OBJECTIVES:

    The main objective of the course is to learn Internet protocols, multimedia communication standards and compression techniques. This course enables the students to Understand how Text, Audio, Image and Video information can be represented digitally in a computer.

COURSE OUTCOMES:

    Upon the completion of this course, the students will be able to
    CO1: Understand the fundamentals of science and have the ability to apply them.
    CO2: Create a basic website using HTML and CSS
    CO3: Design and implement dynamic web page with validation using java script.
    CO4: To understand about various latest interactive multimedia devices, the basic concepts about images and image formats.
    CO5: Design, develop web pages and implement systems and processes related to Internet.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S	M				L
CO2		S	S		S	L	
CO3	M	S	M		M	S	
CO4			S	L	L	L	
CO5		M	M	S	L		

UNIT –I   **12 Hours**

Basics of Internet communication - Hardware elements associated with internet - Internet Services - Internet Protocols - TCP/IP, UDP, HTTP - other Protocols - Telnet - Gopher - Mail and its types - FTP - Remote access and Transaction - Web Indexes - Search Engines.

UNIT- II   **12 Hours**

Introduction to HTML - Tags and Documents - Link documents using Anchor Tags - Images and Pictures - Tables -HTML Forms - Frames - Framesets.

UNIT- III   **12 Hours**

Introduction to Dynamic web applications -Active Server Page Basics - ASP Object Model - Collections - Introduction to PHP.

UNIT- IV   **12 Hours**

Basic software tools: text- image- and sound editing tools- painting and drawing tools- animation tools. Making instant multimedia: Office suite. Multimedia authoring tools: types- card and page based authoring tools- icon and time based authoring tools.

UNIT- V   **12 Hours**

Macromedia Dreamweaver: Getting started- working with tools- working with text- inserting images- using basic -HTML in dream weaver - adding text to web pages- inserting images- setting up tables Using frame & forms - adding multimedia elements to dream weaver - building style sheets using web page

TEXT BOOKS
1. Tay Vaughan, Multimedia making it work, TMH 6th Edition, 2003
2. Deitel & Deitel, Internet and WWW How to program, Prentice Hall 2000.

REFERENCE BOOKS:
1. Daniel C.Lynch, Marehall T. Rose. Internet Systems Handbook , Addison Wesley 1993.
Thomas Penny, How to do Everything with HTML.
   Unit I   : Chapter XII
   Unit II: Chapter XIII
   Unit III: Chapter I, II, III
   Unit IV: Chapter IV, V, VI, VII, XI
   Unit V: Chapter VII, VIII

		L	T	P	C
BCS17R205	**SOFTWARE ENGINEERING**	**5**	**1**	**0**	**6**

Pre-requisite: Problem Solving Using Computer(**BCS17R181**)

Course Category: Program Core

Course Type: Theory

COURSE OBJECTIVES:

The main objective of the course is to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, and ethical. This course enables the students to analyze, evaluate, select and synthesize information sources for the purpose of developing a software system;

COURSE OUTCOMES:

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

CO1: Plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems

CO2: Evaluate the quality of the requirements, analysis and design work done during the module.

CO3: Design and communicate ideas about software system solutions at different levels

CO4: Analyze and translate a specification into a design, and then realize that design practically, using an appropriate software engineering methodology.

CO5: Know how to develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	**2**	**3**	**4**	**5**	**6**	**7**
CO1		S	M				L
CO2		S	S		S	L	
CO3	M	S	M		M	S	
CO4			S	L	L	L	
CO5		M	M	S	L		

UNIT- I   **12 Hours**

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

UNIT –II   **12 Hours**

Software requirements-Functional and non-functional , user, system, requirement engineering process, feasibility studies, requirements, elicitation, validation and management, software prototyping, prototyping in the software process, rapid prototyping techniques, user interface prototyping, S/W document.

UNIT- III   **12 Hours**

Design Concepts and Principles- Design process and concepts, modular design, design heuristic, design model and document, Architectural design, software architecture, data design, architectural design, transform and transaction mapping, user interface design, user interface design principles.

UNIT- IV   **12 Hours**

Software Configuration Management- The SCM process, Version control, Change control, Configuration audit, SCM standards.Software Project Management: Measures and measurements, S/W complexity and science measure, size measure, data and logic structure measure, information flow measure. Estimations for Software Projects, Empirical Estimation Models, Project Scheduling.

UNIT-V   **12 Hours**

Testing- Taxonomy of software testing, levels, test activities, types of s/w testing, s/w testing strategies, strategic approach and issues, unit testing, integration testing, validation testing, system testing and debugging. Trends in Software Engineering**:** Reverse Engineering and Re-engineering – wrappers – Case Study of CASE tools.

TEXT BOOKS:

Software engineering- A practitioner's Approach, McGraw-Hill, Roger S.Pressman, 7th edition.

Unit I : Chapter
Unit II: Chapter
Unit III: Chapter
Unit IV: Chapter
Unit V: Chapter

REFERENCES:

1. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.

2. Pfleeger, "Software Engineering", Pearson Education India, New Delhi, 1999.

3. Carlo Ghezzi, Mehdi Jazayari and Dino Mandrioli, "Fundamentals of Software Engineering", Prentice   Hall of India, New Delhi, 1991

BCS17R283	**OPERATING SYSTEMS LAB**	L	T	P	C
		0	0	3	2

Pre-requisite: Basic knowledge about process management
Course Category: Program Core
Course Type: Laboratory course

COURSE OBJECTIVES:

This Lab course will introduce the basic principles in Operating System. The objective of this course is to enable the students to get practical knowledge in process management, Memory management, File management, Disk management, Network management, I/O management and learn shell programming in unix environment.

COURSE OUTCOMES:

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

CO1: To understand and write a program in Unix environment using editors

CO2: To Understand the concept of inter process communications using fock, msgque and pipe.

CO3: To design and implement advanced file system operations (Manipulate files and directories)

CO4: Ability to write system level programs

CO5: To Write a shell scripts to automate common tasks

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S	M				L
CO2		S	S		S	L	
CO3	M	S	M		M	S	
CO4			S	L	L	L	
CO5		M	M	S	L		

45 Hours

CYCLE-I

1. Usage of following commands:
   ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.

2. Usage of following commands:
   cal, cat(append), cat(concatenate), mv, cp, man, date.

3. Usage of following commands: chmod, grep, tput (clear, highlight), bc.

4. Write a shell script to check if the number entered at the command line is prime or not.
5. Write a shell script to modify "cal" command to display calendars of the specified months.
6. Write a shell script to modify "cal" command to display calendars of the specified range of months.

CYCLE-II

1. Write a shell script to accept a login name. If not a valid login name display message – "Entered login name is invalid".
2. Write a shell script to display date in the mm/dd/yy format.
3. Write a shell script to display on the screen sorted output of "who" command along with the total number of users .
4. Write a shell script to display the multiplication table any number,
5. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.
6. Write a shell script to find the sum of digits of a given number.

CYCLE-III

1. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
2. Write a shell script to find the LCD(least common divisor) of two numbers.
3. Write a shell script to perform the tasks of basic calculator.
4. Write a shell script to find the power of a given number.
5. Write a shell script to find the factorial of a given number.
6. Write a shell script to check whether the number is Armstrong or not.

BCS17R284	MULTIMEDIA LAB	L	T	P	C
		0	0	3	2
Pre-requisite: Basic knowledge about multimedia					
	Course Category: Program Core				
	Course Type: Laboratory course				

COURSE OBJECTIVES:

The main objective of the course is to aware of the concepts underlying modern Computer Graphics.This course enables the students to design 2D geometric transformations , Algorithms for clipping, 3D geometric and modeling transformation, Illumination models and surface rendering methods .

COURSE OUTCOMES:

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

CO1: Learn the representation and transformation of graphical images and pictures

CO2: Learn algorithmic development of graphics primitives like: line, circle, ellipse, polygon etc.

CO3: To implement various graphics drawing algorithms, 2D-3D transformations and clipping techniques.

CO4: To understand about data compression techniques, image compression techniques like JPEG, video compression techniques like MPEG, and the basic concepts about animation.

CO5: To develop an interactive multimedia presentation by using multimedia devices

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S	M				L
CO2		S	S		S	L	
CO3	M	S	M		M	S	
CO4			S	L	L	L	
CO5		M	M	S	L		

45 Hours

CYCLE-I

1. Write a program to rotate an image.

2. Write a program to drop each word of a sentence one by one from the top.

3. Write a program to drop a line using DDA Algorithm.

4. Write a program to move a car with sound effect.

CYCLE-II

1. Write a program to bounce a ball an move it with sound effect.

2. Write a program to test whether a given pixel is inside or outside or on a polygon.

3. Create Sun Flower using Photoshop.

4. Animate Plane flying in the Clouds using Photoshop.

CYCLE-III

1. Create Plastic Surgery for the Nose using Photoshop.

2. Create See-through text using Photoshop.

3. Create a Web Page using Photoshop.

4. Convert Black and White Photo to Color Photo using Photoshop.

Semester – VI

BCS17R399	PROJECT DISSERTATION	L	T	P	C
		0	0	6	6

Pre-requisite: Any Programming Language

Course Category: Program Core
Course Type: Laboratory

(For the Students admitted from the academic year 2017-2018 and onwards)
CBCS PATTERN
GUIDELINES FOR PROJECT

1. The aim of the project work is to acquire practical knowledge on the implementation of the programming concepts studied.
2. Minimum two students should carry out one project work and it may be a work using the software packages that they have learned or the implementation of concepts from the papers studied or implementation of any innovative idea focusing on application oriented concepts.
3. The project work should be compulsorily done in the college only under the supervision of the department staff concerned.

Viva-Voce
1. Viva-Voce will be conducted at the end of the year by both Internal (Respective Guides) and External Examiners, after duly verifying the Annexure Report available in the College, for a total of 100 marks at the last day of the practical session.
2. Out of 100 marks, 80 marks for project report and 20 marks for Viva Voce.

PROJECT WORK

TITLE OF THE PROJECT WORK

Bonafide Work Done by

STUDENT NAME

REG. NO.

Project Work submitted in partial fulfillment of the requirements

for the award of <Name of the Degree>

of KalasalingamUniversity, Krishnan Koil- 620610

College emblem

GUIDE   HOD

Submitted for the Viva-Voce Examination held on _____

Internal Examiner   External Examiner

MONTH – YEAR

CONTENTS

DISCIPLINE SPECIFIC ELETIVES

BCS17R301	SYSTEM SOFTWARE	L	T	P	C
		5	1	0	6

Pre-requisite: Computer System Architecture(BCS17R103),
Operating Systems(BCS17R203)

Course Category: Discipline Specific Elective
Course Type: Theory course

COURSE OBJECTIVES:

The main objective of this course is to gain knowledge on system software and machine architecture concepts, DBMS, text editors and interactive debugging system.

COURSE OUTCOMES:

Upon the completion of this course, the students will be able to
CO1: Understand the System Software, Machine Architectures and Assembler Features.
CO2: Explain the Functions of Loader and Linker.
CO3: Describe the functions of Macro Processors.
CO4: Discuss the basic functions of Compilers and Interpreters.
CO5: Explain the features of DBMS, Text Editors and Debugging System.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S				S	
CO2		S	L	L		S	
CO3		S		L		M	
CO4		M	L	M		S	L
CO5		M	L	M		S	L

UNIT- I   **14 Hours**

Introduction to system software and machine Architecture– Simplified instructional Computer – Traditional machines – RISC Machines Assemblers: Basic assembler functions, machine dependent and machine independent assemblers features – Assemblers design options.

UNIT- II   **12 Hours**

Loader and Linkers- Basic Loader functions, machine dependent and machine independent loader features – Loader design options.

UNIT- III   **10 Hours**

Macro Processors- Basic Macro Processor functions – machine independent Macro Processor features – Macro Processor design options

UNIT –IV   **12 Hours**

Compliers - Basic Complier functions – machine independent Complier features – Complier design options - Division into passes – Interpreters – p-code compilers - Compiler-compilers.

UNIT -V **12 Hours**

Other System Software - Database Managements Systems – Text Editors – Interactive Debugging Systems

TEXT BOOKS:

1. System Software An Introduction to System Programming by Leland L. Beck, Addison-Wesley Publication, 2005
2. H.M. Deitel, Operating Systems, 2nd Edition, Perason, 2003.
Chapters: 1 – 5, 7 (Without Implementation Examples).

REFERENCES:

1. System programming and operating system, Dhamdhere, Tata McGraw Hill, 2006.
2. Achy8ut S. Godbole, Operating Systems, TMH, 2002.

BCS17R302	CLIENT SERVER COMPUTING	L	T	P	C
		5	1	0	6

Pre-requisite: Operating Systems(BCS17R203),Database Management Systems (BCS17R201)
Course Category: Discipline Specific Elective
Course Type: Theory course

COURSE OBJECTIVES:

The main objective of the course is to gain knowledge on Client / Server Concepts and various components of client / server Applications.

COURSE OUTCOMES:

Upon the completion of this course, the students will be able to
CO1: Understand the concept of Client/Server computing and its advantages.
CO2: Explain the components of Client/ Server Applications.
CO3: Describe the communication between Components of Client / Server Applications.
CO4: Discuss the hardware and software Components of Client / Server Applications.
CO5: Explain the Services and Support provided by the Client / Server Applications.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		L	M			M	
CO2		M	M			S	
CO3		M	M		L	S	
CO4		S	M		L	S	
CO5			S	M	L	S	

UNIT- I **12 Hours**

Client / Server Computing – Advantages of Client / Server Computing – Technology Revolution – Connectivity – Ways to improve Performance – How to reduce network Traffic.

UNIT- II **12 Hours**

Components of Client / Server Applications – The Client: Role of a Client – Client Services – Request for Service. Components of Client / Server Applications – The Server: The Role of a

Server – Server Functionality in Detail – The Network Operating System – What are the Available Platforms – The Server Operating system.

UNIT -III **12 Hours**

Components of Client / Server Applications – Connectivity: Open System Interconnect – Communications Interface Technology – Inter-process communication – WAN Technologies.

UNIT- IV **12 Hours**

Components of Client / Server Applications – Software: Components of Client / Server Applications – Hardware.

UNIT- V **12 Hours**

Components of Client / Server applications – Service and Support: System Administration. The Future of Client / Server Computing: Enabling Technologies – Transformational Systems.

TEXT BOOKS:

1. Client /Server Computing, Patrick Smith, Steve Guenferich, 2nd edition, PHI. (Chapters 1-8 & 10)

REFERENCES:

1. Dewire and Dawana Travis, Client/ Server Computing, TMH.
2. Robert Orfali, Dan Harkey, Jeri Edwards: The Essential Client/Server Survival Guide, 2 nd edition, Galgotia Publications.

BCS17R303	BIG DATA ANALYTICS	L	T	P	C
		5	1	0	6

Pre-requisite: Database Management Systems(BCS17R201)

Course Category: Discipline Specific Elective

Course Type **:** Theory

COURSE OBJECTIVES:

The main objective of the course is to prepare the students to understand and practice Big Data Analytics using Hadoop,Ecosystem and a Career in Analytics as a Hadoop Developer, Hadoop Administrator, Data Scientist

COURSE OUTCOMES:

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

CO1: Understand the key issues on big data, characteristics, data sources and the associated applications in intelligent business and scientific computing.

CO2: Acquire fundamental enabling techniques and scalable algorithms in big data analytics.

CO3: Interpret business models and scientific computing paradigms, and apply software tools for Big data analytics.

CO4: Achieve adequate perspectives of big data analytics in marketing, financial services, health services, social networking, astrophysics exploration, and environmental sensor applications.

CO5: Select visualization techniques and tools to analyze big data and create statistical models and understand how to handle large amounts of data.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		L	M			M	
CO2		M	M			S	
CO3		M	M		L	S	
CO4		S	M		L	S	
CO5			S	M	L	S	

UNIT-I   **12 Hours**
Analytics – Nuances of big data – Value – Issues – Case for Big data – Big data options Teamchallenge – Big data sources – Acquisition – Nuts and Bolts of Big data. Features of Big Data -Security, Compliance, auditing and protection - Evolution of Big data – Best Practices for Big data Analytics - Big data characteristics - Volume, Veracity, Velocity, Variety – Data Appliance and Integration tools – Greenplum – Informatica

UNIT- II   **12 Hours**
Evolution of analytic scalability – Convergence – parallel processing systems – Cloud computing –grid computing – map reduce – enterprise analytic sand box – analytic data sets – Analytic methods – analytic tools – Cognos – Microstrategy - Pentaho. Analysis approaches – Statistical significance – business approaches – Analytic innovation – Traditional approaches – Iterative

UNIT-III   **12 Hours**
Introduction to Streams Concepts – Stream data model and architecture - Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window - Realtime AnalyticsPlatform(RTAP) applications IBM Infosphere – Big data at rest – Infosphere streams – Data stage –Statistical analysis – Intelligent scheduler – Infosphere Streams

UNIT-IV   **12 Hours**
Predictive Analytics – Supervised – Unsupervised learning – Neural networks – Kohonen models – Normal – Deviations from normal patterns – Normal behaviours – Expert options – Variable entry - Mining Frequent itemsets - Market based model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent itemsets in a stream – Clustering Techniques – Hierarchical – K- Means – Clustering high dimensional data Visualizations – Visual data analysis techniques, interaction techniques; Systems and applications

UNIT- V   **12 Hours**
IBM for Big Data – Map Reduce Framework - Hadoop – Hive - – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Hbase – Impala – Analyzing big data with twitter – Big data for Ecommerce – Big data for blogs.

TEXT BOOKS:

1. Frank J Ohlhorst, ―Big Data Analytics: Turning Big Data into Big Money‖, Wiley and SAS
Business Series, 2012.
2. Colleen Mccue, ―Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis‖,Elsevier, 2007
REFERENCES:
1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
2. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 2012.

BCS17R304	DATAMINING AND DATA WAREHOUSING	L	T	P	C
		5	1	0	6

Pre-requisite: Database Management Systems(BCS17R201)

Course Category: Discipline Specific Elective
Course Type: Theory course

COURSE OBJECTIVES:

The main objective of the course is to introduce the basic concepts of *Data Warehouse* and *Data Mining* techniques. Examine the types of the *data* to be *mined* and apply preprocessing methods on raw *data*. Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.

COURSE OUTCOMES

Upon the completion of this course, the students will be able to
CO1: Gain the knowledge about Data warehouse and DBMS Schemas for Decision Support.
CO2: Explain about Reporting, Query tools and OLAP.
CO3: Describe Data mining functionalities, Task Primitives and Data Preprocessing steps.
CO4: Apply various Association rule mining, classification and prediction methods in various data sets.
CO5: Discuss various clustering methods and applications in Data mining.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1			M	L			L
CO2		M	S		M		M
CO3			S	L	M		
CO4		S	S		S		M
CO5		S	S		S		L

UNIT- I   **10 Hours**
Data warehousing Components –Building a Data warehouse –- Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata.
UNIT- II   **10 Hours**
Reporting and Query tools and Applications – Tool Categories – The Need for Applications — Cognos Impromptu - Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multi relational OLAP

UNIT-III   **12 Hours**
Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse–Data Preprocessing.

UNIT- IV   **14 Hours**
Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining Various Kinds of Association Rules – Correlation Analysis – Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back propagation - Prediction

UNIT- V   **14 Hours**
Cluster Analysis - Types of Data – Categorization of Major Clustering Methods - K- means – Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Outlier Analysis – Data Mining Applications.

TEXT BOOKS:

1. Alex Berson and Stephen J. Smith, " Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, Tenth Reprint 2007.
2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier, 2007.

REFERENCES:

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, " Introduction To Data Mining", Person Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Ajay ", Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, " Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
4. Daniel T.Larose, "Data Mining Methods and Models", Wile-Interscience, 2006.

BCS17R305	CLOUD COMPUTING	L	T	P	C
		5	1	0	6
Pre-requisite: Computer Networks(BCS17R202)					
	Course Category: Elective				
	Course Type: Theory				

COURSE OBJECTIVES:
The main objective of the course is the students can understand the top-down view of cloud computing from applications and administration to programming, infrastructure, billing and security.

COURSE OUTCOMES:
After completing this course, the student will be able to:
CO1:Understand core concepts of the cloud computing paradigm how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.
CO2: Apply the fundamental concepts in datacenters to understand the tradeoffs in power, efficiency and cost by Load balancing approach.
CO3: Illustrate the fundamental concepts of cloud storage and demonstrate their use in storagesystems such as Amazon S3 and HDFS.
CO4: Analyze various cloud programming models and apply them to solve problems on the cloud.
CO5: Analyze the billing of resources and understand various management and how to deal with disasters.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1			M	L			L
CO2		M	S		M		M
CO3			S	L	M		
CO4		S	S		S		M
CO5		S	S		S		L

UNIT-I   **12 Hours**
Introduction to the Cloud Computing, History of cloud computing, Cloud service options, Cloud Deployment models, Business concerns in the cloud Virtualization and Cloud Platforms -Exploring virtualization, Load balancing, Hypervisors, Machine imaging,Cloud marketplace overview, Comparison of Cloud providers.

UNIT-II   **12 Hours**
AWS history, AWS Infrastructure, AWS services, AWS ecosystem Programming, management console and storage on AWS- Basic Understanding APIs - AWS programming interfaces, Web services, AWS URL naming, Matching interfaces and services, Elastic block store - Simple storage service, Glacier - Content delivery platforms

UNIT-III   **12 Hours**
Users, groups, and roles - Understanding credentials, Security policies,IAM abilities and limitations, AWS physical security - AWS compliance initiatives, Understanding public/private keys, Other AWS security capabilities.

UNIT-IV   **12 Hours**
Virtual private clouds, Cloud models, Private DNS servers (Route 53),Relational database service – DynamoDB, ElastiCache, Redshift.

UNIT-V   **12 Hours**
 Analytics services, Application services, Cloud security, CloudWatch,CloudFormation, CloudTrail, OpsWorks. Managing costs, Utilization and tracking, Bottom line impact,Geographic and other concerns, Failure plans, Examining logs.

TEXT BOOKS:
1. Cloud Computing Bible. Barrie Sosinsky. John Wiley & Sons. ISBN-13: 978-0470903568.
2. Rajkumar Buyya, Cloud Computing: Principles and Paradigms, John Wiley & Sons, First Edition

REFERENCES:
1. Amazon Security overview whitepaper- https://aws.amazon.com/whitepapers
2. IAM Getting started Guide http://docs.aws.amazon.com/IAM/latest/UserGuide/getting-started.html

BCS17R306	DIGITAL IMAGE PROCESSING	L	T	P	C
		5	1	0	6

Pre-requisite: Internet and Multimedia(BCS17R204)

Course Category: Discipline Specific Elective

Course Type: Theory

COURSE OBJECTIVES:

The main objective of the course is students can understand the theoretical knowledge of digital image processing techniques and applications

COURSE OUTCOMES:
After completing this course, the student will be able to:
CO1: Acquire the fundamental concepts of a digital image processing system.
CO2: Learn different image transforms techniques
CO3:Apply image enhancement techniques.
CO4: Understand the concept of restoration techniques.
CO5: Analyze and compress given images using segmentation techniques.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1			M	L			L
CO2		M	S		M		M
CO3			S	L	M		
CO4		S	S		S		M
CO5		S	S		S		L

UNIT- I **12 Hours**
Background and Applications –Elements of Digital Image Processing System –Elements of Visual Perception –Brightness Adoption and Discrimination –Color Representation - Statistical Background –Image Representation –The Need –Format.

UNIT- II **12 Hours**
The Discrete Fourier Transform(DFT) –Properties of 2-D DFT –Hadamard Transform – Walsh Transform –Discrete Cosine Transform (DCT) –Karhunen-Loeve(KL) Transform – Wavelet Transform (WT) –Discrete Sine Transform (DST)-Wavelet Compression.

UNIT- III **12 Hours**

Introduction –Point Operations –Histogram Modeling –Image Smoothing –Magnification and Interpolation –Transform Operations –Multispectral Image Enhancement –False Color, True Color & Pseudo Color –Color Image Enhancement.

UNIT -IV **12 Hours**

Introduction –Convolution Techniques –Formulation of Discrete Linear Operators –Inverse and Weiner Filtering –Maximum Entropy Restoration –Coordinate Transformation and Geometric Correction –Splines and their Role in Image Restoration –Fourier Descriptors.

UNIT- V **12 Hours**

Edge Detection–Segmentation –Texture –Texture Segmentation –Introduction to Image Compression –Error Criterion –Lossy Compression –Loss-less Compression –Other Methods.

TEXT BOOKS:

1.Madhuri A.Joshi, ―Digital Image Processing –An Algorithmic pproach‖, PHI Learning, 2009.
2.HandaB, Dutta MajumderD, ―Digital Image Processing and Analysis‖, PHI Learning, 2009.

REFERENCES:
1. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing', Pearson, Second Edition,2004
2. Anil K. Jain, , Fundamentals of Digital Image Processing', Pearson 2002

BSI17R301	**INFORMATION SECURITY AND CYBER LAWS**	**L**	**T**	**P**	**C**
		5	**1**	**0**	**6**
Pre-requisite: Computer Networks(BCS17R202)					
Course Category: Discipline Specific Elective **Course Type** : Theory					

COURSE OBJECTIVES:

The main objective of the course is students can understand the basics of information security, issues in information security, aspects of risk management and to become aware of technological concepts relating to cyberspace.

COURSE OUTCOMES:

Upon completing this course, the student will be able to:
CO1: Discuss the basics of information security
CO2: Illustrate the legal, ethical and professional issues in information security
CO3: Demonstrate the aspects of risk management.
CO4: Design of Security Architecture
CO5: Understand the concepts of cyber law.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO								
	1	2	3	4	5	6	7		
CO1			S	S					
CO2			S	M	L				
CO3		S	M	S	L				
CO4		M	S	S	M				
CO5		M	S	M			M		

UNIT- I   **12 Hours**
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   **12 Hours**
Need for Security - Business Needs – Threats – Attacks – Legal - Ethical and Professional Issues

UNIT- III   **12 Hours**
Risk Management - Identifying and Assessing Risk - Assessing and Controlling Risk

UNIT- IV   **12 Hours**

Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control Devices, Physical Security, Security and Personnel

UNIT- V   **12 Hours**
Overview of cyber-law ,Basic concepts like cyber-law, cyberspace, Building blocks of cyber space, Evolution of Internet and types of net, Defining computer, computer network, computer system, computer system, Cyber Jurisprudence at International and Indian Level

TEXT BOOKS:

1. "Principles of Information Security" – by Michael E Whitman and Herbert J,Mattord, Vikas Publishing House, New Delhi, 2003
2. Rodney D. Ryder, " Guide to Cyber Laws", Second Edition, Wadhwa and Company,New Delhi, 2012
.
REFERENCES:

1. Micki Krause, Harold,F. Tipton, "Handbook of Information Security Management" Vol 1-3 CRC Press LLC, 2004.
2. Stuart Mc Clure, Joel Scrambray, "Hacking Exposed" - George Kurtz, Tata, McGraw-Hill, 2003
3. Justice Yatindra Singh, " Cyber Laws", Universal Law Publishing, New Delhi, 2013.
4. J. Rosenoer, "CyberLaw: The Law of the Internet", 2010.

BCS17R321	E – COMMERCE	L	T	P	C
		5	1	0	6

Pre-requisite: Basic knowledge about Business administration

Course Category: Discipline Specific Elective
Course Type: Theory course

COURSE OBJECTIVES:
The main objective of the course is the students should have thorough understanding of: E-Commerce , E-Market , EDI , Business Strategies etc.

COURSE OUTCOMES:
Upon the completion of this course, the students will be able to
CO1: Gain the knowledge about fundamentals of E-Commerce and Supply chain Management.
CO2: Explain about Business Strategy and Inter Organizational Transactions.
CO3: Describe the concepts of EDI with its pros and cons, and EDI Concepts.
CO4: Discuss the various technologies used to build E-Commerce websites.
CO5: Discuss the E-Business with real-time Examples.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1			M	M	L		
CO2			M	M	L		
CO3			S	M			
CO4		S	S	S	S		L
CO5		S	L	M	S		L

UNIT- I   **12 Hours**
Introduction to E-Commerce: The Scope of E-Commerce – Definition-E-Commerce & the Trade Cycle – Electronic Market – Electronic Data Interchange – The Internet Commerce – The E-Commerce in Perspective. Business Strategy: The Value Chain – Supply Chains – Porter's Value Chain Model – The Inter Organizational Value Chain.

UNIT- II   **12 Hours**
The Introduction to Business Strategy – Strategic Implications of IT – Technology – Business Environment – Business Capability – Existing Business Strategy – Strategy Formulation & Implementation Planning – e-Commerce Implementation -Commerce Evaluation. The Inter Organizational Transactions – The Credit Transaction Trade Cycle. A Variety of Transactions – Pens & Things.

UNIT- III   **12 Hours**
E-Markets: Markets – E-Markets-Usage of E-Markets-Advantages & Disadvantages of E-Markets. EDI: Introduction – Definition - Benefits of EDI – EDI Standards – EDI Communication EDI Implementation – EDI Agreement – EDI Security.

UNIT-IV   **12 Hours**

The Internet : The Internet – The Development of the Internet – TCP/IP – Internet Components – Uses of the Internet – A Page on the Web: HTML Basics – Introduction to HTML – Further HTML – Client Side Scripting – Server Side Scripting – HTML Editors & Editing – The Elements of E-Commerce : Elements – e-Visibility – The e-Shop – On line Payments - Delivering the Goods – Internet e-Commerce Security .

UNIT- V   **12 Hours**

E-Business: Introduction - The Internet Bookshops – Grocery Supplies - Software Supplies and Support – Electronic Newspapers – The Internet Banking - The Virtual Auctions – Online Share Dealing – Gambling on the Net – e-Diversity.

TEXT BOOK:
   1. David Whiteley, E-Commerce – Strategy, Technology & Applications, Tata McGraw Hill.

REFERENCES :
   1. E-commerce Get It Right! by Ian Daniel, NeuroDigital, 2011
   2. The Complete E-commerce Book: Design, Build & Maintain a Successful Web-based Business, Janice Reynolds, CMP Books, 2000

BCS17R322	ENTERPRISE AND RESOURCE PLANNING	L	T	P	C
		5	1	0	6

Pre-requisite: Basic knowledge in business and planning

Course Category: Discipline Specific Elective
Course Type: Theory course

COURSE OBJECTIVES:

The main objective of the course is to make the students to know the strategic importance of Enterprise Resource Planning

COURSE OUTCOMES:

Upon the completion of this course, the students will be able to
CO1: Gain the knowledge about fundamentals of ERP.
CO2: Understand the key implementation issues of ERP
CO3: Describe the business modules of ERP.
CO4: Aware of some popular products in the area of ERP
CO5: Appreciate the current and future trends in ERP

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1			L	M			
CO2		S	M	M	L		L
CO3			S	S	L		
CO4		L	S	S	L		
CO5				S			

UNIT- I   **12 Hours**

Introduction – Related Technologies – Business Intelligence – E-Commerce and EBusiness – Business Process Reengineering – Data Warehousing – Data Mining – OLAP – Product life Cycle management – SCM – CRM

UNIT- II   **12 Hours**

Implementation Challenges – Strategies – Life Cycle – Pre-implementation Tasks – Requirements Definition – Methodologies – Package selection – Project Teams – Process Definitions – Vendors and Consultants – Data Migration

UNIT- III   **14 Hours**

Operation and Maintenance – Performance – Maximizing the ERP System – Business Modules – Finance – Manufacturing – Human Resources – Plant maintenance – Materials Management – Quality management – Marketing – Sales, Distribution and service.

UNIT- IV   **12 Hours**

Marketplace – Dynamics – SAP AG – Oracle – PeopleSoft – JD Edwards – QAD Inc – SSA Global – Lawson Software – Epicor – Intutive.

UNIT- V   **10 Hours**

Enterprise Application Integration – ERP and E-Business – ERP II – Total quality management – Future Directions – Trends in ERP.

TEXT BOOKS:
1. Alexis Leon, "ERP DEMYSTIFIED", Tata McGraw Hill, Second Edition, 2008.
2. Mary Sumner, "Enterprise Resource Planning", Pearson Education, 2007.

REFERENCES:
1. Jim Mazzullo,"SAP R/3 for Everyone", Pearson,2007.
2. Jose Antonio Fernandz, " The SAP R /3 Handbook", Tata McGraw Hill, 1998.
3. Biao Fu, "SAP BW: A Step-by-Step Guide", First Edition, Pearson Education, 2003.

BCS17R323	MANAGEMENT INFORMATION SYSTEMS	L	T	P	C
		5	1	0	6

Pre-requisite: Basic knowledge in Business management

Course Category: Discipline Specific Elective

Course Type: Theory

COURSE OBJECTIVES:

The main objective of this course is to introduce the students to the Management Information System*s* and its application in organizations. The course would expose the students to the managerial issues relating to information systems and help them identify and evaluate various options in Management Information Systems.

COURSE OUTCOMES:
Upon the completion of this course, the students will be able to
CO1: Gain the knowledge about fundamentals of information system and organization.
CO2: Understand the representation and analysis of system structure**.**
CO3: Describe information theory and information needed to support decision making.
CO4: Explain about transaction processing applications and use of information technology.
CO5: Understand development and maintenance of information systems.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1			S	S			
CO2			S	M	L		
CO3		S	M	S	L		
CO4		M	S	S	M		
CO5		M	S	M			M

UNIT -I   **12 Hours**

Matching the Information System Plan to the Organizational Strategic Plan – Identifying Key Organizational Objective and Processes and Developing an Information System Development – User role in Systems Development Process

UNIT- II   **12 Hours**

Models for Representing Systems: Mathematical, Graphical and Hierarchical – Information Flow – Process Flow – Methods and Heuristics – Decomposition and Aggregation – Information Architecture

UNIT- III   **12 Hours**

Information Theory – Information Content and Redundancy – Classification and Compression – Summarizing and Filtering – Identifying Information needed to Support

Decision Making – Human Factors – Problem characteristics and Information System Capabilities in Decision Making.

UNIT- IV   **14 Hours**

Transaction Processing Applications – Basic Accounting Application – Applications for Budgeting and Planning – Other use of Information Technology: Automation – Word Processing – Electronic Mail – Evaluation Remote Conferencing and Graphics – System and Selection – Cost Benefit – Centralized versus Decentralized Allocation Mechanism.

UNIT- V   **10 Hours**

Systems analysis and design – System development life cycle – Limitation – End User Development – Managing End Users – off– the shelf software packages – Outsourcing – Comparison of different methodologies.

TEXT BOOK:
1. Laudon K.C, Laudon J.P, Brabston M.E, "Management Information Systems - Managing the digital firm", Pearon Education, 2004.
REFERENCES:

1. Turban E.F, Potter R.E, "Introduction to Information Technology"; Wiley, 2 004.
2. Jeffrey A.Hoffer, Joey F.George, Joseph S. Valachich, "Modern Systems Analysis and Design", Third Edition, Prentice Hall, 2002.

BCS17R371	**JAVA PROGRAMMING**	L	T	P	C
		4	0	4	6
Pre-requisite: Programming in C++ (**BCS17R104**)					
	Course Category: : Discipline Specific Elective Course Type: Integrated course				

COURSE OBJECTIVES:

The main objective of the course is to introduce students about object oriented concepts in java programming language and develop java programs to be implemented in various fields.

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

CO1: To understand the principles and practice of object oriented analysis

CO2: Ability to implement basic concepts, compile, test and run Java programs comprising

   more than one class, to address a particular software problem

CO3: Ability to make use of members of classes found in the Java API packages and

   interfaces

CO4: Understand the concept of File handling in java

CO5: Demonstrate the ability to employ various types of selection constructs in a Java program.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1			L	M			
CO2		S	M	M	L		L
CO3			S	S	L		
CO4		L	S	S	L		
CO5				S			

UNIT-I   **12 Hours**
Introduction-Object Oriented paradigm-Basic concepts of object oriented programming-Benefits of OOP-Applications of OOP- Java Features- How Java differs from C and C++ – Java and Internet –Java and www – simple Java program –Structure – Java Tokens – Statements

UNIT-II   **12 Hours**
Constants, Variables, Data Types - Operators and Expressions – Decision Making and Branching: if, if...else, nested if, switch - Decision Making Statements, and Looping: while, do, for – Jumps in Loops - Labeled Loops – Classes, Objects and Methods.

UNIT-III   **12 Hours**
Arrays- Introduction-One dimensional arrays –Two dimensional arrays-Strings-Vectors-Enumerated types-Interfaces- Defining, Extending and implementing interfaces- Packages – JAVA API packages- creating packages-Accessing packages-Adding a class to a package-Hiding classes

UNIT-IV   **12 Hours**
Multithreaded Programming-creating threads- extending thread class- stopping and blocking a thread-life cycle of a thread-synchronization- Implementing a Runnable interface- Inter thread communication-Managing Errors and Exceptions – Applet Programming – Graphics Programming.

UNIT-V   **12 Hours**
Managing Input/output Files in Java : Concepts of Streams- Stream Classes – Byte Stream classes – Character stream classes – Using streams – I/O Classes – File Class – I/O exceptions – Creation of files – Reading / Writing characters, Byte-Handling Primitive data Types – Random Access Files.

TEXT BOOKS:
1. PROGRAMMING WITH JAVA – A PRIMER - E. Balagurusamy, 4th Edition, Tata McGraw-Hill, 2010

REFERNCES:
1. THE COMPLETE REFERENCE JAVA 2 - Patrick Naughton & Hebert Schildt, 3rd ed,TMH
2. S. Ramkumar, K.Satheesh kumar, K.Sumathi, "Java for Beginners – A Guide", Scitech Publications, India, 1st Edition, 2017.

3. PROGRAMMING WITH JAVA – John R. Hubbard, 2nd Edition, TMH.

4. JAVA and Object-Oriented Programming Paradigm – Debasish Jana, 2005, PHI.

5. Ken Arnold, James Gosling, David Homes, "The Java Programming Language", 4th Edition, 2005.

REFERENCES:

1. James Gosling, Bill Joy, Guy L Steele Jr, GiladBracha, Alex Buckley"The Java Language Specification, Java SE 8 Edition (Java Series)", Published by Addison Wesley, 2014.

2. Paul Deitel, Harvey Deitel, "Java: How to Program", 10th Edition, Prentice Hall, 2011.

List of Programs:

1. Programs using classes and methods
2. Programs using one dimensional and two dimensional arrays
3. Programs using Strings
4. Programs using vectors
5. Programs using Inheritance
6. Generate the program using interfaces
7. Programs to implement the exception handling mechanism
8. Programs to implement packages.
9. Programs using multithreading
10. Programs using Applet

BCS17R372	DATA STRUCTURES AND ALGORITHMS	L	T	P	C
		4	0	4	6
Pre-requisite: Problem Solving Using Computer(BCS17R101)					
	Course Category: : Discipline Specific Elective				
	Course Type: Intenerated course				

COURSE OBJECTIVES:

The main objective of the course is to teach students various data structures and to explain them algorithms for performing various operations on these data structures.

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

CO1: Analyze performance of algorithms and choose the appropriate data structure and algorithm design method for a specified application.

CO2: Demonstrate understanding of the abstract properties of various data structures such as stacks, queues, lists, trees and graphs and Use various data structures effectively in application programs.

CO3: Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals, and shortest paths.

CO4: Demonstrate understanding of various sorting algorithms, including bubble sort, insertion sort, selection sort, heap sort and quick sort.

CO5: Gain knowledge about Hashing and Collisions and B- Trees

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1			L	M			
CO2		S	M	M	L		L
CO3			S	S	L		
CO4		L	S	S	L		
CO5				S			

UNIT – I   **12 Hours**
Algorithmic notation – Programming principles – Creating programs- Analyzing programs - array –Representation of Arrays- One dimensional array- Multidimensional array- pointer arrays- Stack and Queue – Fundamentals of stack and Queues – Evaluation of Expressions

UNIT- II   **12 Hours**
Linked List: Single Linked List – Doubly Linked List – Circular Linked List- Application of Linked List- Dynamic Storage Management – Generalized List – Garbage Collection And Compaction

UNIT- III   **12 Hours**
Tree Introduction - Binary Tree Representation – Tree Traversal- Threaded binary Tree – AVL Tree– Graphs – Graphs representation –Graph Traversal - Topological Sorting

UNIT –IV   **12 Hours**
Bubble sort – Insertion Sort – Selection sort – Radix Sort - Shell Sort– Merge sort – Quick Sort – Heap Sort –Linear Search – Binary Search

UNIT- V   **12 Hours**
Hashing – Types of Hashing – Collision Resolution techniques- B- Tree Representation – B tree Operations- B+ Tree Indexing

TEXT BOOKS:
.
 1. Ellis Horowitz ,Fundamentals of Computer Algorithms, Sartaj Sahni, Rajasekaran, 2nd Edition, University Press, 2008.
 2 .D. Samanta- "Classic Data Structures"- Prentice-Hall of India- Pvt. Ltd.- India 2006

REFERENCES :
1. Robert Kruse- C.L. Tondo and Bruce Leung- "Data Structures and Program Design in C"- Prentice-Hall of India- Pvt. Ltd.- Third- 2006.
2. Jean Paul Tremblay and Paul G. Sorenson- "An Introduction to Data Structures with Applications"- Tata McGraw-Hill- Third Edition- 2006.
3. Mark Allen Weiss-" Data Structures and Algorithm Analysis in C"- Pearson Education- Second edition- 2006

List of Programs

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

BCS17R373	OBJECT ORIENTED ANANLYSIS AND DESIGN	L	T	P	C
		4	0	4	6

Pre-requisite: Software Engineering**(BCS17R205)**

Course Category: : Discipline Specific Elective

Course Type: Integrated course

COURSE OBJECTIVES:

The main objective of the course is to teach students about object oriented way of solving problems and to make the student to identify and practice the object-oriented programming concepts and techniques.

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

CO1: Show the importance of systems analysis and design in solving complex problems
CO2: Show how the object-oriented approach differs from the traditional approach to systems analysis and design
CO3: Explain the importance of modeling and how the Unified Modeling Language (UML) represents an object-oriented system using a number of modeling views.
CO4: Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state chart diagrams, activity diagrams
CO5: Recognize the difference between various object relationships: inheritance, association, whole-part, and dependency relationships

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1			L	M			
CO2		S	M	M	L		L
CO3			S	S	L		
CO4		L	S	S	L		
CO5				S			

UNIT-I   **12 Hours**
UML - More about UML - Visualizing a Class - Modeling a Class - Modeling the Relations among Classes - Test cases.

UNIT-II   **12 Hours**
Use Case Diagrams - Use Case Narratives - Use Case Scenarios - Use Case Relationships Understanding the Activity Diagrams - Applying Use Cases

UNIT-III   **12 Hours**
Purpose of Sequence Diagrams - Notations of a Sequence Diagram - Object Lifeline - Activation Message - Understanding Business Modeling - Purpose of State Chart Diagram - Mapping Object Life Cycle - Notations for State Chart Diagrams -State and Composite State -Event - Transition.

UNIT-IV   **12 Hours**
The Interaction Diagrams - Purpose of Collaboration Diagrams - Similarities and Differences between Sequence and Collaboration Diagrams - Notations of a Collaboration Diagram - Creation and Destruction Markers - Entity, Control, Boundary - Apply interaction diagrams to evolve analytical model

UNIT-V   **12 Hours**
Mechanisms - Apply mechanism - Subsystem Identification - Packaging - Architectural patterns - Component Diagram - Deployment Diagram -Class design patterns - Class design

TEXT BOOK:
1. Ali Bahrami, Object Oriented System Development, McGraw Hill International Edition, 2011.

REFERENCES:
1. Craig Larman, "Applying UML and Patterns ",2nd Edition, Pearson Education, 2002
2. Grady Booch," The Unified Modeling Language User Guide", James Rumbaugh, Ivar Jacobson, Addison Wesley, 1999

List of Programs

1. Preparation of Project Requirement Analysis Plan and Diagrams Using any of the CASE tools
2. Preparation of Design Layouts – Database, Input, Output Screens
3. Practice object oriented design principles for implementation.
4. Practice function oriented design.
5. Practice creating software documentation for all the phases of software development life cycle with respect to applications

BCS17R374	WEB TECHNOLOGIES	L	T	P	C
		4	0	4	6

Pre-requisite: Internet and Multimedia(**BCS17R204**)
Course Category: : Discipline Specific Elective
Course Type: Integrated course

COURSE OBJECTIVES:

The main objective of the course is to teach students how to build web applications using ASP and client side script technologies use with Microsoft's IIS and to o build XML applications with DTD and style sheets that span multiple domains

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

CO1: Understand, analyze and apply the role of languages like HTML, DHTML, CSS, XML, Javascript, VBScript, ASP, PHP and protocols in the workings of the web and web applications
CO2: Understand, analyze and create web pages using HTML, DHTML and Cascading Styles sheets
CO3: Understand, analyze and build dynamic web pages using JavaScript (client side programming).
CO4: Understand, analyze and create XML documents and XML Schema
CO5: Understand, analyze and build web applications using PHP

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1			L	M			
CO2		S	M	M	L		L
CO3			S	S	L		
CO4	L	S	S	L			
CO5				S			

UNIT-I   **12 Hours**

World Wide Web – Web browsers – Markup Languages –Style Sheet technologies –client side, server side - HTML – Headings –Links -images- Lists- Tables- Forms- Frames
UNIT-II   **12 Hours**

Cascading style sheets-Inline styles-Embedded style sheets-Linking External style sheets-Positioning elements- Dynamic HTML – Object model and collections, Event model, Filters and Transitions.
UNIT-III   **12 Hours**

JAVASCRIPT-Introduction – Simple program-Decision making - Equality and Relational operators – Control statements – Functions – Programmer defined functions, JavaScript global functions, Recursion – Arrays – References and Reference parameters, Passing arrays to functions, Multidimensional arrays – Objects – Object types.
UNIT-IV   **12 Hours**

XML-Introduction-Structuring data-XML namespaces-Document Type Definitions (DTDs) and Schema-W3C XML schema documents-XML vocabularies-Document Object Model (DOM), DOM methods- Simple API for XML (SAX)-Extensible Style sheet Language (XSL)-Simple Object Access Protocol (SOAP).
UNIT-V   **12 Hours**

PHP-Introduction-String processing and regular expressions-Viewing Client/Server environment variables-Form processing and Business logic-Verifying a username and password-connecting to a database

TEXT BOOKS

1. Deitel, Deitel and Neito, INTERNET and WORLD WIDE WEB – How to program, Pearson Education Asia, 5th Edition , 2011.

REFERENCES

1. Achyut S Godbole and Atul Kahate, "Web Technologies", Second Edition, Tata McGraw Hill, 2012.
2. Thomas A Powell, Fritz Schneider, "JavaScript: The Complete Reference", Third Edition, TataMcGraw Hill, 2013.
3. David Flanagan, "JavaScript: The Definitive Guide, Sixth Edition", O'Reilly Media, 2011

List of Programs

1.HTML and JavaScript

a) Preparation of Bio-data using Forms in HTML.
b) Simple Calculation
    a. Inventory Calculation.
c) Input Validation : Payroll maintenance
d) Event Handling
    a. Changing the Background Color of the Window.
e) Develop a Dynamic Web page Using CSS properties and elements for a university website
f) To generate the random numbers and display in a table format.
g) Generation of Fibonacci series
h) Different Pascal triangle generation
i) Function to determine the pair of integers whether the second integer is multiple of the first.
j) Quiz program
k) Create a guessing number game
l) HTML fom validation

2.PHP and MYSQL

a) Program to implement the concept of operator, arrays and functions
b) Program to communicate between two web pages using PHP.
c) Program to create session and cookies
d) Program for file manipulation in PHP
e) Create a database with two tables in MYSQL and perform the basic query operations.
f) Demonstration of joining tables and usage of sub queries.
g) Working with string, numeric and date functions in MYSQL.
h) Develop a application for the demonstration of database connectivity to PHP with MySQL.
i) Develop a simple application for student academic performance

BCS17R375	WEB DESIGN USING HTML5	L	T	P	C
		4	0	4	6

Pre-requisite: Internet and Multimedia(**BCS17R204**)
Course Category: : Discipline Specific Elective
Course Type: Integrated course

COURSE OBJECTIVES:

The main objective of the course is to aware of the concepts web designing using HTM5.This course enables the students to design attractive web pages.

COURSE OUTCOMES:

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

CO1: Learn the basic principles involved in web designing

CO2: Understand HTML tags and its attributes

CO3: Design web pages with text,frames images and hyper links

CO4: Understand the concept of cascade style sheet and working with cascade style sheet

CO5: Design a complete website

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1			L	M			
CO2		S	M	M	L		L
CO3			S	S	L		
CO4		L	S	S	L		
CO5				S			

UNIT-1   **12 Hours**
Web Design Principles: Basic principles involved in developing a web site - Planning process - Five Golden rules of web designing -Designing navigation bar -Page design-Home Page Layout -Design Concept-Brief History of Internet -What is World Wide Web -Why create a web site -Web Standards -Audience requirement.

UNIT- II   **12 Hours**

Introduction to HTML: What is HTML -HTML Documents-Basic structure of an HTML document -Creating an HTML document -Mark up Tags -Heading-Paragraphs- Line Breaks - HTML Tags.

UNIT- III   **12 Hours**
Elements of html: Introduction to elements of HTML-Working with Text- Working with Lists, Tables and Frames- Working with Hyperlinks, Images and Multimedia -Working with Forms and controls.

UNIT- IV   **12 Hours**
Introduction to Cascading Style Sheets: Concept of CSS -Creating Style Sheet -CSS Properties -CSS Styling(Background, Text Format, Controlling Fonts) -Working with block elements and objects -Working with Lists and Tables -CSS Id and Class- Box Model(Introduction, Border properties, Padding Properties, Margin properties) - CSS Advanced(Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class,

Navigation Bar, Image Sprites, Attribute sector) -CSS Color -Creating page Layout and Site Designs.

UNIT- V   **12 Hours**
Introduction to Web Publishing or Hosting: Creating the Web Site -Saving the site-Working on the web site-Creating web site structure -Creating Titles for web pages -Themes-Publishing web sites.

TEXT BOOK
1.Kogent Learning Solutions Inc, HTML 5 in simple steps A beginner's guide to HTML, Dreamtech Press

REFERENCE BOOKS
1. Steven M. Schafer, Web Designing & Architecture-Educational Technology Centre. University of Buffalo
2. Steven M. Schafer, HTML, XHTML, and CSS Bible, 5ed. Wiley India
3. John Duckett, Beginning HTML, XHTML, CSS, and JavaScript. Wiley India
4. Ian Pouncey, Richard York, Beginning CSS: Cascading Style Sheets for Web Design. Wiley India

List of Programs

1. Create an HTML document with the following formatting options

- Bold
- Italics
- Underline
- Headings (Using H1 to H6 heading styles)
- Font (Type, Size and Color)
- Background (Colored background/Image in background)
- Paragraph
- Line Break
- Horizontal Rule
- Pre tag

2. Create an HTML document which consists of:
- Ordered List
- Unordered List
- Nested List
- Image

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

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

5.Create a form using HTML which has the following types of controls:
- Text Box
- Option/radio buttons
- Check boxes
- Reset and Submit buttons

6.Create HTML documents (having multiple frames)

BCS17R376	VISUAL PROGRAMMING	L	T	P	C
		4	0	4	6

Pre-requisite: Problem Solving Using Computer(BCS17R101)

Course Category: : Discipline Specific Elective

Course Type: Integrated course

COURSE OBJECTIVES:

The main objective of the course is to make the students to work in visual basic and able to do projects using various features of Visual Basic

COURSE OUTCOMES:

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

CO1: Understand the basic components of visual basic such as data types,arrays and control flow statements

CO2: Work with forms,Menu box,List box and Combox controls

CO3: Design forms using Graphics and images

CO4: Understand Activex controls and implement programs using them

CO5: Understand about data base connectivity and accessing fields of database

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1			L	M			
CO2		S	M	M	L		L
CO3			S	S	L		
CO4		L	S	S	L		
CO5				S			

UNIT-1   **12 Hours**
Visual Basic – Variables – Constant – Arrays – Collections – Procedures – Subroutines, Functions, Calling Procedures – Arguments – Argument Passing Mechanisms, Using Optional Arguments, Passing an UnKnown Number of Arguments, Named Arguments – Function Return Values – Returning Custom Data Type, Arrays, Error as Function Values – Control Flow Statements – If..Then, If..Then..Else, Select Case – Loop Statements – Do..Loop, For..Next, While..Wend – Nested Control Structures – The Exit Statement.

UNIT- II   **12 Hours**
Working With Forms: The Appearance of Forms – Start up, Loading, Showing and Hiding, Controlling – Designing Menus – Menu Editor, Programming Menu Commands, Using Access and Shortcut Keys, Manipulating Menus at Runtime – Building Dynamic form at Runtime.Basic ActiveX Controls – The TextBox Control – Basic Properties, Manipulating Control' Text, Text Selection, Search and Replace Operations, Capturing KeyStrokes – The ListBox and ComboBox Control – Basic Properties, Control's methods, Indexing with the

ListBox –Searching Sorted List, ComboBox Control – The ScrollBar and Slider Controls – ScrollBar Control, Slider Control – File Controls.

UNIT- III   **12 Hours**

Drawing with Visual Basic: Graphics Controls – Sizing Images, Loading and Saving Images, Setting Picture and Image Properties, Exchanging through Clipboard – Coordinate Systems – Scale properties and Methods, Twips Per Pixel X, Twips Per Pixel Y Properties, Current X Current Y Properties – Graphics Methods – Drawing Text, Line and Shapes, Filling Shapes, Circle Method, Drawing Modes, Drawing Curves – Optimization Issues.

UNIT- IV   **12 Hours**

Advanced ActiveX Controls: The Common Dialogs Control – Usage, Properties, Color, Font, FileOpen and FileSave Common Dialog Box, Multiple File Selection, Print and Help Common DialogBox – TreeView and List View – How Tree Structure work, ImageList, Using TreeView and List Control, Structuring Tree View Control, Viewing Folder's Files. More Advanced ActiveX Controls: RichTextBox Control –

UNIT- V   **12 Hours**

DataBase Programming: RecordSets, Data Control, Data Control's Properties, Data Control's Methods – Understanding Relational Concepts – Using Visual Data Manager – Structure of the BIBLIO DataBase – Validating Data – Entering Data – Accessing fields in Recordset – Introduction to SQL – Advanced Data – Bound Controls.-Active Data Objects: Creating Data Project –

TEXT BOOK:
1. Evangelos Petroutsos, Mastering Visual Basic 6, BPB Publications, New Delhi.

REFERENCES:
1. PK.MCBride, Programming in Visual Basic, BPB Publications, New Delhi.
2. Steve Brown, Visual Basic 6 in Record Time, BPB Publications.
3. Gary Cornell & Troy Strain, Visual Basic Nuts & Bolts For Experienced Programmers, MCGrawHill Publication, New Delhi.

List of Programs

1. Write a visual basic program to design a calculator using control arrays
2. Write a visual basic program to find day of the date after 'n' days from current date
3. Write a visual basic program to draw different shapes and fill them
4. Write a visual basic program to create your own note pad
5. Write a visual basic program to implement graphic functions and also to include free hand drawing.
6. Write a visual basic program to animate a picture
7. Write a visual basic program to prepare a mark statement for the students
8. Write a visual basic program to prepare the Electricity bill
9. Write a visual basic program to prepare the pay bill.

BCS17R 377	COMPUTER GRAPHICS	L	T	P	C
		4	0	4	6

Pre-requisite: Problem Solving Using Computer(BCS17R101)

Course Category: : Discipline Specific Elective

Course Type: Integrated course

COURSE OBJECTIVES:

The main objective of the course is to teach the students about the importance of computer graphics in the field of computer science and train them to develop their own programs using graphics packages

COURSE OUTCOMES:

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

CO1: Demonstrate about graphics devices and output primitives

CO2: Understand the attributes of lines and filling algorithms

CO3: Understand Windowing concepts ,Clipping Algorithms and interactive picture construction techniques

CO4: Understand 3D display techniques and 3D representation

CO5: Understand 3D viewing and Hidden space removal techniques.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1			L	M			
CO2		S	M	M	L		L
CO3			S	S	L		
CO4		L	S	S	L		
CO5				S			

UNIT-1   **12 Hours**
Overview of Graphic Systems – Display Devices – hard copy Devices – Interactive Input Devices – Display Processor – Graphic software – Output Primitives – Line Drawing Algorithms – Initialising Lines – Line command – fill areas – circle Generation Algorithms.

UNIT-II   **12 Hours**
Attributes of output primitives – line style – color and Intensity – area filling algorithms – character Attributes – inquiry functions – bundled attributes – two dimensional transformations – basic and composite transformations – metric representations.

UNIT-III   **12 Hours**
Windowing and Clipping – Windowing concepts – Clipping Algorithms – Window to view port Transformations – segments – Interactive input methods – Physical input devices – logical classification of input devices – interactive picture construction techniques – input functions.

UNIT-1V   **12 Hours**
Three dimensional concepts – 3D Display Techniques – 3D representation – polygon and curved surface – 3D transformations.

UNIT-V   **12 Hours**
3D viewing – projections – viewing transformation –Implementation of viewing operations – Hidden surface and Hidden Line removal – back free removal, depth buffer and scan line methods – shading.

TEXT BOOK:
1. Donald Hearn and M.Pualine Baker "Computer Graphics",PHI , 2nd Edition.

REFERENCES:
1.William M.Neuman and Robert F Sproul "Principles of Interactive computer Graphics" , McGraw Hill International Edition,2nd Edition.
2. Foley, van Dam, Feiner, and Hughes. Computer Graphics: Principles and Practice, 3rd edition in C.

List of Programs:
1. Generating lines using line drawing algorithms.
2. Generating circles using circle generation algorithms .
3. Generating ellipse using ellipse generation algorithms.
4. Filling shapes using filling algorithms.
5. Scaling, rotating and translating an object in 2D.
6. Clipping a line using line clipping algorithm.
7. Clipping a polygon using polygon clipping algorithm.
8. Animation program.

SKILL ENHAMEMENT ELETIVES

BCS17R251	OFFICE AUTOMATION TOOLS	T	T	P	C
		1	0	3	2

Pre-requisite: Basic knowledge of operating computer

Course Category: Skill Enhancement Elective

Course Type: Theory with Practical course

COURSE OBJECTIVES :
The students will be familiar with various aspects of XML, and also will be able to develop complex XML applications.

COURSE OUTCOMES :
Upon successful completion of this course, Students will be able to
CO1: To Write a XML application using structure and presentation technologies
CO2: Apply XML manipulation technologies such as XSLT, XPath, XLink and XQuery
CO3: Do Program Manipulation and Dynamic access through DOM architecture

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S				S	
CO2		S	L	L		S	
CO3		S		L		M	

UNIT- I   **20 hrs(5 T+15L)**

Introduction to Microsoft Office 2007-Word Processing & Microsoft Word-Introduction to Word Processing-Some Important Terms of Word Processing Starting Word-Microsoft Word Screen-File Menu-Edit Menu-View Menu-Insert Menu Format Menu Tools Menu-Table Menu-Window Menu-Help Menu-Formatting the Text- Alignment of Text-Applying Fonts-Size of Text-Font of the Text-Color of the Text.

Exercises

1. **Preparing a Govt. Order / Official Letter / Business Letter / Circular Letter**
   Covering formatting commands - font size and styles - bold, underline, upper case, lower case, superscript, subscript, indenting paragraphs, spacing between lines and characters, tab settings etc.

2. **Preparing a news letter:**
   To prepare a newsletter with borders, two columns text, header and footer and inserting a graphic image and page layout.

3. **Creating and editing the table**
   To create a table using table menu

   To create a monthly calendar using cell editing operations like inserting, joining, deleting, splitting and merging cells

   To create a simple statement for math calculations viz. Totalling the column.

4. **Creating numbered lists and bulleted lists**
   To create numbered list with different formats (with numbers, alphabets, roman letters) To create a bulleted list with different bullet characters.

5. **Printing envelopes and mail merge.**
   To print envelopes with from addresses and to addresses

   To use mail merge facility for sending a circular letter to many persons To use mail merge facility for printing mailing labels.

6. **Using the special features**
   To spell check and correct.

   To generate table of contents for a document

To prepare index for a document.

7. Create an advertisement and Prepare a Resume

Prepare a Corporate Circular letter inviting the share holders to attend the Annual Meeting.

UNIT- II   **20 hrs(5 T+15L)**

MS Excel: Working with Spreadsheets- opening, Saving files, setting Margins, Converting files to different formats (importing, exporting, sending files to others), Spread sheet addressing - Rows, Columns & Cells, Referring Cells & Selecting Cells – Shortcut Keys. **Entering & Deleting Data-** Entering data, Cut, Copy, Paste, Undo, Redo, Filling Continuous rows, columns, Highlighting values, Find, Search & replace, Inserting Data, Insert Cells, Column, rows & sheets, Symbols, **Formatting Spreadsheets-** Labelling columns & rows, Formatting- Cell, row, column & Sheet, Category - Alignment, Font, Border & Shading, Hiding/ Locking Cells,. **Working with sheets** – Sorting, Filtering, Validation, Consolidation, and Subtotal. **Creating Charts -** Drawing.

Exercises

1. Using formulas and functions:
To prepare a Worksheet showing the monthly sales of a company in different branch offices (Showing Total Sales, Average Sales).

Prepare a Statement for preparing Result of 10 students in 5 subjects (using formula to get Distinction, I Class, II Class and Fail under Result column against each student).

2. Operating on the sheets:
Finding, deleting and adding records, formatting columns, row height, merging, splitting columns etc. Connecting the Worksheets and enter the data.

3. Creating a Chart:
To create a chart for comparing the monthly sales of a company in different branch offices

4. Using the data consolidate command:
To use the data consolidate command to calculate the total amount budgeted for all departments (wages, travel and entertainment, office supplies and so on) or to calculate the average amount budgeted for – say, department office expenses.

5. Sorting Data, Filtering Data and creation of Pivot tables.

UNIT- III   **20 hrs(5 T+15L)**

MS Power point: Introduction to presentation – Opening new presentation, Different presentation templates, Setting backgrounds, Selecting presentation layouts. Creating a presentation - Setting Presentation style, Adding text to the Presentation. Formatting a Presentation - Adding style, Colour, gradient fills, Arranging objects, Adding Header &

Footer, Slide Background, Slide layout. Adding Graphics to the Presentation- Inserting pictures, movies, tables etc into presentation, Drawing Pictures using Draw. Adding Effects to the Presentation- Setting Animation & transition effect. Printing Handouts, Generating Standalone Presentation viewer.

Exercises

1. Creating a new Presentation based on a template – using Auto content wizard, design template and Plain blank presentation.
2. Creating a Presentation with Slide Transition – Automatic and Manual with different effects.
3. Creating a Presentation applying Custom Animation effects – Applying multiple effects to the same object and changing to a different effect and removing effects.

Text Book:
1. Vikas Gupta "IT Tools and Applications"- -Dreamtech Press-First edition-2003.

BCS17R252	XML PROGRAMMING	L	T	P	C
		1	0	3	2
Pre-requisite: Basic knowledge of operating computer					
	Course Category: Skill Enhancement Elective				
	Course Type: **Theory** with Practical course				

COURSE OBJECTIVES:

The students will be familiar with various aspects of XML, and also will be able to develop complex XML applications.

COURSE OUTCOMES :

Upon successful completion of this course, Students will be able to
CO1: To Write a XML application using structure and presentation technologies
CO2: Apply XML manipulation technologies such as XSLT, XPath, XLink and XQuery
CO3: Do Program Manipulation and Dynamic access through DOM architecture

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S				S	
CO2		S	L	L		S	
CO3		S		L		M	

UNIT- I   **20 hrs(5 T+15L)**

Need of XML,History of Markup lang, What is XML, Role of XML, 3 XML Language basics, Revolution, XML Technology, Namespace, EDI, Simple XML file creation, Simple XML file creation

Exercise

1. In this exercise, student will practice identifying the structure of an

information object. For the sample document provided below:

    i.   Label the information structures you see, including containing structures.

    ii.   Draw a tree representation of the structure.

2. Deconstructing an XML Document

In this exercise, student will practice identifying the explicit structure within an XML document. In a sense, this is the reverse of what you did in Exercise #1. For the sample XML markup below, create a document-like representation (or a simple drawing) for the content contained within the XML tags:

<book>

<coverInfo>

    <title>The XML Handbook</title>

    <author>Charles F. Goldfarb</author>

    <author>Paul Prescod</author>

    <edition>Second</edition>

<description>The definitive XML resource: applications, products, and technologies. Revised and expanded—over 600 new pages.

</description>

</coverInfo>

</book>

UNIT- II   **20 hrs(5 T+15L)**

Simple XML document creation, XM structuring, XML well-formed documents, XML valid documents, XML validation using Schema, XML presentation using CSS, XML , XML presentation technologies

Exercises

1. Well-Formedness
This exercise checks your understanding of the constraints for well-formedness. Are the following document instances well-formed? Explain any NO answers.

 <list><title>The first list</title><item>An item</list>

<item>An item</item><item>Another item</item>

<para>Bathing a cat is a <emph>relatively</emph> easy task as long as the cat is willing.</para>

<bibl><title>How to Bathe a Cat<author></title>Merlin Bauer<author></bibl>

UNIT- III   **20 hrs(5 T+15L)**

Other XML Concepts Scripting XML, XML as Data, Linking with XML., XML with Style: XSL –Style Sheet Basics, XSL basics, XSL style sheets.

Exercise

1. In this exercise, create some XML markup based on the tree representation from Exercise #1 above, and the content from the original sample document.

2. Well Formedness

This exercise is a bit more challenging than the previous example. Here is a fragment of an XML document instance. Identify all the places where it fails to match the constraints for well- formedness.

<PROCEDURE><TITLEHow to Bathe a Cat</TITLE>

<OVERVIEW>

This procedure tells you how to bathe a cat. <WARNING></OVERVIEW>Cats don't like to take baths. You could get hurt doing this. Be sure to obtain all the required protective gear before you start. </WARNING><EQUIPEMENT><ITEM>Hockey Mask <ITEM>Padded Full-body Kevlar Armor</ITEM><ITEM>Tub full of warm water</ITEM><ITEM>Towels

</ITEM><ITEM>First Aid kit</ITEM><ITEM>Cat Shampoo</ITEM>

<EQUIPMENT><INSTRUCTIONS> <STEP> Locate the cat, who by now is hiding under the bed.</STEP><STEP>Place the cat in the tub of water.</STEP> <ITEM>Using the First Aid kit, repair the damage to your head and arms.</STEP> <STEP>Place the cat back in the tub and hold it down.</STEP> <STEP>Wash it really fast, then make an effort to dry it with the towels.</STEP> <STEP>Decide not to do this again. </STEP> </INSTRUCTIONS>

TEXT BOOK
1. Frank. P. Coyle - XML, Web Services and the data revolution, Pearson Education, 2002.
2. Gavin Powel, Beginning XML Databases, Wrox Press, 2007.

REFERENCES:
1. Michael J. Young ,Step by Step XML , Microsoft Press, 2002

2. Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh, - Developing Java Web Services - Wiley Publishing Inc., 2004

BCS17R253	QUANTITATIVE APTITUDE DEVELOPMENT	L	T	P	C
		1	0	3	2
Pre-requisite: Basic mathematical skills					
	Course Category: Skill Enhancement Elective				
	Course Type: Theory with Practical course				

COURSE OBJECTIVES:

The students will enable to improve their aptitude testing and they become confident to face any competitive exams.

COURSE OUTCOMES :

Upon successful completion of this course, Students will be able to

CO1: To solve problems on numbers, ratio and proportion, time and distance
CO2: To solve problems on trains, simple interest,clocks
CO3: To solve problems on permutation, probabilityand logical reasoning

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S				S	
CO2		S	L	L		S	
CO3		S		L		M	

UNIT- I   **20 hrs(5 T+15L)**
Averages – Problems on numbers – Problems on Ages – Percentages – Profit and Loss - Ratio and Proportion – Partnership – Time and Work – Pipes and Distances – Time and distance

Online Exam covering all topics

UNIT- II   **20 hrs(5 T+15L)**
Problems on Trains – Boats and Streams – Allegation – Simple Interest – Compound Interest Calendar – Clocks –
Online Exam covering all topics

UNIT- III   **20 hrs(5 T+15L)**
Permutation – Combination – Probability -Direction sense test – Mathematical Operations – Logic – Problems on cubes – Problems on dice

Online Exam covering all topics

TEXT BOOK:
1. R.S.Aggarwal, "Quantitative Aptitude for Competitive Examinations", 7th Revised Edition.S.Chand and Co. Ltd, New Delhi, 2005.

REFERENCES:
1.R.S.Aggarwal, "Verbal and Non Verbal Resanoning", S.Chand and Co. Ltd, New Delhi.

2.Barron's Guide for GMAT, Galgotia Publications, New Delhi, 2006.

BCS17R254	WORKING WITH COREL DRAW	L	T	P	C
		1	0	3	2

Pre-requisite: Basic knowledge in GUI

Course Category: Skill Enhancement Elective
Course Type: Theory with Practical course

COURSE OBJECTIVES:

The students will enable to work with COREL-DRAW and create their own designs

COURSE OUTCOMES :

Upon successful completion of this course, Students will be able to

CO1: Create design templates with different shapes
CO2: Use toolbox for resizing the objects
CO3: Use Text Tool for resizing the text formats

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S				S	
CO2		S	L	L		S	
CO3		S		L		M	

UNIT- I   **20 hrs(5 T+15L)**

Introduction-Getting Started-Creating A New File - Title Bar-Menu Bar-Work Area-Printable Page Property Bar-Page Counter Bar-Colour Palette-Toolbox-Status Bar-Drawing Figures-Lines-Ellipse-Circles-Rectangle-Square-Polygon-Saving-Closing-Opening-Views-Normal View-Preview-Wire Frame View-Draft View-Zoom-View Manager-Creating a View.

5-10 Exercises in creating designs using shapes

UNIT- II   **20 hrs(5 T+15L)**
Introduction - Toolbox-Selecting an Object-Resizing an Object-Moving an Object-Changing the Shape-Combining Two Objects-Skewing-Welding the Objects-Blending-Curve Lines-Straight Lines-Continuing a Line-View Mode-Changing-Media Tool-Rotating An Object-Grouping-Fill Tool Fly Out-Filling-Spray Mode.

5-10 Exercises in changing objects in different ways

UNIT- III   **20 hrs(5 T+15L)**

Introduction-Text Tool-Entering Artistic Text-Entering Paragraph Text-Converting Text-Formatting Text-Changing the Font Size-Arranging Objects-Ordering The Objects-Changing

the Font-Bullets-Decorating the Text-Webdings-Text Editor-Opening-Changing the Alignment-Type Style-Spell Checking-Grammer-Searching Synonyms-Find-Replace-Editing-Kerning-Formatting Characters.

5-10 Exercises in changing texts in different ways

TEXT BOOK:

1. Vimal Pandya, Graphic Designing & Computer Application V, HK Arts College Publication, 2013.

REFERENCES:

1. Bansal, S.K, Internet Technology and Globalization, A.P.H. Publishing Corporation, New Delhi 2001.

BCS17R255	SYSTEM ADMINISTRATION AND MAINTENANCE	L	T	P	C
		1	0	3	2

Pre-requisite: Basic knowledge in Windows OS

Course Category: Skill Enhancement Electives

Course Type: Theory with Practical course

COURSE OBJECTIVES:

The students will enable to gain knowledge about Windows OS

COURSE OUTCOMES :

Upon successful completion of this course, Students will be able to

CO1: Understand the basic concepts of Windows NT OS
CO2: Understand about the file system and account management system of different OS
CO3: Understand about disk administration and disk fragmentation

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S				S	
CO2		S	L	L		S	
CO3		S		L		M	

UNIT- I   **20 hrs(5 T+15L)**

Introduction - System Administration -History of System Administration. System Administration Roles.Basics of Windows NT/2000/2003 and Unix/Linux. History-windows NT/2000/2003 and then using Unix/Linux)

Exercises

1.Linux Desktop tour. Configuring desktop environment and desktop settings.

2. **Basic Commands :**Terminal, shell,Cat, ls, cd, date, cal, man, echo, pwd, Mkdir, rm, rmdir Ps, kill

3. **Package Installation**
Synaptic package manager

4.In Windows Creating users – Admin and regular,Path of their personal files. Adding and changing passwords. Difference between workgroup and domain.

UNIT- II   **20 hrs(5 T+15L)**
Basic Info and Account Management. File and directory layout.File Systems (NTFS, FAT, UFS). File permissions. ACL. Installing the Operating System.Basic DOS/Windows/Unix commands and tools. Command Line vs. Gui. Start up (booting) and Shutdown. Task Manager. More Account Management.System Processes. Scheduling jobs (scheduler/cron), job monitoring. event viewer/ps), start and stop jobs.

Exercises
1. **Network Administration**
Ipconfig,Ping, tracert, route, hostname, net, netstat, whoami Set manual IP address, check connectivity – ipv4, ipv6
2. **Administrator Tools**

 Control Panel -> Administrative Tools
Computer Management, Local security Policy, Performance Monitor, Task Scheduler, Antivirus and firewall.

UNIT- III   **20 hrs(5 T+15L)**
Disk administration. File systems/partitions. Disk DeFragmentation.RAID. Basic client/server file sharing.Files, Directories and Memory Management. Permissions. Networking. TCP/IP, DNS, DHCP, Domains/NIS. File Sharing. Client/Server. NFS. NetBeui. PDC/BDC. Active Directory. Setting up a file server (and client/server network).Ethernet Addresses, Hostnames.

Exercises
1. Misc

 Start->Accessories->System tools -> All options (Remote desktop, backup/restore etc.)
2.LAN – sharing printer, files and folder over the network

TEXT BOOK:
1. Thomas A. Limoncelli, Christina J. Hogan, and Strata R. Chalup "The Practice of System and Network Administration" (2nd Ed.), Addison-Wesley, 2007.

REFERENCE BOOKS:
1.E. Siever, S. Figgins, Linux in a Nutshell, O'Reilly, Sixth Edition 2009.
2. 2.T. Bautts, T. Dawson, G.N. Purdy, Linux Network Administrator's Guide,O'Reilly, Third Edition,2005 .
3. A. Basta, W.Halton, Computer Security: Concepts, Issues and Implementation, Cengage Learning India, 2008.

BCS17R256	SEARCH ENGINE OPIMIZATION	L	T	P	C
		1	0	3	2

Pre-requisite: Basic knowledge about search engines

Course Category: Skill Enhancement Elective
Course Type: Theory with Practical course

COURSE OBJECTIVES:

The students will enable to gain knowledge, search engines and search engine optimization

COURSE OUTCOMES:

Upon successful completion of this course, Students will be able to

CO1: Understand about different search engines
CO2: Understand about the page optimization,meta tags.
CO3: Understand about off page optimization and blog submission

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S				S	
CO2		S	L	L		S	
CO3		S		L		M	

UNIT- I   **20 hrs(5 T+15L)**

Domain, Portal and search engine, SEO, Types of SEO, Black Hat, White Hat- Introduction to Search Engines – Working, Examples, Google, Yahoo, Bing, AltaVista etc.
Online Quiz covering all topics

UNIT- II   **20 hrs(5 T+15L)**

On Page optimization – Meta description and meta keywords, Headings, Bold Text, Domain names and suggestions- Canonical tag, Meta tags, Images and alt, Internal link, sitemap, Invisible text, SWOT   analysis

Online Quiz covering all topics

UNIT- III   **20 hrs(5 T+15L)**

Off Page Optimization – Page Rank, Link Popularity, Link Building, Directory, Social bookmarks, Blog Submission
Online Quiz covering all topics

TEXT BOOK:

1.Adam Clarke,SEO 2017 -,Learn search engine optimization with smart internet marketing strategies.

REFERENCES:
1.Eric Enge, Stephan Spencer, Jessie Stricchiola,The Art of SEO, 3rd Edition Mastering Search Engine Optimization,2015.

BCS17R351	PHP PROGRAMMING	L	T	P	C
		1	0	3	2

Pre-requisite: Basic knowledge about web programming

Course Category: Skill Enhancement Elective
Course Type: Theory with Practical course

COURSE OBJECTIVES:

This course introduces students to the PHP programming language, and their basic syntax commonly used to create dynamic websites. Topics include PHP syntax, using phpMyAdmin, creating tables and queries using SQL, web application security, frameworks, and other related topics. It also includes basics of using content management systems for managing website content. (CSU)

COURSE OUTCOMES:

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

CO1: To understand the general concepts of PHP scripting language for the development of Internet websites.
CO2: Use PHP logical and comparison operators, branching structures (if/switch), and loop structures (for, for each, do, do/while)
CO3: Use HTML form elements that work with any server-side language, and also Create a PHP web page that is unique to each visitor.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S				S	
CO2		S	L	L		S	
CO3		S		L		M	

UNIT- I   **20 hrs(5 T+15L)**

PHP introduction, inventions and versions, important tools and software requirements, PHP with other technologies, scope of PHP, Basic Syntax, PHP variables and constants, Types of data in PHP , Expressions, scopes of a variable (local, global), PHP Operators : Arithmetic, Assignment, Relational , Logical operators, Bitwise , ternary and MOD operator, PHP operator Precedence and associativity

1. Write a Program to check and print whether a given number is even or odd.

2. Write a program to compute net amount from the given quantity purchased and rate per quantity. Discount @10% is allowed if the quantity purchased exceeds 100.

3. Write a program to find largest among three numbers using ternary operators.

UNIT- II   **20 hrs(5 T+15L)**

PHP Functions,-Function, Need of Function - declaration and calling of a function- PHP Function with arguments- Default Arguments in Function- Function argument with call by value-call by reference- Scope of Function Global and Local-String Manipulation and Regular Expression- Creating and accessing String - Searching & Replacing String-Formatting- joining and splitting String - String Related Library functions.

1. Write a PHP program using Java Script to convert the decimal number to its binary equivalent. You must use a form to accept the number from the user.

2. Write a Menu-Driven program to implement a calculator which performs only addition, subtraction, multiplication and division. The operation should happen based on the user choice. (use switch case)

3. Write a function countWords ($str) that takes any string of characters and finds the Number of times each word occurs. You should ignore the distinction between capital and lowercase letters

UNIT- III   **20 hrs(5 T+15L)**

Handling HTML form with PHP- Capturing Form Data- GET and POST form methods-Dealing with multi value fields- Redirecting a form after submission- PHP IF Else conditional statements (Nested IF and Else), Switch case- while ,For and Do While Loop-Goto - Break ,Continue and exit

Exercises(minimum 5 exercises)

1. Create a form with a text box asking to enter your favorite city with a submit button when the user enters the city and clicks the submit button another php page should be opened displaying "Welcome to the city

2. Write a PHP code that define class Student with attributes RollNo, Name, Branch, and Year, create 3 instances of it, sets the values of each instance appropriately and print the values of all attributes.

TEXT BOOK

1. Tatroe, K., MacIntyre, P., & Lerdorf, R. *Programming Php*. " O'Reilly Media, Inc.".2013

REFERENCE BOOK

1. MacIntyre, P., Danchilla, B., Gogala, M., & Myer, T. *Pro PHP programming*. Apress. 2011
2. Holzner, S.. *PHP: the complete reference*. Tata McGraw-Hill Education.2007

BCS17R352	PROGRAMMING WITH SCILAB	L	T	P	C
		1	0	3	2

Pre-requisite: Basic knowledge in mathematical formulas and matrix operations

Course Category: Skill Enhancement Electives

Course Type: Theory with Practical course

COURSE OBJECTIVES:

This course introduces students about programming with SCILAB which is one of the mathematical tools for complex calculations.

COURSE OUTCOMES:

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

CO1: Work with SCILAB environment and create working directory
CO2: Plot Graphs, generate waveforms and working with matrices.
CO3: Develop programs using Control statements and create files .

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S				S	
CO2		S	L	L		S	
CO3		S		L		M	

UNIT- I   **20 hrs(5 T+15L)**

Introduction to Programming: Components of a computer, working with numbers, Machine code, S o f t w a r e hierarchy- Programming Environment: SCILAB Environment, Workspace, Working Directory, Expressions, Constants, Variables and assignment statement, Arrays.

1. Write a program to assign the following expressions to a variable A and then to print out the value of A.

   a. (3+4)/(5+6)
   b. $2\pi^2$
   c. $\sqrt{2}$
   d. $(0.0000123 + 5.67 \times 10^{-3}) \times 0.4567 \times 10^{-4}$

2. Celsius temperatures can be converted to Fahrenheit by multiplying by 9, dividing by 5, and adding 32. Assign a variable called C the value 37, and implement this formula to assign a variable F the Fahrenheit equivalent of 37 Celsius.

3. Set up a vector called N with five elements having the values: 1, 2, 3, 4, 5. Using N,

create assignment statements for a vector X which will result in X having these values:
   a. 2, 4, 6, 8, 10

   b. 1/2, 1, 3/2, 2,
   5/2 c. 1, 1/2,
   1/3, 1/4, 1/5

d. 1, 1/4, 1/9, 1/16, 1/25

UNIT- II   **20 hrs(5 T+15L)**

Graph Plots: Basic plotting, Built in functions, Generating waveforms, Sound replay, load and save-   Matrices and Some Simple Matrix Operations, Sub- Matrices. Procedures and Functions: Arguments and return values,

Exercises:

1. A supermarket conveyor belt holds an array of groceries. The price of each product (in pounds) is [0.6, 1.2 ,0.5, 1.3] ; while the numbers of each product are [3, 2 ,1 ,5]. Use MATLAB to calculate the total bill

2. The sortrows(x) function will sort a vector or matrix X into increasing row order. Use this function to sort a list of names into alphabetical order.

3. The "identity" matrix is a square matrix that has ones on the diagonal and zeros elsewhere. You can generate one with the eye() function in MATLAB. Use MATLAB to find a matrix B, such that when multiplied by matrix A=[1 2; -1 0] the identity matrix I=[1 0; 0 1] is generated. That is A*B=I

UNIT- III   **20 hrs(5 T+15L)**

Control Statements: Conditional statements: If, Else, Else-if, Repetition statements: While, for loop. Manipulating Text: Writing to a text file, Reading from a text file, Randomising and sorting a list, searching a list.

- Build a square wave by adding together 10 odd harmonics: 1f, 3f, 5f, etc. The amplitude of the nth harmonic should be 1/n. Display a graph of one cycle of the result superimposed on the individual harmonics.
- Write a function called FtoC (ftoc.m) to convert Fahrenheit temperatures into Celsius. Make sure the program has a title comment and a help page. Test from the command window with:
   o FtoC(96)
   o lookfor Fahrenheit
   o help FtoC
- Write a program to input 2 strings from the user and to print out (i) the concatenation of the two strings with a space between them, (ii) a line of asterisks the same length as the concatenated strings, and (iii) the reversed concatenation. For example:
   i.   Enter string 1: <u>Mark</u>
   ii.   Enter string 2: <u>Huckvale</u>
   iii.   Mark Huckvale
   iv.   *************
   v.   elavkcuH kraM

TEXT BOOK:
1. M.Affouf, SCILAB by Example , CreateSpace Independent Publishing Platform,2012.

REFERENCES:
1.H. Ramchandran, A.S. Nair, SCILAB , S.Chand, 2011.

BCS17R353	SOFTWARE TESTING CONCEPTS	L	T	P	C
		1	0	3	2

Pre-requisite: Basic knowledge in mathematical formulas and matrix operations

Course Category: Skill Enhancement Electives

Course Type: Theory with Practical course

COURSE OBJECTIVES:
This course introduces students about Software testing concepts and tools used in industry for testing

COURSE OUTCOMES:
On the completion of the course, students will be able to:
CO1: Understand SDLC models and different types of testing
CO2: Understand the basic concepts of black box testing and challenges in it.
CO3: Understand about functional and non functional testing and their types.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S				S	
CO2		S	L	L		S	
CO3		S		L		M	

UNIT- I   **20 hrs(5 T+15L)**

Software Development Life Cycle models: Phases of Software project – Quality, Quality Assurance, Quality control – Testing, Verification and Validation – Process Model to represent Different Phases - Life Cycle models. White-Box Testing: Static Testing – Structural Testing –Challenges in White-Box Testing.

Exercise

1. Write a program that take three inputs (a,b &c) that represent the sides of a triangle, and the output is one of the below four:
    a. Not a triangle
    b. Scalene triangle
    c. Isosceles triangle
    d. Equilateral triangle

Generate test cases using Boundary Value Analysis, Equivalence Class Partitioning and Decision Table Testing.
        Generate test cases using Basis path testing.
        Run code coverage tool.

UNIT- II   **20 hrs(5 T+15L)**

Black-Box Testing: What is Black-Box Testing? - Why Black-Box Testing? – When to do Black-Box Testing? – How to do Black-Box Testing? – Challenges in White Box Testing - Integration Testing: Integration Testing as Type of Testing – Integration Testing as a Phase f Testing – Scenario Testing – Defect Bash.

Exercises

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

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

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

II. Generate test cases using Basis path testing.

III. Run code coverage tool

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

UNIT- III   **20 hrs(5 T+15L)**

System and Acceptance Testing: system Testing Overview – Why System testing is done? – Functional versus Non-functional Testing - Functional testing - Non-functional Testing – Acceptance Testing – Summary of Testing Phases.

Exercises

1. Write a program that dynamically allocates memory to10 integers using malloc() or calloc() and

- donot free memory leading to memory leaks. Verify the same usingValgrind.
- Now, free memory using free() at the end of the program to avoid memory leaks. Verify the same using Valgrind.

2.Use LoadUI load testing tool to test the web application performance.

TEXT BOOK:
1. Software Testing Principles and Practices, Srinivasan Desikan & Gopalswamy Ramesh, 2006, Pearson Education.

REFERENCES:
1. Effective Methods of Software Testing, William E. Perry, 3 rd ed, Wiley India. 2. Software Testing, Renu Rajani, Pradeep Oak, 2007, TMH.

BCS17R354	ANDROID PROGRAMMING	L	T	P	C
		1	0	3	2
Pre-requisite: JAVA PROGRAMMING(BCS17R371)					
	Course Category: Skill Enhancement Elective Course Type: Theory with Practical course				

COURSE OBJECTIVES:

This course introduces mobile application development for the Android platform. Students will learn skills for creating and deploying Android applications, with particular emphasis on software engineering topics including software architecture, software process, usability, and deployment.

COURSE OUTCOMES:

Upon successful completion of this course, Students will be able to
CO1: .Know the basic concepts and technique of developing applications for the Android mobile environment.
CO2: Able able to use the SDK and other development tools. And the basic concepts of Android phone features and capabilities.
CO3: Be able to understand Java programming as it related to application development for the Android platform..

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S				S	
CO2		S	L	L		S	
CO3		S		L		M	

UNIT- I   **20 hrs(5 T+15L)**
Introduction: History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture.**Overview of object oriented programming using Java:** OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine.

 Exercise

1. Create "Hello World" application. That will display "Hello World" in the middle of the screen in the emulator. Also display "Hello World" in the middle of the screen in the Android Phone.
2. Create an application with login module. (Check username and password).
3. Create spinner with strings taken from resource folder (res >> value folder) and on changing the spinner value, Image will change.

UNIT- II   **20 hrs(5 T+15L)**
Development Tools, Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools,

creating a android project – Hello Word, run on emulator, Deploy it on USB-connected Android device.

Exercise

1. Create and Login application as above. On successful login, pop up the message.
2. Create an application to Create, Insert, update, Delete and retrieve operation on the database.

UNIT- III   **20 hrs(5 T+15L)**

User Interface Architecture Application context, intents, Activity life cycle, multiple screen sizes. **User Interface Design:** Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners (Combo boxes), Images, Menu, and Dialog. **Database**, Understanding of SQLite database, connecting with the database.

Exercise

1. Create a menu with 5 options and and selected option should appear in text box.
2. Create a list of all courses in your college and on selecting a particular course teacher-in- charge of that course should appear at the bottom of the screen.
3. Create an application with three option buttons, on selecting a button colour of the screen will change.

TEXT BOOK

1. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.

REFERENCES:
1. Burnette, Ed. (2010) Hello, Android. Introducing Google's Mobile Development Platform (3rd Edition). [Covers Android 2] Pragmatic Bookshelf, Dallas TX. ISBN: 978-1-93435-656-2. Book Information: http://pragprog.com/titles/eband3/hello-android

BCS17R355	R PROGRAMMING	L	T	P	C
		1	0	3	2

Pre-requisite: JAVA PROGRAMMING(BCS17R371)
Course Category: Skill Enhancement Elective **Course Type**: Theory with Practical course

COURSE OBJECTIVES:

This course introduces students about R programming which is one of the data mining and big data analytic tool for retrieving data from database

COURSE OUTCOMES:

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

CO1: Work with SCILAB environment and create working directory
CO2: Plot Graphs, generate waveforms and working with matrices.
CO3: Develop programs using Control statements and create files.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S				S	
CO2		S	L	L		S	
CO3		S		L		M	

UNIT- I 20 hrs(5 T+15L)

Introduction: Overview and History of R, Getting Help, Data Types,Subsetting, VectorizedOperations,Reading andWritingData.

UNIT- II 20 hrs(5 T+15L)

Control Structures,Functions, lapply,tapply,split, mapply,apply,Coding Standards.

UNIT- III 20 hrs(5 T+15L)

Scoping Rules,Debugging Tools,Simulation, R Profiler.

TEXT BOOK

1.N. Venables, D. M. Smith, An Introduction to R,R-coreteam,2015.

REFERENCES:
1. Hadley Wickham, Advanced R, 2014.

List of Programs

1. Write a program that prints 'Hello World' to the screen.
2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n
3. Write a program that prints a multiplication table for numbers up to 12.
4. Write a function that returns the largest element in a list.
5. Write a function that computes the running total of a list.
6. Write a function that tests whether a string is a palindrome.
7. Implement the following sorting algorithms: Selection sort, Insertion sort, Bubble Sort
8. Implement linear search.
9. Implement binary search.
10. Implement matrices addition , subtraction and Multiplication

BCS17R356	OPEN SOURCE SOFTWARE	L	T	P	C
		1	0	3	2

Pre-requisite: Preliminary knowledge programming and usage of licensed software.

Course Category: Skill Enhancement Elective
Course Type: Theory with Practical course

COURSE OBJECTIVES:

The objective of this course is to utilize and contribute to open source projects. To make the students to gain experience using open source tools, languages and frameworks to prepare for careers in software development.

COURSE OUTCOMES:
Upon successful completion of this course, Students will be able to
CO1: .Understand the Open source Principles and Free software
CO2: Get knowledge about the methodology and Languages used to develop open source products
CO3: Acquire knowledge about open source desktop and different type of vendors and database approaches.

MAPPING OF COURSE OUTCOME(S):

CO / PO	PO						
	1	2	3	4	5	6	7
CO1		S				S	
CO2		S	L	L		S	
CO3		S		L		M	

UNIT- I   **20 hrs(5T+15L)**
Introduction to Open sources – Need of Open Sources – Advantages of Open Sources– Application of Open Sources. Open source operating systems: LINUX: Introduction – General Overview – Kernel Mode and user mode – Process – Advanced Concepts – Scheduling – Personalities – Cloning – Signals – Development with Linux. .

  Exercises

  1. Kernel configuration, compilation and installation
  2. Virtualisation environment
  3. Compiling from source
  4. Getting started with Linux, learn basic commands and directory structure, execute file and directory operations

UNIT- II   **20 hrs(5 T+15L)**

PHP: Introduction – Programming in web environment – variables – constants – data;types – operators – Statements – Functions – Arrays – OOP – String Manipulation and regular expression – File handling and data storage – PHP and SQL database – PHP and LDAP – PHP Connectivity – Sending and receiving E-mails – Debugging and error handling – Security – Templates.

  Exercises

  1. Running PHP : simple applications like login forms after setting up a LAMP stack

2. Simple PHP programs using operators
3. User Authentication System Using PHP
4. PHP program that demonstrate form element

UNIT- III   **20 hrs(5T+15L)**

MySQL: Introduction – Setting up account – Starting, terminating and writing your ownSQL programs – Record selection Technology – Working with strings – Date and Time– Sorting Query Results – Generating Summary – Working with metadata – Usingsequences – MySQL and Web.

 Exercises

1. Performing database operations using PHP and MYSQL
2. Student registration form using PHP and MYSQL
3. Library management system using PHP and MYSQL

TEXT BOOKS:
1. Remy Card, Eric Dumas and Frank Mevel, "The Linux Kernel Book", Wiley Publications, 2003
2. Steve Suchring, "MySQL Bible", John Wiley, 2002

REFERENCES:
1. Rasmus Lerdorf and Levin Tatroe, "Programming PHP", O'Reilly, 2002
2. Wesley J. Chun, "Core Phython Programming", Prentice Hall, 2001
3. Martin C. Brown, "Perl: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
4. Steven Holzner, "PHP: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.