



FAROOK COLLEGE (AUTONOMOUS)

**REGULATIONS FOR
CHOICE BASED CREDIT AND
SEMESTER SYSTEM FOR UNDER
GRADUATE (UG) CURRICULUM-2019
(FCCBCSS-UG 2019)**

Prepared by Board of Studies in Computer Science

CERTIFICATE

I hereby certify that the documents attached are the bona fide copies of the syllabus of B.Sc.Computer Science Programme to be effective from the academic year 2019-20 onwards.

Date:

Place:

PRINCIPAL

**COURSE STRUCTURE BACHELOR OF SCIENCE IN COMPUTER SCIENCE
(EFFECTIVE FROM THE ACADEMIC YEAR 2019- 20)**

SEMESTER 1									
COURSE NUMBER	SUBJECT CODE	SUBJECT/ TITLE	INSTRUCTIONAL HOURS PER WEEK			MARKS			REMARKS
			TH	PRA	TOT	INT	EXT	CREDIT	
1		Common English Course 1	5	0	5	20	80	4	
2		Common English Course 2	4	0	4	20	80	3	
3		Additional Language Course 1	4	0	4	20	80	4	
4	BCS1B01	Computer Fundamentals	2	2	4	20	80	3	
5		Complementary Mathematics 1	4	0	4	20	80	3	
6		Complementary Physics 1	4	0	4	20	80	3	
7	AEC1E01	Environmental Studies						4*	
Total					25		600	20	

SEMESTER 2									
COURSE NUMBER	SUBJECT CODE	SUBJECT/ TITLE	INSTRUCTIONAL HOURS PER WEEK			MARKS			REMARKS
			TH	PRA	TOT	INT	EXT	CREDIT	
8		Common English Course 3	5	0	5	20	80	4	
9		Common English Course 4	4	0	4	20	80	3	
10		Additional Language Course 2	4	0	4	20	80	4	
11	BCS2B02	Problem solving using C language	2	0	2	20	80	3	
12	BCS2B03 (P)	Lab 1: Programming in C Language	0	2	2	20	80	2	
13		Complementary Mathematics 2	4	0	4	20	80	3	
14		Complementary Physics 2	4	0	4	20	80	3	
15	AEC2E02	Disaster Management						4*	
Total					25		700	22	

SEMESTER 3									
COURSE NUMBER	SUBJECT CODE	SUBJECT/ TITLE	INSTRUCTIONAL HOURS PER WEEK			MARKS			REMARKS
			TH	PRA	TOT	INT	EXT	CREDIT	
16	BCS3A11	Numerical Skills	4	0	4	20	80	4	
17	BCS3A12	Web Designing	4	0	4	20	80	4	
18	BCS3B04	Data Structures	2	2	4	20	80	3	
19	BCS3B05	Operating System Concepts	3	0	3	20	80	3	
20		Complementary Mathematics 3	5	0	5	20	80	3	
21		Complementary Physics 3	5	0	5	20	80	3	
22	AEC3E03	Human Rights						4*	
Total					25		600	20	

SEMESTER 4									
COURSE NUMBER	SUBJECT CODE	SUBJECT/ TITLE	INSTRUCTIONAL HOURS PER WEEK			MARKS			REMARKS
			TH	PRA	TOT	INT	EXT	CREDIT	
23	BCS4A13	Object Oriented Concepts through Python	4	0	4	20	80	4	
24	BCS4A14	Principles of Software Engineering	4	0	4	20	80	4	
25	BCS4B06	Fundamentals of Database Management System and RDBMS	3	2	5	20	80	3	
26	BCS4B07 (P)	Lab 2: Data Structures and RDBMS	0	2	2	20	80	2	
27		Complementary Mathematics 4	5	0	5	20	80	3	
28		Complementary Physics 4	5	0	5	20	80	3	
29	AEC4E04	Gender Studies						4*	
Total					25		600	19	

* Credit of Audit courses not counted for the calculation of SGPA or CGPA

SEMESTER 5									
COURSE NUMBER	SUBJECT CODE	SUBJECT/ TITLE	INSTRUCTIONAL HOURS PER WEEK			MARKS			REMARKS
			TH	PRA	TOT	INT	EXT	CREDIT	
30	BCS5B08	Computer Organization and Architecture	4	0	4	20	80	4	
31	BCS5B09	Java Programming	3	3	6	20	80	4	
32	BCS5B10	Web Programming using PHP	3	3	6	20	80	4	
33	BCS5B11	Computer Networks	4	0	4	20	80	4	
34	BCS5D01 /02/03	Open Course (Office Automation, Online Marketing, Content Management System,)	3	0	3	10	40	2	
		Project Work	0	2	2			0	
Total					25		450	18	

SEMESTER 6									
COURSE NUMBER	SUBJECT CODE	SUBJECT/ TITLE	INSTRUCTIONAL HOURS PER WEEK			MARKS			REMARKS
			TH	PRA	TOT	INT	EXT	CREDIT	
35	BCS6B12	Computer Graphics	4	1	5	20	80	4	
36	BCS6B13	Mobile Operating System	4	0	4	20	80	4	
37	BCS6B14	System Software	4	0	4	20	80	4	
38	BCS6B15 (P)	Lab 3: Java and PHP	0	3	3	20	80	2	
39	BCS6B16 (P)	Lab 4 : Android and Shell Scripting	0	3	3	20	80	2	
40	BCS6F01 /02/03	Elective (Cloud Computing, Visual Programming, Micro Processor & Micro Controllers, Introduction to Internet of Things-IOT)	4	0	4	20	80	3	
41	BCS6B (Pr)	Project Work	0	2	2	10	40	2	
Total					25		650	21	

SEMESTER 1									
COURSE NUMBER	SUBJECT CODE	SUBJECT/ TITLE	INSTRUCTIONAL HOURS PER WEEK			MARKS			REMARKS
			TH	PRA	TOT	INT	EXT	CREDIT	
1		Common English Course 1	5	0	5	20	80	4	
2		Common English Course 2	4	0	4	20	80	3	
3		Additional Language Course 1	4	0	4	20	80	4	
4	BCS1B01	Computer Fundamentals	2	2	4	20	80	3	
5		Complementary Mathematics 1	4	0	4	20	80	3	
6		Complementary Physics 1	4	0	4	20	80	3	
7	AEC1E01	Environmental Studies						4*	
Total					25		600	20	

Course No: 4

Course Code: BCS1B01

Course Title: Computer Fundamentals

Objectives of the Course

- To make the students aware of the basics of computer organization, operating systems and the fundamentals of programming.

Prerequisites

- Background of the basic science at +2 level.

Course Outcome

- Acquire the basic knowledge about Computer system and Programming.

Module I (4 T)

Concept of Hardware and Software: Computer Languages – Machine Language, Assembly Language, High-level Language, Language translators: Compiler, Interpreter, Assembler, Features of good language.

Basic Computer Organization: Von Neumann model, Input Unit, Output Unit, Storage Unit, Control Unit, memory hierarchy, registers, cache memory, RAM, ROM, PROM and EPROM, Secondary storage devices, storage capacity, bit, byte, nibble

Module II (3 T+6 P)

Introduction to Operating System: Meaning and Definition, Structure of OS, Types of OS, Functions of OS, Basic DOS commands. Introduction to Linux: Basic commands in Linux such as listing files, viewing contents in files, creating and deleting directories, moving and copying

files and/or directories, man pages, setting permissions on files/directories and vi editor.
Introduction to Windows OS environment: Creating files/ directory, moving file, printing file.

Module III (4 Hours)

Fundamentals of problem solving: The problem solving aspect, Top-down design, Purpose of programming, the concept of algorithm, flow chart- symbols, sample algorithms- Sum, Average, Finding Smallest Number, Checking Odd/ Even Number, Prime number, Quadratic equation.

Module IV (2 T+12 P)

Introduction to C Programming: Overview and importance of C, C Program Structure and Simple programs, Creation and Compilation of C Programs under Linux and Windows Platforms.

Module V (2 T+ 12P)

Elements of C Language and Program constructs: Character Set, C Tokens, Keywords and Identifier, Constants, Variables, Data types, Variable declaration and assignment of values, Symbolic constant definition. C Operators, arithmetic operators, relational operators, and logical operators, assignment operators, increment and decrement operators, conditional operators, special operators, arithmetic expressions, evaluation of expressions, precedence of arithmetic operators, Type conversion in expressions, operator precedence and associativity, Mathematical Functions, I/O operations.

References

1. Computer Fundamentals by P.K Sinha
2. An introduction to Digital Computer design by V. Rajaraman and T. Radhakrishnan
3. Computer fundamentals by B. Ram
4. Linux in a Nutshell, Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins, O'Reilly.
5. E. Balaguruswami, Programming in ANSI C.

Course No: 7

Course Code: AEC1E01

Course Title: Environmental Studies

Objectives of the Course

- To get an awareness of environment, Ecosystem and Biodiversity
- Environmental pollution and other social issues

Prerequisites

- None

Course Outcome

- Environment friendly attitude.

Module I

Introduction to Environmental Studies- Multidisciplinary nature of environmental studies, Definition, scope and importance, Need for public awareness, Natural resources and associated problems.

Module II

Ecosystem- Concept of ecosystems, structure and function of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, food chains, food webs and ecological pyramids. Features and functions of forest ecosystem, grassland ecosystem, desert ecosystem and aquatic ecosystems.

Module III

Biodiversity and its conservation- Introduction, definition, genetic, species and ecosystem diversity, bio geographical classification of India, value of biodiversity, threats to biodiversity, endangered and endemic species of India, conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Module IV

Environmental Pollution- Definition, cause, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution and nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes, role of an individual in prevention of pollution.

Module V

Social Issues and the Environment- from Unsustainable to Sustainable development, urban problems related to energy, water conservation, rain water harvesting, watershed management, environmental ethics: Issues and possible solutions. Overview of Environment Protection Act.

References

1. Online resources
2. Video lectures available in NPTEL and SWAYAM online learning platforms.

SEMESTER 2					
COURSE	SUBJECT	SUBJECT/ TITLE	INSTRUCTIONAL	MARKS	REM

NUMBER	CODE		HOURS PER WEEK						ARK S
			TH	PRA	TOT	INT	EXT	CREDIT	
8		Common English Course 3	5	0	5	20	80	4	
9		Common English Course 4	4	0	4	20	80	3	
10		Additional Language Course 2	4	0	4	20	80	4	
11	BCS2B02	Problem solving using C language	2	0	2	20	80	3	
12	BCS2B03 (P)	Lab 1: Programming in C Language	0	2	2	20	80	2	
13		Complementary Mathematics 2	4	0	4	20	80	3	
14		Complementary Physics 2	4	0	4	20	80	3	
15	AEC2E02	Disaster Management						4*	
Total					25		700	22	

Course No: 11

Course Code: BCS2B02

Course Title: Problem solving using C language

Objectives of the Course

- To equip the students with fundamental principles of problem solving.
- To learn the concept of programming
- To equip the students to write programs for solving simple computing problems

Prerequisites

- Knowledge to write algorithm and to draw flow chart for solving simple computing problems.

Course Outcome

- Attain the skill to write the algorithm, flowchart and C program to solve problems.

Module I (3 T+ 6 P)

Decision making, Branching and Looping. Decision making with IF statement, Simple IF statement, If else statement, if else if Ladder, Nesting of If, Switch statement, Conditional operator, Go to statement. Looping: While loop, Do-While, and For Loop, Nesting of loops, jumps in loop, skipping of loops.

Module II (3T+ 6 P)

Array- one dimensional array, two dimensional and multidimensional arrays. Strings- representation of strings, array of strings, string manipulation functions. Pointers- understanding pointers, accessing the address of a variable, declaring and initializing pointers, accessing a variable through its pointer, pointer expressions. Pointer and arrays, pointer and character string.

Module III (4 T+ 6 P)

The Concept of modularization and User defined functions, Multifunction Program, function prototypes, function definition, calling functions, various categories of functions, arguments and argument passing methods, Nesting of functions and recursion, functions and arrays, scope and lifetime of variables in functions. Pointers and functions.

Module IV (3 T+ 6 P)

Structures & Union - structure definition, giving values to members, structure initialization, comparison of structure variables, arrays of structures, arrays within structures, structures within arrays, structures and functions, Unions. Bit fields. Dynamic memory allocation.

Module V (2 T+ 6 P)

Files-defining, opening and closing files, error handling, File manipulation functions, command line operations. Pre-processor directives, Macro substitution directives, simple macros, macros with arguments, nesting of macros, Compiler control directives.

References

1. E. Balaguruswami, Programming in ANSI C.
2. Brian W. Kernighan & Dennis M. Ritchie, The C Programming Language.
3. Yashavant P. Kenetkar, Let us C.
4. Byran Gotfried, Schaums Outline series Programming with C.
5. Ashok N. Kamthane, Programming in C, Pearson, 2nd Edition.

Course No: 7

Course Code: AEC2E02

Course Title: Disaster Management

Objectives of the Course

- To get an awareness on managing disastrous conditions

Prerequisites

- None

Course Outcome

- Student will be able to act promptly in disastrous conditions.

Module I

Meaning of Disasters, Definitions, Hazard and Disaster, Natural vs. Man-made Disasters, Nature of Disasters.

Module II

Aggravating factors of Disasters, Significance and Repercussions.

Module III

Understanding various types of disasters, Geological disasters, Climatic disasters, Environmental disasters, Epidemics, Industrial and technological accidents, Causes and effects of disasters.

Module IV

Disaster in global context and regional context, Efforts to mitigate disasters worldwide.

Module V

Disasters in India-Flood, Drought, Cyclone, Earthquake, Landslide.

References:

1. Online resources
2. Video lectures available in NPTEL and SWAYAM online learning platforms.

SEMESTER 3									
COURSE NUMBER	SUBJECT CODE	SUBJECT/ TITLE	INSTRUCTIONAL HOURS PER WEEK			MARKS			REMARKS
			TH	PRA	TOT	INT	EXT	CREDIT	
16	BCS3A11	Numerical Skills	4	0	4	20	80	4	
17	BCS3A12	Web Designing	4	0	4	20	80	4	
18	BCS3B04	Data Structures	2	2	4	20	80	3	
19	BCS3B05	Operating System Concepts	3	0	3	20	80	3	
20		Complementary Mathematics 3	5	0	5	20	80	3	
21		Complementary Physics 3	5	0	5	20	80	3	
22	AEC3E03	Human Rights						4*	
Total					25		600	20	

Course No: 16

Course Code: BCS3A11

Course Title: Numerical Skills

Objectives of the Course

- Acquire knowledge of fundamental statistics.
- Develop competence in Combinational Logic Problem formulation and Logic Optimization

Prerequisites

- Basic Mathematical Skills.

Course Outcome

- Acquire knowledge about the ideas and techniques of fundamental statistics, and to illustrate some of their applications.
- Develop competence in Combinational Logic Problem formulation and Logic Gates
- Develop design capability in the field of combinational logic using gates Objectives of the Course

Module I (12T)

Basic Statistics - definition of statistics, characteristics of statistics, uses, scope and limitation of statistics; Frequency distribution: Classification, discrete and continuous series, formation of frequency distribution. Measures of Central Tendency: Mean, Median, Mode, Geometric mean, Harmonic mean, Meaning and simple problems.

Module II (12T)

Number Systems and Codes, Decimal numbers, Binary numbers, Binary arithmetic, 1's and 2's complements, Octal numbers, Hexadecimal numbers, inter conversions of number systems, Digital codes: Binary coded decimal(BCD), Gray code, ASCII code, error detection and error correction codes, Hamming code.

Module III (12 T)

Boolean Algebra : Boolean Algebra: Boolean operations, logic expressions, rules and laws of Boolean algebra, DeMorgan's theorems, minterms, maxterms, SOP and POS form of Boolean expressions for gate network, simplification of Boolean expressions using Boolean algebra and Karnaugh map techniques (up to 4 variables)

Module IV (10 T)

Logic Gates Positive and negative logic, NOT gate, OR gate, AND gate, NAND gate, NOR gate, EX-OR and EX-NOR gates, Universal gates.

Module V (14 T)

Arithmetic and Combinational Logic Circuits Half adder, full adder, parallel binary adder, decoders, BCD to 7-segment decoder, multiplexers and de-multiplexers, multiplexer and de-multiplexer trees.

Introduction to Sequential Circuits: SR latch, SR flip flop, JK flip flop, Master Slave JK flip flop, D type flip flop, T type flip flop.

References:

1. Fundamentals of Statistics, S.C Gupta, Himalaya Publishing House.
2. Thomas L Floyd, Digital Fundamentals, PHI.
3. Malvino & Leach, Digital Principles & Applications, TMH.

Course No: 17

Course Code: BCS3A12

Course Title: Web Designing

Objectives of the Course

- Learn web designing

Prerequisites

- Knowledge of Programming

Course Outcome

The learner will be able to

- Understand the basics of creating webpages using HTML5
- Understand the basics of creating client side scripts using JavaScript in a HTML page
- Develop Web pages using HTML and JavaScript
- Understand the application of content management systems (Joomla and Wordpress) for web page development.

Module I (7T)

Web page Design using HTML: Introduction - history of HTML, W3C, XML, SGML, DHTML. HTML5: Introduction, features, Structure of HTML document, Elements, Attributes, Types of Elements and Attributes, Basic HTML Data types, Basic formatting tags: heading, paragraph, underline break, bold, italic, underline, superscript, subscript, font and image. Attributes: - align, color, bgcolor, font face, border, size. Tables: table creation, rows, columns, heading, border.

Module II (7T)

Client Side Scripting using JavaScript: Client side scripting - Introduction, uses, major client side scripting languages, JavaScript: history, advantages, Including JavaScript in HTML body section, variables, variable names, comments, Literals: Numeric, Floating Point, Boolean, String, Object. Document Methods: write and writeln methods. Operators (Arithmetic, Assignment, Relational, Logical), Conditional statements: if, if else, switch. Control flow statements: while, do..while, for, break, continue. Popup boxes: alert, prompt, confirm.

Module III (8T)

Website development using Joomla: Joomla Basics., Joomla FrontEnd: Understanding Basic Joomla Template. Working with and Creating Content for Joomla: Defining Content, Managing Content, Managing Categories, Menus and Menu Items, Working with Parameters and Options, Editing Layout. Joomla BackEnd: Joomla Global Configuration, Article Manager, Archive Manager, Frontpage Manager, Section Manager, Category Manager, Media Manager, Menu Manager, Component Manager, Content Manager, Extensions Manager, Module Manager.

Module IV (8T)

Joomla BackEnd: Joomla Global Configuration, Article Manager, Archive Manager, Frontpage Manager, Section Manager, Category Manager, Media Manager, Menu Manager, Component Manager, Content Manager, Extensions Manager, Module Manager.

Module V (8T)

Basics of Website development using Wordpress: Introduction, Features. Pages vs Posts, Creating Pages, Child Pages, Applying Templates, Formatting Pages: Visual Editor and HTML Editor, Scheduling Posts, Adding Links, Adding Images, Media Library. Themes, Adding a Theme, Search and Install, Choosing a Theme. Menus, Creating, Adding a menu to a Page. Publishing a page.

Reference:

1. HTML 5 Black Book Second Edition, DT Editorial Services, Dreamtech Press, New Delhi.
2. The official Joomla Book, Jennifer Marriott and Elin Waring, Addison Wesley.
3. Getting Started With Wordpress, E-Book, iThemes Media LLC.
4. www.w3schools.com
5. www.html-5-tutorial.com

Course No: 18

Course Code: BCS3B04

Course Title: Data Structures

Objectives of the Course

- Understand the various techniques of storage and representations of real world data.
- To design and develop applications using various data structures
- Learn various searching, sorting and hashing techniques

Prerequisites

- Knowledge of C Programming.

Course Outcome

- Choose the appropriate data structure and algorithm design method for a specific problem.
- Able to evaluate how the choice of data structures and algorithm design methods impacts the performance of programs.
- Solve problems using various data structures such as arrays, linked lists, stacks, and queues; implementing programs for solving these problems.

Module I (8 T + 6 P)

Introduction to data structures - need for data structures, definition, categories of data structures, operations;

Array: Storage representation of 1D, 2D and Multi-dimensional arrays, Operations on arrays- insertion, deletion, searching- linear and binary searching. Sorting- Insertion sort, Bubble sort, Selection sort, Quick sort, Heap sort and Merge sort methods, Implementation, Comparison of different sorting techniques. Sparse matrix: definition and its representation.

Module II (8 T +6 P)

Linked Lists, creation, operations on linked lists- traversal, insertion, and deletion. Doubly linked list (definitions only).

Stacks: Stack - Definition, Operation on stack, Implementation using arrays and linked lists, Applications of Stacks, Function Calling, Recursion- direct & indirect recursion, Evaluation of

arithmetic Expressions, Conversion of Expressions - Prefix, Infix and Postfix expressions.
Queues: Definition, Implementations using arrays and linked lists, Circular queue, De-queue, Priority queues, Applications of queues.

Module III (7 T + 3P)

Trees - Definition, Basic terminology, Binary trees, Representation of binary trees, Sequential representation of binary trees, Linked representation of binary trees, Traversals, Threaded binary tree. Binary Search Trees: Definition, Insertion, Deletion, Traversal and Searching BST, Heap tree: Insertion and deletion (program not needed).

Module IV (7 Hours)

Graphs: Graphs Terminologies, Representation of graphs, Adjacency Matrix, Adjacency List, Adjacency Multi-list, Graph search methods (BFS and DFS), Minimal Spanning Tree, Prims Algorithm and Kruskals Algorithms, Shortest path problem, Dijkstra Algorithm.

Module V (6 Hours)

Hashing: Different hashing functions, Methods for collision handling.

References:

1. E. Horowitz & S. Sahni, Fundamentals of data structures.
2. Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft. Data Structures and Algorithms, Addison Wesley
3. Aron M, Tenenbaum, Data Structure Using C and C++
4. E. Balaguruswamy. Data Structures Using C.
5. Seymour Lipschutz, Data Structures

Course No: 19

Course Code: BCS3B05

Course Title: Operating System Concepts

Objectives of the Course

- To learn objectives & functions of Operating Systems.
- To understand processes and its life cycle.
- To learn and understand various Memory and Scheduling Algorithms.
- To have an overall idea about the latest developments in Operating Systems.

Prerequisites

- Knowledge in data structures.

Course Outcome

- Realize the importance of Operating System.

Module I (10 T)

Operating System Objectives and functions: The Evolution of Operating Systems, Serial

Processing, Simple batch Systems, Multi Programmed batch Systems, Time Sharing Systems, Parallel Systems, Distributed Systems, and Real time systems.

Module II (12 T)

Definition of Process, Process States, Process Control Block, Operations on Process, Process Communication, Communication in Client server System, Basic concepts of threads, Concurrency, Principles of Concurrency, Mutual exclusion, The Critical Section Problem, Synchronization Hardware, Semaphores, Classical Problems of synchronization. Dead lock, dead lock prevention, dead lock detection, and dead lock avoidance.

Module III (12 T)

CPU Scheduling: Scheduling Criteria, Scheduling algorithms - FCFS, SJF, Priority, RR, Multilevel, Feedback Queue, File System, Functions and organization, Allocation and Free space management.

Module IV (12 T)

Memory Management, Address binding, Logical Vs Physical address space, Dynamic Loading, Dynamic Linking and Shared Libraries, Overlays, Swapping, Contiguous Memory allocation, Paging, Segmentation, Virtual memory, Demand paging, Page replacement, Thrashing.

Module V (12 T)

Protection and security: policy and mechanism, authentication, authorization. Mobile OS: Concepts, history, features, architecture, Case studies: Android, UNIX kernel and Microsoft Windows NT (concept).

References:

1. Silberschatz, Galvin, Gagne, Operating System Concepts, John Willey & Sons.
2. Nutt G.J, Operating Systems: A Modern Perspective, Addison Wesley.
3. William Stallings, Operating Systems, Internals and Design Principles, - PHI.

Course No: 22

Course Code: AEC3E03

Course Title: Human Rights

Objectives of the Course

- Get an awareness on human rights, policies and its challenges

Prerequisites

- None

Course Outcome

- Awareness of human rights, policies and challenges.

Module I

Concept of Human rights, meaning of human rights, definitions, characteristics, evolution of human rights, Adoption of Universal Declaration of Human Rights, Approaches to the study of Human Rights, Classification of Human Rights.

Module II

United Nations and Human Rights: International Bill Of Rights, Universal Declaration of the Human Rights, the UN Commission on Human Rights

Module III

Indian Constitution and Human Rights: Fundamental Rights, Right To Information Act.

Module IV

Protecting Human Rights: Indian Judiciary and Human Rights, National Human Rights Commission, Role of Media in Protecting Human Rights.

Module V

Challenges to Human Rights in India, Violence against Women, Police Atrocities against Children, State and Human Rights.

References:

1. Online resources

SEMESTER 4					
COURSE NUMBER	SUBJECT CODE	SUBJECT/ TITLE	INSTRUCTIONAL HOURS PER WEEK	MARKS	REMARK

			TH	PRA	TOT	INT	EXT	CREDIT	S
23	BCS4A13	Object Oriented Concepts through Python	4	0	4	20	80	4	
24	BCS4A14	Principles of Software Engineering	4	0	4	20	80	4	
25	BCS4B06	Fundamentals of Database Management System and RDBMS	3	2	5	20	80	3	
26	BCS4B07 (P)	Lab 2: Data Structures and RDBMS	0	2	2	20	80	2	
27		Complementary Mathematics 4	5	0	5	20	80	3	
28		Complementary Physics 4	5	0	5	20	80	3	
29	AEC4E04	Gender Studies						4*	
Total					25		600	19	

Course No: 23

Course Code: BCS4A13

Course Title: Object Oriented Concepts through Python

Objectives of the Course

- To learn basics of Python programming
- To learn decision making, looping and functions in Python
- Understand Object Oriented Programming using Python

Prerequisites

- Knowledge of C language.

Course Outcome

- Describe various statements, data types and functions in Python.
- Interpret Object oriented programming in Python.

Module I (7 T)

Introduction to Object-Oriented Programming -basic concepts of OOPS - Object, Class, Inheritance, Polymorphism, Abstraction, Encapsulation. Advantage of OOPs, Object-based programming language.

Module II (12 T)

Introduction to python, features, IDLE, Writing and executing python scripts, data type variables-integers, identifiers, comments, variables and assignments, float point types, user inputs, eval function, print function, operators, , operator precedence and associativity.

Module III (12 T)

Boolean expressions, Simple if statement, if-else statement, compound boolean expressions, nesting, multi way decisions. Loops: The while statement, the for statement, nested loops, break and continue statements, infinite loops.

Module IV (14 T)

Functions, standard mathematical functions, time functions, random numbers, writing user defined functions, using functions, main function, parameter passing. Using global variables, default parameters, recursion.

Module V (15 T)

String and string operations, List- creating list, accessing, updating and editing list, basic list operations. Tuple- creating and accessing tuples in python, basic tuple operations. Dictionary, built in methods to access, update and delete dictionary values. Set and basic operations on a set. Class in Python - Creating classes, attributes, creating instances, accessing instances, destroying objects.

References:

1. Richard L. Halterman, Learning To Program With Python
2. E. Balaguruswamy, Introduction to Computing and Problem Solving Using Python
3. Martin C. Brown, Python: The Complete Reference.

Course No: 24

Course Code: BCS4A14

Course Title: Principles of Software Engineering

Objectives of the Course

- To learn engineering practices in software development.
- To learn various software development methodologies and practices.
- To learn and study various Evaluation methods in Software Development.

Prerequisites

- Knowledge of C language.

Course Outcome

- Realize the importance of Software Engineering in Software development.

Module I (10 T)

The Evolving Role of Software, Software Myths, Software Engineering: A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Process Models, Agile Process Model, Component-Based Development.

Module II (12 T)

Requirement analysis and specification, Understanding the requirement, Requirement modelling,

Requirement Specification (SRS), Requirement Analysis and Requirement Elicitation, Requirement Engineering.

Module III (12 T)

Software Design-Design Concepts and Design Principal, Architectural Design, Component Level Design ,Function Oriented Design, Object Oriented Design, User Interface Design, Web Application Design.

Module IV (12 T)

Software Coding & Testing- Coding Standard and coding Guidelines, Code Review, Software Documentation, Testing Strategies, Testing Fundamentals, Testing Techniques and Test Case, Black Box Testing, White Box Testing, Testing Process.

Module V (12 T)

Software Maintenance and Configuration Management, types of Software Maintenance, Re-Engineering, Reverse Engineering, Forward Engineering, The SCM Process, Identification of Objects in the Software Configuration, Version Control and Change Control.

References:

1. Pankaj Jalote, An Integrated Approach to Software Engineering, Narosa Pub.
2. Roger S. Pressman, Software Engineering - A Practical Approach, McGraw Hill.
3. Ivan Somervelli, Software Engineering.

Course No: 25

Course Code: BCS4B06

Course Title: Fundamentals of Database Management System and RDBMS

Objectives of the Course

- To learn the basic principles of database and database design
- To learn the basics of RDBMS
- To learn the concepts of database manipulation SQL

Prerequisites

- Basic knowledge of computers, data structures and programming.

Course Outcome

Students will be able to

- Design and normalize databases for real life applications.
- Develop and deploy databases for different applications using MySQL.

Module I (10 T)

Database System concepts and applications: Introduction to data bases, File Systems Versus DBMS. Advantages and Disadvantages of using DBMS Approach, Database administrators and

users. Data Models, Schemas, and Instances, Types of Data Models, Three Schema Architecture and Data Independence, Database Languages and Interfaces. Conceptual Data Models for Database Design: Entity Relationship Models- Concept of Entity, Entity Sets, Relationship Sets, Attributes, Domains, Constraints, Keys, Strong and Weak Entities. Concepts of EER.

Module II (8 T + 8P)

Relational Data Model: Relations, Domains and Attributes, Tuples, Keys. Integrity Rules, Relational Algebra and Operations, Relational Calculus and Domain Calculus. Relational Database Design using ER to Relational Mapping.

Module III (10 T + 6P)

Relational database design: - Anomalies in a Database, Normalization Theory, Functional Dependencies. First, Second and Third Normal Forms, Relations with more than one Candidate Key, Good and Bad Decompositions, Boyce Codd Normal Form, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

Module IV (9 T + 14 P)

SQL- Data Definition in SQL: creation, updation, deletion of tables, modifying the structure of tables, renaming, dropping of tables. Constraints. Database Manipulation in SQL: Select command, Logical operators, Range searching, Pattern matching, Grouping data from Tables in SQL, GROUP BY, HAVING clauses, Joins - Joining Multiple Tables, Joining a Table to itself. Views -Creation, Renaming the column of a view, destroys view.

Module V (8 T + 2 P)

Transaction Management and Concurrency Control thorough MySQL - Transaction: Properties (ACID), states, Commit, Auto-commit, Rollback; Concurrency Control-Lost update problems, Locks, two phase locking.

References:

1. Fundamentals of Database Systems, Elmasri & Navathe, Pearson Education.
2. Database System Concepts Abraham Silberschatz, Henry F Korth, S. Sudarshan, 5th Ed.
3. Introduction to Database Systems, CJ Date, Addison Wesley.
4. Database Management Systems Ramkrishnan McGraw Hill.

Course No: 22

Course Code: AEC4E04

Course Title: Gender Studies

Objectives of the Course

- Get an awareness on gender studies

Prerequisites

- None

Course Outcome

- Awareness gender related issues.

Module I

Making women visible- Women in History– Women's work, Men's property - Space and Location of Women. Key Concepts and Terminologies- Sex– Gender and Gendering – Sexuality– Patriarchy– Matriarchy –Matriliney – Patriliney–Domestic Violence–House hold Management.

Module II

Scanning the Indian Society through Women Perspective - Brahmanical patriarchy–Wifehood–Seed and Earth-Sthreedharma – Pathivratha concepts, Widowhood, Food as a medium of proliferation of caste, Three-fold oppression of Dalit women, Caste and Gender.

Module III

Women in the Fight for Freedom and Social Justice in India- Women in the Revolt of 1857, Participation of Santhal, Bhil and Munda women in anti-British struggles, British attitude towards women fighters. Eminent followers of Mahatma Gandhi, Women in Revolutionary Movements, Women Regiment of INA.

Module IV

Women in the Fight for Freedom and Social Justice in Kerala- Women question in the social reform movement in Kerala, Freedom movement and Kerala women.

Module V

Women in Narratives - Goddess and Dasis in Vedas– Sakuntala- Jatakas and Budhist literature.

References:

1. Online resources

SEMESTER 5									
COURSE NUMBER	SUBJECT CODE	SUBJECT/ TITLE	INSTRUCTIONAL HOURS PER WEEK			MARKS			REMARKS
			TH	PRA	TOT	INT	EXT	CREDIT	
30	BCS5B08	Computer Organization	4	0	4	20	80	4	

		and Architecture							
31	BCS5B09	Java Programming	3	3	6	20	80	4	
32	BCS5B10	Web Programming using PHP	3	3	6	20	80	4	
33	BCS5B11	Computer Networks	4	0	4	20	80	4	
34	BCS5D01 /02/03	Open Course (Office Automation, Online Marketing, Content Management System)	3	0	3	10	40	2	
		Project Work	0	2	2			0	
Total					25		450	18	

Course No: 30

Course Code: BCS5B08

Course Title: Computer Organization and Architecture

Objectives of the Course

- Understand the basic architecture of a computer
- Understand the basic Computer Organization

Prerequisites

- Basic knowledge of computers.

Course Outcome

- Understand control unit operations and conceptualize instruction level parallelism.
- Understand the computer arithmetic operations algorithms.
- Identify and compare different methods for computer I/O mechanisms.
- Categorize memory organization and explain the function of each element of a memory hierarchy.
- Understand the parallel processing system fundamental ideas

Module I: (10 T)

Sequential Circuits: Shift register: serial in - serial out, serial in - parallel out, parallel in - serial out, parallel in-parallel out configurations. Ring counter, Johnson's counter, asynchronous counters and synchronous counters, up/down asynchronous counter.

Module II: (14 T)

Basic Computer Organization and Design: Instruction Codes , Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory reference Instructions, Input, Output and Interrupt Design of Basic Computer, Design of Accumulator logic.

Micro programmed Control: Control Memory, Address sequencing, Micro program Example, Design of control unit. Processor Organization: general register organization, stack organization, instruction formats, addressing modes, data transfer and manipulation, program control. Computer Arithmetic: Addition, Subtraction, Multiplication, Division algorithms.

Module III (12 T)

Input-Output Organization: Peripheral devices, I/O interface, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor, and Serial Communication. I/O Controllers, Asynchronous data transfer, Strobe Control, Handshaking.

Module IV (10 T)

Memory Organization: Memory Hierarchy, Main memory (RAM/ROM chips), Auxiliary memory, Associative memory, Cache memory, Virtual Memory, Memory Management Hardware, hit/miss ratio, magnetic and optical storage devices.

Module V (14 T)

Parallel Processing: Basic Parallel Processing Architecture - Taxonomy- SISD, MISD, SIMD, MIMD structures - CISC Vs RISC - Symmetric Multiprocessors - Cache coherence and MESI protocol - Clusters - Non Uniform Memory Access. Pipelining: Basic Concepts of pipelining, Instruction Pipelining. Hazards, Reservation Tables, Collision, Latency, Dynamic pipeline, Vector processing & Vector processors.

References:

1. Thomas L Floyd, Digital Fundamentals, PHI.
2. M. Morris Mano, Computer System Architecture, PHI.
3. William Stallings, Computer Organization and Architecture, PHI.

Course No: 31

Course Code: BCS5B09

Course Title: Java Programming

Objectives of the Course

- Understand the concepts of java programming language.
- To design and develop applications using OOPS concepts through java

Prerequisites

- Basic knowledge of any programming language.

Course Outcome

- Implementing OOPS concepts using Java programming language to solve the given problem
- Prepare, test, document professional looking software package for business project using the Java programming language.
- Develop GUI based applications in Java

Module I: (7 T + 9 L)

Introduction to Java: History, the Java Virtual Machine, Features, Language Components: Lexical units, Data Types, variables, Type Conversions and Casting, Operators, Control Structures - The for Statement, The if Statement, The while and do while Statements, The switch Statement, The

break Statement, The continue Statement. Arrays.

Module II: (10 T + 10 P)

Basic OOPS Concepts: Defining New Data Type - Class, declaring objects, methods, Constructors, this keyword, finalize. Overloading methods and constructors, argument passing, Passing Objects to Methods, command line arguments, Access controls, static and final. Inheritance, super keyword, method overriding, dynamic method dispatch, Abstract classes, final and inheritance, Interfaces – defining and implementing interfaces. Packages and import statement. Strings.

Module III (8T + 8P)

Exceptions, Threads, Input and Output in Java: need for exception handling, try, catch, throw, throws and finally. Developing user defined Exception classes.

Stream and Stream classes, byte stream, character stream, predefined streams, reading keyboard inputs, Writing to console, print writer class, buffered streams, reading and writing text files.

Threads: threads vs. processes, thread states, advantages of using threads, creating threads by extending Thread class, creating threads by implementing Runnable, thread priorities, daemon threads, thread problems, synchronization.

Module IV (10 T + 8 P)

Networking and Database Connectivity: Networking fundamentals, the client/server model, InetAddress, URLs, sockets, simple client/server example.

Introduction to JDBC: The JDBC connectivity model, drivers, connecting to the database, creating a SQL query, the statement interface, executing SQL queries, getting the results, ResultSet interface, executing SQL update, delete queries, error checking and the SQLException class, Meta data, transaction management.

Module V (10 T + 10 P)

Applets, Events and GUI Applications: Introduction to GUI applications - applets - types of applet, applet skeleton, update method, repaint method, Html Applet tag and passing parameter to applet. Event Handling: The Delegation Event Model, Event Classes, Event Listener Interfaces, Introduction to the AWT, overview of the AWT, structure of the AWT, The AWT hierarchy, containers, components, creating frames, working with color, font and font metrics, graphics – point, drawing lines, rectangles, polygon and ovals. AWT Controls – Label, Button, TextField, TextArea, Checkbox, Choice, List, Scroll bar, Layout and Layout Managers, Menu, MenuBar, MenuItem, Checkbox MenuItem.

References:

1. Java Complete Reference, Herbert Schildt, Tata McGraw hill edition.
2. Patrick N & Schildt H, Java 2 The Complete Reference, Tata Mc- Graw Hill.
3. J2EE Complete Reference, Jim Keogh, Tata McGraw hill edition.
4. Java Enterprise in a nutshell, David Flanagan, Jim Farley, William Crawford & Kris Mangnusson, OReill.
5. E. Balguruswamy, Programming in Java.

Course No: 32
Course Code: BCS5B10
Course Title: Web Programming using PHP

Objectives of the Course

- To learn client side and server side scripting.
- To learn PHP Programming.
- To learn how to develop dynamic websites.
- To learn how to interact with databases through internet.

Prerequisites

- Knowledge in Programming.

Course Outcome

The learner will be able to

- Understand creation of forms and CSS in HTML
- Understand the development of JavaScript user defined functions for form validation
- Develop basic PHP scripts for transferring data from HTML form to a web server
- Develop basic PHP scripts for interacting with MySQL database and display the content on a HTML page

Module I (8T + 8P)

HTML 5 Elements: ARTICLE, ASIDE, NAV, PROGRESS, MARK. Navigation Links using anchor tag: internal, external, mail and image links. Lists: ordered, unordered. HTML5 Form controls: form, text, password, text area, tel, url, email, range, number, button, submit, reset, checkbox, radio button, select box, datalist, output, hidden, color, date (min and max attributes). CSS: Introduction to Cascading Style Sheet (CSS), Types: inline, internal and external. CSS Syntax: Selector - Universal, Class, ID, Comments. Background - Background Color, Background Image. Text - Text Color, Text Alignment, Text Decoration. CSS Lists - Different List Item Markers, Unordered List, Ordered List.

Module II (8T + 8P)

JavaScript: Arrays: Creating, Accessing, for... In loop. Writing JavaScript in HTML head and body elements. Objects: String, Array, Date. Built-in Global Functions: alert(), prompt(), confirm(), isNaN(), Number(), parseInt(). Writing User Defined Functions. Writing JavaScript in External Files and Using in the HTML page, Document Object Model (Concept), Events Familiarization: Form Events - onLoad, onunload, onClick, onBlur, onSubmit, onerror, oninput, onReset. Keyboard Events: onkeydown, onkeyup, onkeypress. Form Data Validation using form controls text, password, text area, tel, number.

Module III (10T + 10P)

Server side scripting using PHP: Introduction to Server Side Script, PHP, Role of Web server, LAMP / WAMP. PHP Syntax, data types, variables, operators, conditional statements, loops, including files, comments, variables and scope, echo and print.

Module IV (9T + 9P)

PHP String Manipulation: String Variables in PHP, The Concatenation Operator, String functions - strlen, strpos, strstr, strcmp, substr, str_replace, string case. Working with array: Array constructs - array(), list() and foreach(). User-Defined Functions. Passing information between pages: HTTP GET and POST method. Working with Forms: \$_GET and \$_POST, Form Data Processing at Server side.

Module V (10T + 10P)

PHP & MySQL: Features of MySQL, data types, Introduction to SQL commands - CREATE TABLE, SELECT, DELETE, UPDATE, INSERT. PHP functions for MySQL operations: mysqli_connect(), mysqli_select_db(), mysqli_prepare(), mysqli_query(), mysqli_fetch_row(), mysqli_fetch_array(), mysqli_fetch_object(), mysqli_close(). Insertion and Deletion of data from MySQL table using PHP, Displaying data from MYSQL in webpage.

References:

1. HTML 5 Blackbook, Dreamtech Press, ISBN 987-93-5119-907-6, 2016 Edition.
2. Jon Duckett, Web Programming with HTML, XHTML, CSS, Wrox Beginning.
3. Jim Converse & Joyce Park, PHP & MySQL Bible, Wiley.
4. Deitel, Harvey M. and Paul J., INTERNET & WORLD WIDE WEB HOW TO PROGRAM,3/E, 2004
5. Beginning PHP, D W Mercer, A Kent, S D Nowicki Publisher: Wrox.

Course No: 33

Course Code: BCS5B11

Course Title: Computer Networks

Objectives of the Course

- To learn about transmissions in Computer Networks.
- To learn various Protocols used in Communication.
- To have a general idea on Network Administration

Prerequisites

- Knowledge in data structure.
- Knowledge in Operating System concepts.

Course Outcome

Student will be able to

- Differentiate the functionalities of each layers of OSI Reference Model.
- Describe the protocols comes under each layer of TCP/IP Protocol Suite.

Module I (12 T)

Transmission media - wired and wireless media. Analog and digital data, periodic and aperiodic signals, composite signals, digital data transmission. Transmission Modes - Analog Transmission, Multiplexing, Frequency division multiplexing, Time Division Multiplexing and Wave Division Multiplexing, Switching - Circuit switching, Packet Switching and Message Switching, DTE - DCE Interface. Introduction to Computer networks, Topology, categories of networks,

Internetwork, Internet, Network Models, Layered model, OSI and TCP/IP models.

Module II (12 T)

Data link layer, Error detection and correction, Types of errors, Single bit error and Burst error, Vertical redundancy check(VRC), longitudinal redundancy Check(LRC), Cyclic Redundancy Check(CRC), Error correction - Single bit error correction, Hamming code Data compression - Huffman code, data link control, Line discipline, Flow control, Error control, Multiple Access, Random Access, ALOHA, pure ALOHA and slotted ALOHA, CSMA/CD and SCMA/CA, Polling, Wired LANs, Ethernet - IEEE standards, Wireless LANs - IEEE - 802.11, Bluetooth.

Module III (14 T)

Network layer, Networking and Internetworking devices - Repeaters, Bridges, Routers, Gateways, Logical addressing - IPv4 & IPv6 addresses, Network Address Translation(NAT), Internet protocols, internetworking, Datagram, Transition from IPv4 to IPv6, Address Mapping-Error reporting and multicasting - Delivery, Forwarding and Routing algorithms, Distance Vector Routing, Link State Routing, Multicast routing protocols, The Dijkstra Algorithm.

Module IV (10 T)

Transport layer, Process-to-process Delivery: Connectionless and Connection oriented Protocols, User Datagram Protocols, Transmission Control Protocol and SCTP, Congestion control and Quality of Service.

Module V (12 T)

Application Layer: Domain Name Systems, WWW, HTTP, File Transfer Protocol (FTP), Trivial File Transfer Protocol (TFTP), Simple Mail Transfer Protocol (SMTP) and Post Office Protocol (POP). Network management: SNMP, Network security, Cryptography.

References:

1. Computer Networks, Fifth Edition by Andrew S. Tanenbaum and David J Wetheral, Pearson Education
2. Data Communications and Networking, Fourth Edition by Behrouz A Forouzan, McGraw-Hill reprint, 2011.

Course No: 34

Course Code: BCS5D01

Course Title: Open Course (Office Automation)

Objectives of the Course

- To learn Office Automation.

Prerequisites

- Basic knowledge in Computer & Internet

Course Outcome

- Get into the knowledge on Office Automation

Module I (8 T)

Documentation Using a Word Processor (OpenOffice Writer / M.S. Word): Introduction to Office Automation, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, Bookmark. Advance Features - Tables, linking and embedding object, Mail Merge, Macros, Template.

Module II (8 T)

Electronic Spread Sheet (OpenOffice Calc/MS-Excel) - Introduction to Spread Sheet, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions, Charts, Advanced features - Pivot table & Pivot Chart, Linking and Consolidation.

Module III (10 T)

Presentation using (OpenOffice Impress/MS-Power Point): Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, Charts, Word Art, Layering art Objects. Animations and Sounds: Inserting Animated Pictures or Accessing through Object, Inserting Recorded Sound Effect or In-Built Sound Effect.

Module IV (9 T)

Database Management systems using (MS Office-MS Access/ Open Office-Base). Introduction, Planning a Database, Creating a New Database, Creating Tables, Working with Forms, Creating queries, Finding Information in Databases, Creating Reports, Types of Reports, Printing & Print Preview

Module V (10 T)

Website development using Joomla: Joomla Basics, Installing Joomla and Configuring Joomla. Joomla FrontEnd: Understanding Basic Joomla Template. Working with and Creating Content for Joomla: Defining Content, Managing Content, Managing Categories, Menus and Menu Items, Working with Parameters and Options, Editing Layout

References:

1. Russell A. Stultz, Learn Microsoft Office, BPB Publication.
2. Jennifer Marriott and Elin Waring, The official Joomla Book, Addison Wesley.
3. www.w3schools.com
4. www.html-5-tutorial.com

Course No: 34

Course Code: BCS5D02

Course Title: Open Course (Online Marketing)

Objectives of the Course

- Get familiarized with e-commerce and the technologies used.
- Understand different types of online payment systems.
- Get familiarized with concept of e-business, e-business models and e-business strategies.

Prerequisites

- Knowledge of computer and internet.

Course Outcome

- Describe hardware and software technologies for e-commerce.
- Define and describe e-business and its models, e-business strategies.
- Explain payment systems for e-commerce.

Module I (8 T)

Overview of Internet Marketing: Introduction to E-Marketing, E-Marketing Plan, Practices in E-Marketing, E-Marketing Mix (Product, Pricing, Place), Viral Marketing and Social Networking Marketing, The Rise of Mass Media and Changing Marketing Mindset.

Module II (8 T)

Internet Properties & Marketing Implications: Website analysis, Web and other online content, Website properties, Website design and usability features, Multimedia and interactive features.

Module III (8 T)

Consumer Characteristics & Branding Strategy: Branding and consistency online/offline branding, Environmental, situational, and personal factors affecting users, Market segments served, Brand position, Offline versus online customers. The PROS and CONS of online shopping, Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e-commerce.

Module IV (10 T)

Business Model, Business pyramid model, Specific e-business models used, Customer value, Revenue stream sources. E-Marketing Metrics and Site objectives. Role of Internet in B2B Application. Planning for Electronic Commerce: Planning Electronic Commerce initiatives, linking objectives to business strategies, measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites.

Module V (10 T)

Electronic Data Exchange: Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model. Electronic Payment System: Introduction, Types of Electronic Payment System, Payment Types, Traditional Payment, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash. E-Governance in India: E-Governance of India, Indian customer EDI System, Service center, Imports, Exports.

References:

1. Parasuraman, A. & Zinkhan, G. M. (2003). Marketing to and serving customers through the Internet: An overview and research agenda. *Journal of the Academy of Marketing Science*, 30(4), 286-295
2. G.S.V.Murthy, E-Commerce Concepts, Models, Strategies, Himalaya Publishing House
3. Kamlesh K Bajaj and Debjani Nag, E- Commerce.
4. Gray P. Schneider, Electronic commerce.

Course No: 34

Course Code: BCS5D03

Course Title: Open Course (Content Management System)

Objectives of the Course

- To Introduce Content Management system.
- Introduce the three most popular open source content management systems in use- WordPress, Drupal, and Joomla.

Prerequisites

- Basic knowledge about Database Management System and Webpage design

Course Outcome

- Accomplish the knowledge on Content Management System.

Module I (8 T)

Content Management System: Introduction, Features, Web-based publishing, format management, revision control, indexing, search, and retrieval. Digital Asset Management System, Distinguish between the basic concepts of user and content, content management application (CMA), Content display application (CDA). Content Management Framework (CMF).

Module II (8 T)

Exploring Content Management Systems terminology: Open source, PHP, MySQL, server-side, client-side, static HTML website, how CMS web pages are generated, Website strategy and planning, site mapping, content planning.

Module III (8 T)

Web content management system: Web Servers, Web hosting, working with WAMP, XAMPP, LAMP- installation and directory structure.

Module IV (10 T)

Website development using Joomla: Joomla Basics, Installing Joomla and Configuring Joomla. Joomla FrontEnd: Understanding Basic Joomla Template. Working with and Creating Content for Joomla: Defining Content, Managing Content, Managing Categories, Menus and Menu Items, Working with Parameters and Options, Editing Layout.

Module V (10 T)

Joomla BackEnd: Joomla Global Configuration, Article Manager, Archive Manager, Frontpage Manager, Section Manager, Category Manager, Media Manager, Menu Manager, Component Manager, Content Manager, Extensions Manager, Module Manager. Practical Application: Basic Planning of Business Sites, Social Media, E-commerce Web Sites.

Reference:

1. H. M. Dietel, Internet and World Wide Web, Pearson.
2. Jennifer Marriott and Elin Waring, The official Joomla Book, Addison Wesley.
3. www.w3schools.com

SEMESTER 6									
COURSE NUMBER	SUBJECT CODE	SUBJECT/ TITLE	INSTRUCTIONAL HOURS PER WEEK			MARKS			REMARKS
			TH	PRA	TOT	INT	EXT	CREDIT	
35	BCS6B12	Computer Graphics	4	1	5	20	80	4	
36	BCS6B13	Mobile Operating System	4	0	4	20	80	4	
37	BCS6B14	System Software	4	0	4	20	80	4	
38	BCS6B15 (P)	Lab 3: Java and PHP	0	3	3	20	80	2	
39	BCS6B16 (P)	Lab 4 : Android and Shell Scripting	0	3	3	20	80	2	
40	BCS6F01 /02/03	Elective (Cloud Computing, Visual Programming, Micro Processor & Micro Controllers, Introduction to Internet of Things-IOT)	4	0	4	20	80	3	
41	BCS6B (Pr)	Project Work	0	2	2	10	40	2	
Total					25		650	21	

Course No: 35

Course Code: BCS6B12

Course Title: Computer Graphics

Objectives of the Course

- To learn the basic principles of 2 and 3 dimensional computer graphics
- To comprehend and analyze the fundamentals of animation, transformations clipping-underlying technologies, principles, and applications.
- Introduce image manipulation using GIMP.

Prerequisites

- Basic knowledge on computer system.

Course Outcome

1. To implement various algorithms for line drawing, scan, convert the basic geometrical primitives, transformations.
2. To describe the importance of viewing, projections and fundamentals of animation.
3. To work with GIMP.

Module I (12T)

Introduction to Computer Graphics Definition, Application, Pixel, Frame Buffer, Raster and Random Scan display, Display devices CRT, Color CRT Monitors, basics of LCD & LED Monitors.

Module II (12T)

Scan Conversion of line DDA algorithm of line drawing, Scan conversion of circles Bresenham's circle generating algorithm, Polygon Filling, Scan line polygon filling algorithm.

Module III (12T)

Two Dimensional transformation, Translation, Rotation, Scaling, Homogeneous Coordinates, Reflection, Shear.

Module IV (12T)

Window to view port transformation, clipping, line clipping, Cohen Sutherland line clipping, Polygon clipping, Sutherland and Gary Hodgman polygon clipping algorithm.

Module V (12T)

Color Models & Color Applications Light and Color, Different color models, RGB, CMY, YIQ. Introduction to GIMP Image Manipulation using GIMP.

References:

1. Donald Hearn and M. Pauline Baker, Computer Graphics, PHI, New Delhi.
2. Zhigang Xiang and Roy Plasock, Computer Graphics, Schaum's Outlines.
3. Deborah Morley, Understanding Computers Today and Tomorrow, Introductory Edition.

Course No: 36

Course Code: BCS6B13

Course Title: Mobile Operating System

Objectives of the Course

- To introduce android platform and architecture.
- To learn the fundamentals components of android applications
- To develop applications targeting android mobile devices

Prerequisites

- Knowledge of Object Oriented Concepts and Java.

Course Outcome

- Design, develop and debug android applications.
- Design and implement applications with databases and content providers.

Module 1: (12 T + 5 P)

Introducing the android computing platform, History of android, android software stack, Dalvik virtual machine, Developing end user application using android SDK, android java packages, Setting up the development environment, Installing android development tools (ADT), Fundamental components, Android virtual devices, Running on real device, Structure of android application, Application life cycle. Manifests.

Module II: (12 T + 10 P)

Understanding android resources - Enumerating key android resources, String resources - string arrays, plurals, Layout resources, Colour resources, dimension resources, image resources Resource reference syntax, Defining own resource IDs.

Understanding intents - basics of intents, types of intent, available intents, exploring intent composition, Rules for Resolving Intents to Their Components, ACTION PICK, GET CONTENT, pending intents.

Module III: (12 T + 10 P)

User interfaces development in android - building UI completely in code, UI using XML, UI in XML with code, Android's common controls - Text controls, button controls, checkbox control, radio button controls, image view, date and time controls, map view control, understanding adapters, adapter views, list view, grid view, spinner control, gallery control, styles and themes, Understanding layout managers - linear layout manager, table layout manager, relative layout manager, frame layout manager, grid layout manager.

Android menus - creating menus, working with menu groups, responding to menu items, icon menu, sub menu, context menu, dynamic menus, loading menu through XML, popup menus,

Module IV: (12 T + 10 P)

Fragments in android - structure of fragment, fragment life cycle, fragment transaction and back stack, fragment manager, saving fragment state, communications with fragments, startActivity() and setTargetFragment(). Using dialogs in android, alert dialog, dialog fragments, working with toast.

Implementing action bar – creating action bar, types – standard action bar, tabbed action bar activity, tabbed listener, list navigation action bar activity, list listener, action bar and menu interaction, action bar and search view, action bar and fragments.

Introduction to services, bound and unbound service, life cycle of service.

Module V: (12 T + 10 P)

Persisting data - Files, saving state and preferences – saving application data, creating, saving and retrieving shared preferences, preference framework and preference activity, preference layout in XML, native preference controls, preference fragments, preference activity, persisting the application state, including static files as resources, Working with file system, SQLite - SQLite types, database manipulation using SQLite, SQL and database centric data model for android, android database classes. Understanding content providers, content URIs, built in providers. Reading, writing and updating data using content URIs.

References:

1. Pro Android 4, SatyaKomatineni& Dave MacLean, Apress.
2. Professional Android 4 Application Development, Retomeier, Wrox.
3. Programming Android, ZigurdMednieks, Laird Dornin, G. Blake Meike, and Masumi Nakamura, O'Reilly.

Course No: 37

Course Code: BCS6B14

Course Title: System Software

Objectives of the Course

- To build fundamental knowledge in system software.
- To learn functions of various system software.
- To learn specifically learn compilation process of a program.

Prerequisites

- Basic knowledge in Programming.

Course Outcome

The learner will be able to

- Understand the basics of system software
- Understand the fundamental principles of system software such as macro processors, loaders, linkers and compilers
- Understand the basics of LEX and YACC

Module I (12 T)

System software: General concept, Assemblers, loaders, linkers, macros, compilers, interpreters, operating system, Design of assemblers.

Module II (12T)

Macros and macro processors, Macro definitions and instructions, Macro calls, Features of Macros, Design of Macro processors.

Module III (12T)

Loading, linking and relocating Loader schemes- Binders, linking loaders, overlays, dynamic binders-Dynamic loading and dynamic linking – Relocatability of programs.

Module IV (12T)

Compilers - Phases of a compiler - Lexical, Syntax, Intermediate code generation, Optimization, Code generation, Symbol table and error correcting routines – Passes of a compiler.

Module V (12T)

Case studies of lexical and syntax analysers: LEX and YAAC.

References:

1. D.M. Dhamdhere, Systems Programming and Operating Systems
2. John J Donovan, Systems programming
3. Jim Welsh and R M Mckeag, Structured System Programming, Prentice Hall.
4. Principal of Compiler Design, Alfred Aho V and Jeffrey D Ullman, Addison- Wesley Publi.
5. L Lbech, System Software.

Course No: 40

Course Code: BCS6EI01

Course Title: Elective (Cloud Computing)

Objectives of the Course

- To learn basics of cloud computing and loud computing services
- To understand key concepts of virtualization, distributed programming paradigms
- Enumerate the security issues in cloud

Prerequisites

- Knowledge in Computer Network and Operating System.

Course Outcome

- Define Cloud Computing and different Cloud service and deployment models
- Describe importance of virtualization along with their technologies.
- Use and Examine different cloud computing services
- Analyze the components of open stack and other cloud infrastructures

Module I (12T)

Introduction - evolution of cloud computing – system models for distributed and cloud computing – NIST cloud computing reference architecture – Infrastructure as a Service (IaaS) – resource virtualization – Platform as a Service (PaaS) – cloud platform & management – Software as a Service (SaaS) – available service providers.

Module II (12T)

Virtualization - basics of virtualization - types of virtualization – implementation levels of

virtualization - virtualization structures - tools and mechanisms - virtualization of CPU, memory, I/O devices - desktop virtualization – server virtualization – Linux KVM, Xen, Qemu, LXC, OpenVZ.

Module III (12T)

Cloud infrastructure - FOSS cloud software environments - Eucalyptus, Open Nebula, OpenStack – OpenStack architecture – compute, object storage, image service, identity, dashboard, networking, block storage, metering, basic cloud orchestration and service definition.

Module IV (12T)

Programming model - parallel and distributed programming paradigms – Mapreduce, twister and iterative Mapreduce – mapping applications - programming support – Apache Hadoop – HDFS, Hadoop I/O, Hadoop configuration, MapReduce on Hadoop.

Module V (12T)

Security in the cloud - security overview – cloud security challenges – software as a service security – security governance – risk management – security monitoring – security architecture design – data security – application security – virtual machine security – Qubes – desktop security through Virtualization.

References:

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, Distributed and Cloud Computing (From Parallel Processing to the Internet of Things), Elsevier Science, ISBN: 9780128002049.
2. John W. Rittinghouse and James F. Ransome, Cloud Computing: Implementation, Management, and Security, 1st Edition, CRC Press, ISBN: 1439806802.
3. Toby Velte, Robert Elsenpeter and Anthony Velte, Cloud Computing, A Practical Approach, TMH, ISBN: 9780071626958.
4. George Reese, Cloud Application Architectures, 1st Edition, Shroff /O'Reilly, ISBN: 8184047142.
5. Ravi Nair and Jim Smith, Virtual Machines: Versatile Platforms for Systems and Processes, 1st Edition, Elsevier Science / Morgan Kaufmann, ISBN: 9780080525402/ 1558609105.
6. Katarina Stanoevska - Slabeva, Thomas Wozniak, Santi Ristol, Grid and Cloud Computing – A Business Perspective on Technology and Applications, Springer, ISBN: 3642051928.

Course No: 40

Course Code: BCS6E102

Course Title: Elective (Visual Programming)

Objectives of the Course

- To learn the basic concepts of .NET framework
- To learn the basics of visual programming using VB.NET

Prerequisites

- Basic programming skills.

Course Outcome

- Design and develop window based applications using VB.NET

Module I (12T)

Introduction to visual programming - Concept of event driven programming - Introduction to VB.Net environment, the .NET Framework and the Common Language Runtime. Building VB.NET Applications, the Visual Basic Integrated Development - Basic Language – Console application and windows application, Data types, Declaring Variables, scope of variables, operators and statements.

Module II (12T)

Making Decisions with If . . . Else Statements, Using Select Case, Making Selections with Switch and Choose, Loop statements - Do Loop, for, while – The With Statement – Handling Dates and Times - Converting between Data Types - Arrays - declaration and manipulation - Strings & string functions – Sub Procedures and Functions.

Module III (12T)

Windows Applications - Forms - Adding Controls to Forms, Handling Events, MsgBox, InputBox, Working with Multiple Forms, Setting the Startup Form, SDI & MDI Forms, Handling Mouse & Keyboard Events, Common controls (Text Boxes, Rich Text Boxes, Labels, Buttons, Checkboxes, Radio Buttons, Group Boxes, List Boxes, Checked List Boxes, Combo Boxes, Picture Boxes, Scroll Bars, Tool Tips, Timers) properties – methods.

Module IV (12T)

Object-Oriented Programming - Creating and using Classes & objects – Handling Exceptions - On Error GoTo - Raising an Exception - Throwing an Exception - Using Structured Exception Handling - Debugging and tracing.

Module V (12T)

Data Access with ADO.NET - Accessing Data with the Server Explorer - Accessing Data with Data Adaptors and Datasets - Creating a New Data Connection - Creating and populating Dataset - Displaying Data in a Data Grid - Selecting a Data Provider - Data Access Using Data Adapter Controls – Binding Data to Controls - Handling Databases in Code - Binding to XML data.

References:

1. Visual Basic .NET Black Book, by Steven Holzner
2. VB.NET for developers, By Keith Franklin, Rebecca Riordan, SAMS
3. Sams Teach Yourself Visual Studio .NET 2005 in 21 Days, By Jason Beres.
4. Learning Visual Basic .NET by Jesse Liberty.
5. Visual Basic .Net programming in easy steps BY TIM ANDERSON, DreamTech Press.

Course No: 40

Course Code: BCS6EI03

Course Title: Elective (Micro Processor & Micro Controllers)

Objectives of the Course

- To learn the working and programming in 8086 micro processor
- To learn the basic concepts of microcontroller and microcontroller interface

Prerequisites

- Knowledge of computer basics, digital electronics

Course Outcome

- Describe the architecture of 8086 microprocessor and 8051 microcontroller.
- Write and execute assembly language programs for 8086 microprocessor

Module I (12T)

16-Bit Microprocessor: 8086 Architecture, Pin Configuration, 8086 Minimum and Maximum mode configurations.

Module II (12T)

Addressing modes, 8086 Instruction set (Data transfer, Arithmetic, Branch, Processor control & String instruction), 8086 interrupts.

Module III (12T)

Assembler Directives: Data Definition And Storage Allocation, Program Organization, Alignment, Program End value, Returning Attribute, Procedure Definition, Macro Definition, Data Control, Branch Displacement, Header File Inclusion-Target Machine Code generation Control Directives.

Module IV (12T)

Peripherals and Interfacing: Interfacing output displays (8212), interfacing input keyboards, key Debounce, Programmable communication interface (8251A), programmable peripheral interface (8255), Programmable DMA Controller (8257), Programmable interrupt controller (8259), Programmable interval timer (8253).

Module V (12T)

Advanced Microprocessors: Introduction to 80186, 80286, 80386, 80486 and Pentium processors, General introduction to BIOS and DOS interrupts.

References:

1. Barry.B.Brey. The Intel Microprocessor 8086/8088. 80186, 80286, 80386 and 80486 Architecture Programming and Interfacing, Prentice Hall of India Pvt.Ltd.1995.
2. K.R. Venugopal, Raj Kumar, Microprocessor X86 programming, Bpb publications New Delhi
3. Abel P, IBM PC Assembly Language & Programming 5th Edition Parson Education Asia 2001

4. B Ram, Fundamentals of Microprocessors and Microcomputers – Dhanpat Rai Publications Pvt. Ltd., New Delhi
5. Mohamad Rafiquzzaman, Microprocessors and Microcomputer Based System Designing. Universal Bookstall, New Delhi
6. Yu. Cheng Liu, Glenn A Gibson, Microcomputer Systems: The 8086/8088 Family. Architecture, Programming & Designing Prentice Hall of India.

Course No: 40

Course Code: BCS6EI04

Course Title: Elective (Introduction to Internet of Things-IOT)

Objectives of the Course

- Induce an awareness to Arduino and Raspberry –Pi

Prerequisites

- Basic understanding of Linux OS and Python.

Course Outcome

- Setting up Arduino and Raspberry –Pi
- Design and develop basic projects in IOT.

Module I (12T)

Introduction to Arduino environment: Overview, board description, installation, program structure, data types, variables& constants, operators, control statements, loops, functions, strings, string objects, time, arrays.

Module II (12T)

Arduino Function libraries: I/O functions, Advanced I/O functions, Character functions, math library, trigonometric functions. Arduino Advanced: Due & bZero, Pulse width Modulation, Random Numbers, Interrupts, Communication, Inter Integrated circuit, Serial peripheral Interface.

Module III (12T)

Introduction to Raspberry –Pi, SOC, versions, features, Raspberry Pi B+ , Basics of Electronics: Hardware Description, Pin Configuration, Preparing SD Card for OS Installation: Downloading Image, Various Operating Systems Available, Making SD Card: Fedora ARM Installer Raspberry Pi SD Installer: First time configuration: Using Whole SD Card, Using Whole Screen, Changing Timezone, Booting Into Desktop, Raspi-Config Test.

Module IV (12T)

Network Setup: Setting Up Using GUI, Setting up using command line, Finding Pi's IP Address.
GPIO Setup: The GPIO Connector, Libraries Using GIT, Configuring GPIO: Test and Configure.
Pi using Secure Shell (SSH): Enabling SSH, Putty, Test and Configure. Pi over VNC:
Installing VNC, Configuring VNC, Running VNC at Startup, Test and Configure.

Module V (12T)

Python for Pi: Importing Libraries, Functions, Classes, Accessing SMTP Inbox Using Python, Manipulating GPIO Pins Using Python. Making Raspberry –Pi a Web Server: Apache installation, Configuring and Deploying Apache, Hosting a Website.

References:

1. Arduino Cookbook: Recipes to Begin, Expand, and Enhance Your Projects, Michael Margolis, O' Reilly
2. Raspberry Pi- Beginners Guide, Gareth Halfacree, Raspberry Press
3. Online resources

Course No: 41

Course Code: BCS6B (Pr)

Course Title: Project Work

Objectives of the Course

- To offer students a glimpse into real world problems and challenges that requires IT based solutions
- To get a hand on experience for developing software solution by using software engineering and IT concepts.
- To improve the team building, communication and management skills of the students

Prerequisites

- Knowledge of programming, software engineering principles and other concepts

Course Outcome

- Discover potential research areas in the field of Computer Science.
- Understands the characteristics of various domains
- Compare and contrast the several existing solutions
- Formulate and propose a plan and other specifications for creating a solution
- To report and present the findings or results

Course Outline

The objective of the B. Sc Computer Science final project work is to develop a quality software solution by following the software engineering principles and practices. During the development of the project the students should involve in all the stages of the software development life cycle (SDLC). The main objective of this project course is to provide learners a platform to demonstrate their practical and theoretical skills gained during five semesters of study in B. Sc Computer

Science Programme. During project development students are expected to define a project problem, do requirements analysis, systems design, software development, apply testing strategies and do documentation with an overall emphasis on the development of a robust, efficient and reliable software systems. The project development process has to be consistent and should follow standard. For example database tables designed in the system should match with the E-R Diagram. SRS documents to be created as per IEEE standards. Students are encouraged to work on a project preferably on a live software project sponsored by industry or any research organization. Topics selected should be complex and large enough to justify as a B. Sc Computer Science final semester project. The courses studied by the students during the B. Sc Computer Science Programme provide them the comprehensive background knowledge on diverse subject areas in computer science such as computer programming, data structure, DBMS, Computer Organization, Software Engineering, Computer Networks, etc., which will be helping students in doing project work. Students can also undertake group project to learn how to work in groups. For internal evaluation, the progress of the student shall be systematically assessed through two or three stages of evaluation at periodic intervals. A bonafied project report shall be submitted in hard bound complete in all aspects.
