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Programme:- BCA (AI & DA) **Semester - I** **wef: July 2022**

Name of Paper	Paper Code	Theory					
		Credit			Marks		
Computer Fundamentals and Organization	BAI-101	L	T	J	EST	CAT	Total
		3	1	0	70	30	100

Course Objective	The objective of this course is to help to acquire the basic learning and knowledge of computer. Also to understand digital systems and acquire the knowledge of computer organization.

Units	Contents (Theory)	Hours /week
I	**Introduction to Computer:** Computer Characteristics, Concept of Hardware, Software, Evolution of computer and Generations, Types of Computer – Analog and Digital computers, Hybrid Computers, General Purpose and Special Purpose Computer, Limitations of Computer, Applications of Computer in Various Fields. Functional Block Diagram of Computer: CPU, ALU, Memory Unit, Bus Structure of Digital Computer – Address, Data and Control Bus.	8
II	**Input/Output Devices:** Input Device: Keyboard, Mouse, Scanner, MICR, OMR. Output Devices – VDU, Printers – Dot Matrix, Daisy-wheel, Inkjet, Laser, Line Printers and Plotters. Computer Memory: Memory Concept, Memory Cell, Memory Organization, Semiconductor Memory – RAM, ROM, PROM, EPROM, Secondary Storage Devices – Magnetic Tape, Magnetic Disk (Floppy Disk and Hard Disk.), Compact Disk. Software – System and Application Software.	8
III	**Introduction to Digital Systems:** Introduction to Digital electronics, Digital and Analog Signals and Systems, Binary Digits, Data Representation: Number System: Binary, Octal, Hexadecimal, Conversions from one base to another. Binary Arithmetic: Binary arithmetic operations; Representation of Negative Numbers;1's complement and 2's complement, Complement arithmetic, Binary Codes: BCD code, ASCII code, EBCIDIC code.	8
IV	**Boolean algebra:** Rules and laws of Boolean algebra, Boolean theorems, Boolean functions and Truth tables, Digital Logic gates: Basic Gates – AND, OR, NOT, Universal Gates – NAND, NOR, Other Gates–XOR, XNOR, NAND, NOR, Half-Adder, Full-Adder, ,Encoders, Decoders, Multiplexers, De- multiplexers, Flip-flops,Registers, Counters.	8
V	**Memory organization:** Primary memory-RAM, ROM, PROM, EPROM, PLA programmable logic array, Secondary memory and its types, Internal organization of a memory chip, Organization of a memory unit, Concept of cache memory, Concept of virtual memory.	8

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Text Books/ References Book:-			
Name of Authors	Titles of the Book	Edition	Name of the Publisher
M. Morris Mano	Digital Logic and Computer Design	4th edition, 2013	Prentice Hall of India Pvt. Ltd.
W. Stallings	Computer Organization and Architecture-Designing for Performance	6th dition, 2003	Prentice Hall, Inc.
Andrew S. Tanenbaum,	Structured Computer Organization	6th edtion, 2013	Prentice Hall of India Pvt. Ltd.
S.K. Basandra	Computer Today	First edition, Ver. 06, 1995	Galgotia Publications.
P.K. Sinha	Computer Fundamentals	06th edition, 1992	BPB publications
B. Ram	Computer Fundamentals and Architecture	4th ed., 2000	New Age International

COURSE OUTCOMES: Students will be able to	
CO1	Identity input and output devices of Computer system.
CO2	Understand Computer hardware and Computer Software
CO3	Convert different type of codes and number systems which are used in digital communication and computer systems.
CO4	Create the appropriate truth table from a description of a combinational logic function.
CO5	Design and analyze circuits for digital arithmetic.

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Name of Paper	Paper Code	Theory					
		Credit			Marks		
		L	T	J	EST	CAT	Total
Foundation to AI, Data Science, Ethics and Foundation of Data Analysis	**BAI-102**	**3**	**1**	**0**	**70**	**30**	**100**

Course Objective	The objective of this course is to teach students the concepts of current main conceptual frameworks at use in AI.

Units	Contents (Theory)	Hours /week
I	**Introduction to Data Science:** Defining Data Science and Big Data, Benefits and Uses of Data Science and Big Data, Facets of Data, Structured Data, Unstructured Data, Natural Language, Machine generated Data, Graph based or Network Data, Audio, Image, Video, Streaming data, Data Science Process, Big data ecosystem and data science, distributed file systems, Distributed programming framework, data integration framework, machine learning framework, No SQL Databases, scheduling tools, benchmarking tools, system deployments	**8**
II	**Data Science Processes:** Six steps of data science processes, define research goals, data retrieval, cleansing data, correct errors as early as possible, integrating – combine data from different sources, transforming data, exploratory data analysis, Data modelling, model and variable selection, model execution, model diagnostic and model comparison, presentation and automation.	**8**
III	**Introduction to Machine Learning:** What is Machine Learning, Learning from Data, History of Machine Learning, Big Data for Machine Learning, Leveraging Machine Learning, Descriptive vs Predictive Analytics, Machine Learning and Statistics, Artificial Intelligence and Machine Learning, Types of Machine Learning – Supervised, Unsupervised, Semi-supervised, Reinforcement Learning, Types of Machine Learning Algorithms, Classification vs Regression Problem, Bayesian, Clustering, Decision Tree, Dimensionality Reduction, Neural Network and Deep Learning, Training machine learning systems	**8**
IV	**Introduction to AI:** What is AI, Turing test, cognitive modelling approach, law of thoughts, the relational agent approach, the underlying assumptions about intelligence, techniques required to solve AI problems, level of details required to model human intelligence, successfully building an intelligent problem, history of AI.	**8**
V	**Introduction to Data Analytics:** Working with Formula and Functions, Introduction to Power BI & Charts, Logical functions using Excel, Analysing Data with Excel.	**8**

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Text Books/ References Book:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Study Material will be provided.			
Elaine Rich and Kevin Knight	Artificial Intelligence	III edition	Tata McGraw Hill.
Patrick Henry Winston	Artificial Intelligence	III edition	Addison-Wesley Publishing Company
Stuart J Russell & Peter Norvig	Artificial Intelligence	III edition	Pearson

COURSE OUTCOMES: Students will be able to	
CO1	Uses of AI, Ethics present and future
CO2	Introduction to Machine Learning
CO3	Understand application of AI by domain.
CO4	Role of AI in society.
CO5	Understand Data Analytics

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Name of Paper	Paper Code	Theory					
		Credit			Marks		
Problem Solving and Programming in C	**BAI-103**	**L**	**T**	**J**	**EST**	**CAT**	**Total**
		3	1	0	70	30	100

Course Objective	The objective of this course is to provide foundation in the basic concepts of C programming. Also to teach the students the development of programming logics that are appropriate for problems solving.

Units	Contents (*Theory*)	Hours /week
I	**Overview of C Language:** Programming concepts:-Software, Classification of Software, Modular Programming, Structured Programming, Algorithms and Flowcharts with examples History of C, Character set, C tokens, Identifiers, Keywords, Data types, Variables, Constants, Symbolic Constants , Operators in C, Hierarchy of Operators, Expressions, Type Conversions and Library Functions, Storage Classes -Automatic, External, Static and Register Variables	**8**
II	**Control Statements and Functions**: Decision Making Statements - if Statement, if–else statement, nesting of if-else statements, else–if ladder, switch statement, Looping – for loop, while, do-while, Nested loop, break, continue, and goto statements. Functions**:** Function Definition, prototyping, types of functions, passing arguments to functions, Nested Functions, Recursive functions.	**8**
III	**Arrays and Strings:** Declaration and Initialization, Types of Arrays, Operations on arrays, Strings: Declaration and Initialization, String Functions, Arrays of strings, passing strings to functions.	**8**
IV	**Pointers ,Structure and Union :** Pointer concept, Pointer Type Declaration, Pointer Assignment, Pointer Initialization, Pointer Arithmetic, Functions And Pointers, Arrays And Pointers, Pointer Arrays, Structure: Definition and declaration; Variables initialization; Accessing members of a Structure; , arrays of structures , size of structure ,Nested structures, Union**:** Definition and declaration, difference between Union and structure .	**8**
V	**I/O Formats and Files -** Concept of Files, Text and Binary files, File Opening In Various Modes And Closing of a File, Reading from a File, Writing onto a File.	**8**

Text Books/ References Book:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher

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Balaguruswamy E.	Programming in ANSI C	7th edition	Mc Graw Hill
Brian W. Kernighan and Dennis M. Ritchie	The C programming language	2nd edition, 1988	Prentice Hall of India
Yashavant Kanetkar	Let Us C	15th Edition	BPB
Yashavant Kanetkar	Working With C	1994	BPB

COURSE OUTCOMES: Students will be able to	
CO1	Write, compile and debug programs in C language.
CO2	Design programs involving decision structures, loops and functions.
CO3	Differentiate between call by value and call by reference
CO4	Understand the dynamics of memory by the use of pointers
CO 5	Create/update basic data files

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Name of Paper	Paper Code	Theory					
		Credit			Marks		
		L	T	J	EST	CAT	Total
Elementary Mathematics	**BAI-104**	3	1	0	70	30	100

Course Objective	The objective of this course is to teach the basic concepts of mathematics**.**

Units	Contents (*Theory*)	Hours /week
I	**Sets**: Introduction of elements of mathematics, Set & subset, Finite and Infinite set, Equal set, Null set, Proper subset, universal set, Singleton set. Union, Intersection, complement of set. Common applications of set.	**8**
II	**Theory of Indices**: Definition & types of matrices, Elementary transformation of matrices, Determinant and matrices, Special matrices, Addition and subtraction of matrix, Inverse of a matrix. Ratio and Proportion equation, Percentage, Percentages of different quantities, Commission & Brokerage, Discount, Profit & Loss.	**8**
III	**Permutation Combinations & Probabilities**: The rules of sum and product, Permutations, Combinations, Binomial and Multinomial theorems, Combinations with repetitions.	**8**
IV	**Frequency distribution**: Histogram, Measure of central tendency, Mean, Mode, Median, Standard deviation.	**8**
V	**Mathematical Series**: Arithmetic, Geometric & Harmonic Series. Differentiation of functions, derivatives of some common functions, polynomials, exponential, logarithmic & trigonometric functions.	**8**

Text Books/ References Book:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
S. M. Shukla.	Business Mathematics	2018	Sahitya Bhawan Publications
H. S. Sharma.	Mathematical Statistics	First Edition , 2017	Ram Prasas Publications
Ray & Seth.	Matrices	2014	R. Chand and Co.
D.C. Agarwal , Sonendra Gupta, Avnish Mishra	Business Mathematics	2017	Shree Sai Prakhashan

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COURSE OUTCOMES: Students will be able to	
CO1	Understand the foundations of mathematics.
CO2	Perform basic computations in higher mathematics.
CO3	Understand set related operations.
CO4	Solve polynomials, exponential, logarithmic & trigonometric functions.
CO5	Understand and solve probability and permutation and combination problems.

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Name of Paper	Paper Code	Theory					
		Credit			Marks		
		L	T	J	EST	CAT	Total
Operating System	BAI-105	3	1	0	70	30	100

Course Objective	The objective of this course is to understand operating system and its components and their functionalities.

Units	Contents (*Theory*)	Hours /week
I	**Operating systems:** Introduction of operating system, Evolution of Operating Systems, Operating system components, Operating-System Services, Types of operating systems: Batch, Multi-programmed, Multitasking, Multiprocessor, Real-time, Distributed, Parallel and Open source, Concept of System calls.	**8**
II	**Process management and Synchronization:** Processes, Process Scheduling algorithms, Inter process Communication, Threads, Thread issues, Critical-Section Problem and Semaphores.	**8**
III	**Deadlock:** Deadlock definition, Characterization, Deadlock prevention, Deadlock detection, Deadlock avoidance, Recovery from Deadlock, Banker's Algorithm.	**8**
IV	**Memory Management and allocation methods:** Address binding, Logical and Physical address space, Contiguous allocation methods – Static & Dynamic partitioned memory allocation, Concepts of fragmentation, Swapping, Non–contiguous memory allocation methods – Paging and its basic principle, Segmentation and its basic principle	**8**
V	.**Virtual memory:** Demand paging, Page fault, Page replacement algorithms – FIFO, LRU, OPT, Thrashing.	**8**

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Text Books/ Reference Books:-			
Name of Authors	**Titles of the Book**	**Edition**	**Name of the Publisher**
Galvin P., J. L. Abraham Silberschatz	Operating System Concepts	9th Edition, 1989	John, Wiley & Sons Company
Deitel, H.M.	An Introduction to Operating Systems	2004	Addison Wesley Publishing Co.
Tanenbaum, A. S.	Modern Operating System	4th Edition, 2016	Prentice Hall of India, Pvt. Ltd.,
D. M. Damdhere,	Operating Systems	4thEdition, 2003	Tata McGraw Hill

COURSE OUTCOMES: Students will be able to	
CO1	Understand the components and services of operating system.
CO2	Understand the importance of process and scheduling.
CO3	Understand the concept and importance of synchronization.
CO4	Identify deadlock and prevent it.
CO5	Understand memory management concept.

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Name of Paper	Paper Code	Practical				
		Credit		Marks		
		P	J	ESP	CAP	Total
Programming Lab in C	BAI-106	2	-	30	20	50

Content:

1. WAP that accepts the marks of 5 subjects and finds the sum and percentage marks obtained by the student.
2. WAP that calculates the Simple Interest and Compound Interest. The Principal, Amount, Rate of Interest and Time are entered through the keyboard.
3. WAP to calculate the area and circumference of a circle.
4. WAP that accepts the temperature in Centigrade and converts into Fahrenheit using the formula C/5 = (F-32)/9.
5. WAP that swaps values of two variables using a third variable.
6. WAP that checks whether the two numbers entered by the user are equal or not.
7. WAP to find the greatest of three numbers.
8. WAP that finds whether a given number is even or odd.
9. WAP that tells whether a given year is a leap year or not.
10. WAP that accepts marks of five subjects and finds percentage and prints grades according to the following criteria:
    Between 90-100%----------Print ‘A’
    80-90%----------Print ‘B’
    60-80%----------Print ‘C’
    Below 60%----------Print ‘D’
11. WAP that takes two operands and one operator from the user and perform the operation and prints the result by using Switch statement.
12. WAP to print the sum of all numbers up to a given number.
13. WAP to find the factorial of a given number.
14. WAP to print sum of even and odd numbers from 1 to N numbers.
15. WAP to print the Fibonacci series.
16. WAP to check whether the entered number is prime or not.
17. WAP to find the sum of digits of the entered number.

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Name of Paper	Paper Code	Practical				
		Credit		Marks		
		P	J	ESP	CAP	Total
Programming Lab in Linux and Excel	**BAI-107**	2	-	30	20	50

Contents:

1. Differentiate between windows and linux.
2. Different flavors of Linux
3. Shells used in linux
4. Commands in linux
5. The word Processor
6. The Spreadsheet
7. The Presentation

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Name of Paper	Paper Code	Practical				
		Credit		Marks		
		P	J	ESP	CAP	Total
Mini Project in C	BAI-108	0	1	30	20	50

Note:- Design a project using features and file handling of C Language to automate the working of an application. There will be common project title for all students.

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Name of Paper	Paper Code	Practical				
		Credit		Marks		
		P	J	ESP	CAP	Total
Seminar/Presentation-I	BAI-109	-	-	-	-	-

Note: Each and Every student has to give presentation on any relevant topic.

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Name of Paper	Paper Code	Theory					
		Credit			Marks		
		L	T	J	EST	CAT	Total
Yoga and Meditation	*BAI-110	-	-	-	-	-	-
Course Objective	The Programme has been framed with an intention to provide knowledge of Yoga and Meditation.						

Note: Every student will do Yoga and Meditation. Sessions will be conducted for students.