DEPARTMENT OF Computer Engineering

Sr. No	Course No	Course Title	Credits	Semester
1.	FBM-111	Computer Programming and Data Structure	3 (1+2)	I
2.	FBM-122	Information and Communication Technology	2 (1+1)	II
3.	FBM-243	ICT Application in Food Industry	3 (1+2)	IV

FBM-111   COMPUTER PROGRAMMING AND DATA STRUCTURES   3 (1+2)

THEORY

Introduction: introduction to high level languages i.e. "C" language. Basic structure of C program, character set, variables, constants Data type: Primary data types and user defined data types, typecasting Operators: Arithmatic, logic, relational, building and evaluating expressions, standard library functions Managing Input and Output: input/output statement, scanf(), getchar (), getch(), putchar() Decision making, branching, looping: conditional statements (if, if-else, nesting of if, if-ladder); Looping statement (while(), do,, while() and for() – looping statements) Array: one dimensional, two dimensional and multi dimensional arrays Functions: library functions, user defined functions, passing arguments and returning values, recursion String functions: strcat(), strlen(), strcpy(), stremp (), etc. Data structure: structures, Union and Pointers (Syntax and definition) Stacks, push/pop operations, Queues, Insertion and deletion operations, linked lists

Practical

Write a first programme to print "Welcome to C-programming".; Write a program for addition, subtraction, multiplication and division of given two numbers A,B.; Write a program to check odd or even number.; Write a program to convert number of days in to months and days.

Write a program to find the Area of Circle, by giving radius as input.; Write a program to find the right most digit of a given number.; Program to calculate the simple interest by giving, principle amount, rate of interest and period in months.; Write a program to find the square root of a given number.; Write a program to find the largest among two numbers;

Write a program to find the largest of three given numbers A, B, C.; Write a program to find the roots of quadratic equation $AX2+BX+C= 0$; Write a program to find the average/mean of given 10 numbers.; Write a program to print the given number in reverse order.; Write a program to fin

d the sum of first fifty even numbers.; Write a program to generate Fibonacci series up to given numbers N.; Write a program to print the following triangle. ;

$$1$$
$$12$$
$$123$$
$$1234$$

Write a program to determine if the given number is prime or not prime; Write a program to find the factorial of a given number using function.; Write a program to find the factorial of a given numbers using Recursion.; Write a program to find Xy using user defined function.; Write a program to check the given integer number is Palidrome or not; Write a program to print the following triangle.

$$12345$$
$$1234$$
$$123$$
$$12$$
$$1$$

Write a program to find the average of 10 given numbers using arrays; print the numbers as well as average.Write a program to determine the grade of a student using nested if statement. Write a

program to select the desired branch of Engineering b using switch-case statement.; Write a program to check the given character is VOVEL or NOT; Write a program to read the string in the form of first name, middle name and last name and print the complete name.; Write a program to determine whether the given string is palindrome or not.; Write a program to determine whether the given character is in lowercase, uppercase, punctuation or space. ; Write a program to arrange the given 10 numbers using bubble sort method.; Write a program to arrange the given 10 numbers using selection sort method.; Write a program for addition of 3 x 3 matrix: Write a program of substraction fo 3 x 3 matrix: Write a program for multiplication of 3 x 3 matrix

Teaching Schedule - Theory with Weightages (%)

No. of Units	Topics	Per cent Covered
1 – 2	Introduction: introduction to high level languages i.e. "C" language. Basic structure of C program, character set, variables, constants	13
3 – 4	Data type: Primary data types and user defined data types, typecasting	13
5 – 6	Operators: Arithmatic, logic, relational, building and evaluating expressions, standard library functions	13
7	Managing Input and Output: input/output statement, scanf(), getchar (), getch(), putchar()	6
8	Decision making, branching, looping: conditional statements (if, if-else, nesting of if, if-ladder); Looping statement (while(), do,, while() and for() – looping statements)	6
9	Array: one dimensional, two dimensional and multi dimensional arrays	6
10 – 11	Functions: library functions, user defined functions, passing arguments and returning values, recursion	13
12	String functions: strcat(), strlen(), strcpy(), stremp (), etc.	6
13 – 14	Data structure: structures, Union and Pointers (Syntax and definition)	12
15 – 16	Stacks, push/pop operations, Queues, Insertion and deletion operations, linked lists.	12
	Total	**100**

Practical Exercises

No. of Units	Topics	Number of practicals
1	Write a first programme to print "Welcome to C-programming".	1
2	Write a program for addition, subtraction, multiplication and division of given two numbers A,B.	1
3	Write a program to check odd or even number.	1
4	Write a program to convert number of days in to months and days.	1
5	Write a program to find the Area of Circle, by giving radius as input.	1
6	Write a program to find the right most digit of a given number.	1
7	Program to calculate the simple interest by giving, principle amount, rate of interest and period in months.	1
8	Write a program to find the square root of a given number.	1
9	Write a program to find the largest among two numbers.	1
10	Write a program to find the largest of three given numbers A, B, C.	1
11	Write a program to find the roots of quadratic equation $AX^2+BX+C=0$	1
12	Write a program to find the average/mean of given 10 numbers.	1
13	Write a program to print the given number in reverse order.	1
14	Write a program to fin d the sum of first fifty even numbers.	1
15	Write a program to generate Fibonacci series up to given numbers N.	1
16	Write a program to print the following triangle. 1 12 123 1234	1
17	Write a program to determine if the given number is prime or not prime	1
18	Write a program to find the factorial of a given number using function.	1
19	Write a program to find the factorial of a given numbers using Recursion.	1
20	Write a program to find X^y using user defined function.	1
21	Write a program to check the given integer number is Palidrome or not	1
22	Write a program to print the following triangle. 12345 1234 123	1

| | | 12 | |
		1	
23	Write a program to find the average of 10 given numbers using arrays; print the numbers as well as average.	1	
24	Write a program to determine the grade of a student using nested if statement.	1	
25	Write a program to select the desired branch of Engineering b using switch-case statement.	1	
26	Write a program to check the given character is VOVEL or NOT	1	
27	Write a program to read the string in the form of first name, middle name and last name and print the complete name.	1	
28	Write a program to determine whether the given string is palindrome or not.	1	
29	Write a program to determine whether the given character is in lowercase, uppercase, punctuation or space.	1	
30	Write a program to arrange the given 10 numbers using bubble sort method.	1	
31	Write a program to arrange the given 10 numbers using selection sort method.	1	
32	Write a program for addition of 3 x 3 matrix: Write a program of substraction fo 3 x 3 matrix: Write a program for multiplication of 3 x 3 matrix	1	
	Total	32	

TEXT BOOK

Sr. No.	Name of Book	Author	Publisher
1	Data Structures and Algorithm Analysis in C++,	Mark Allen Weiss	4th Ed. Pearson Education, Boston, USA. 2014
2	Computer programming in C	Rajaraman V.	Prentice Hall of India, 2006
3	Computer Concept and Programming in C	Godse AP and Godse DA	Technical Publication, Pune 2008
4			

REFERENCE BOOKS

Sr. No.	Name of Book	Author	Publisher
1	Fundamentals of Computer Programming with C#	Sofia, Bulgaria	Svetlin Nakov & Co, 2013
2	Object Oriented Programming with C++	Balagurusamy	4th Ed. Tata McGraw-Hill Publishing Company Limited, New Delhi. 2008

**FBM-122   INFORMATION AND COMMUNICATION   2 (1+1)
                              TECHNOLOGY**

THEORY

Introduction to Computers, Definition: Hardware, Software & firmware. Types of software. Data Representation, Number systems (Binary, Hexadecimal). Difference between ASCII & UNICODE (Different Encoding Schemes) Primary , Secondary Memory , Units used for measurement of memory , Input Output devices Operating Systems, definition and types File Management. Applications used for document creation & Editing, Data presentation using slides. Use of Spreadsheets for statistical analysis, evaluating mathematical & logical expressions Use of Spreadsheets for Interpretation and graph creation Database, concepts and types, uses of DBMS/RDBMS in Agriculture Database design, creation, Preparation of presentation. Import export operations, using numerical tabular data/text/graph /slides within different applications using cut-paste. Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc; Geospatial technology for generating valuable agri-information Decision support systems, concepts, components and applications in Agriculture, Agriculture Expert System, Soil Information Systems etc for supporting Farm decisions Communication process, Berlo' s model, feedback and barriers to communication.

Practical

Study of Computer Components, accessories; practice of important DOS Commands;

Introduction of different operating systems such as MS-Windows, Unix/ Linux, Creating, Files

& Folders, File Management.; Word-Processing – 1; Word Processing – 2; Presentation

Spreadsheet -1 ; Spreadsheet -2; Spreadsheet -3; DBMS/RDBMS Creating, Updating database

Querying/Retrieving data , relation ; Introduction to World Wide Web (WWW).; Demonstration of Agri-information system.; Hands on Crop Simulation Models (CSM) such as DSSAT/Crop-Info/CropSyst/Wofost; Computation of water and nutrient requirements of crop using CSM and IT tools; Introduction of Geospatial Technology for generating valuable information for Agriculture.; Hands on Decision Support System; Introduction of programming languages. Preparation of contingent crop planning.

Teaching Schedule - Theory with Weightages (%)

No. of Units	Topics	Per cent Covered
1	Introduction to Computers, Definition: Hardware, Software & firmware. Types of software.	7
2	Data Representation, Number systems (Binary, Hexadecimal). Difference between ASCII & UNICODE (Different Encoding Schemes)	7
3	Primary , Secondary Memory , Units used for measurement of memory , Input Output devices	7
4	Operating Systems, definition and types	7
5	File Management.	6
6	Applications used for document creation & Editing, Data presentation using slides.	6
7	Use of Spreadsheets for statistical analysis, evaluating mathematical & logical expressions.	6
8	Use of Spreadsheets for Interpretation and graph creation.	6
9	Database, concepts and types, uses of DBMS/RDBMS in Agriculture	6
10	Database design, creation,	6
11	Database, concepts and types, uses of DBMS/RDBMS in Agriculture	6
12	Database design, creation,	6
13	Preparation of presentation. Import export operations, using numerical tabular data/text/graph /slides within different applications using cut-paste.	6
14	Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc; Geospatial technology for generating valuable agri-information	6
15	Decision support systems, concepts, components and applications in Agriculture, Agriculture Expert System, Soil Information Systems etc for supporting Farm decisions.	6
16	Communication process, Berlo' s model, feedback and barriers to communication.	6
	Total	**100**

Practical Exercises

No. of Units	Topics	Number of practicals
1	Study of computer components, accessories	1
2	practice of important DOS Commands	1
3	Introduction of different operating systems such as MS-Windows, Unix/ Linux, Creating, Files & Folders, File Management.	1
4	Word-Processing – 1	1
5	Word Processing – 2	1
6	Presentation	1
7	Spreadsheet -1	1
8	Spreadsheet -2	1
9	Spreadsheet -3	1
10	DBMS/RDBMS Creating, Updating database	1
11	Querying/Retrieving data , relation	1
12	Introduction to World Wide Web (WWW). Demonstration of Agri-information system.	1
13	Hands on Crop Simulation Models (CSM) such as DSSAT/Crop-Info/CropSyst/Wofost; Computation of water and nutrient requirements of crop using CSM and IT tools	1
14	Introduction of Geospatial Technology for generating valuable information for Agriculture.	1
15	Hands on Decision Support System	1
16	Introduction of programming languages. Preparation of contingent crop planning.	1
	Total	**16**

TEXT BOOK

Sr. No.	Name of Book	Author	Publisher
1	Computer Fundamentals	Pradeep K. Sinha and Priti Sinha	III edition, BPB Publications, B-14, Connaught Place, New Delhi – 110 001.
2	Computer Fundamentals	P.K. Sinha	BPB Publications, B-14, Connaught Place, New Delhi – 110 001.

REFERENCE BOOKS AND LINKS

- Mastering Office Professional for window 95, BPB Publications, B-14, Connaught Place, New Delhi – 110 001.
- Statistical Methods for Agricultural workers by V.G. Panse and P.V. Sukhatma, ICAR, New Delhi.
- http://www.tutorialsforopenoffice.org/category_index/base.html
- http://mkisan.gov.in/downloadmobileapps.aspx
- http://www.nrsc.gov.in/Agriculture
- http://iasri.res.in/

- http://communicationtheory.org/berlos-smcr-model-of-communication/

FBM-243   **ICT APPLICATION IN FOOD INDUSTRY**   **3 (1+2)**

Theory

Importance of computerization in food industry, operating environments and information systems for various types of food industries, Supervisory control and data acquisition (SCADA); SCADA systems hardware, firmware, software and protocols, landlines, local area network systems, modems; Spreadsheet applications: Data interpretation and solving problems, preparation of charts, use of macros to solve engineering problems, use of add-ins, use of solver; Web hosting and webpage design; file transfer protocol (FTP), on-line food process control from centralized server system in processing plant; Use of MATLAB in food industry; computing with MATLAB, script files and editor/debugger, MATLAB help system, problem solving methodologies, numeric, cell, arrays, matrix operations, user defined functions, programming using MATLAB; debugging MATLAB programs, applications to simulations; Plotting and model building in MATLAB, X-Y plotting functions, subplots and overlay plots, special plot types, interactive plotting in MATLAB, function discovery, regression, the basic fitting interface, three dimensional plots; Introduction to toolboxes useful to food industry, curve fitting toolbox, fuzzy logic toolbox, neural network toolbox, image processing toolbox, statistical toolbox; Introduction to computational fluid dynamics (CFD), governing equations of fluid dynamics; Models of flow, substantial derivative, divergence of velocity, continuity, momentum and energy equations; Physical boundary conditions, discretization; Applications of CFD in food and beverage industry; Introduction to CFD software, GAMBIT and FLUENT software; LabVIEW – LabVIEW environment: Getting data into computer, data acquisition devices, NI-DAQ, simulated data acquisition, sound card, front panel/block diagram, toolbar/tools palette Components of a LabVIEW application: Creating a VI, data Flow execution, debugging techniques, additional help, context help, tips for working in LabVIEW; LabVIEW typical programs: Loops, while loop, for loop, functions and sub Vis, types of functions, searching the functions palette, creating custom sub Vis, decision making and file I/O, case structure, select (if statement), file I/O; LabVIEW results: Displaying data on front panel, controls and indicators, graphs and charts, arrays, loop timing, signal processing, textual math, math script.

Practical

Introduction to various features in spreadsheet; Solving problems using functions in spreadsheets; Use of Add-Ins in spread sheet and statistical data analysis using Analysis Tool pack; Solution of problems on regression analysis using Analysis Tool pack in spreadsheet; Solution of problems on optimization using solver package in spreadsheet; Introduction to MATLAB; Writing code using MATLAB programming; Solution of problems using Curve Fitting Toolbox in MATLAB; Solution of problems using Fuzzy Logic Toolbox in MATLAB; Solution of problems using Neural Network Toolbox in MATLAB; Solution of problems using Image Processing Toolbox in MATLAB; Introduction to GAMBIT software; Creation of geometry for laminar flow through pipe using GAMBIT; Introduction to FLUENT software; Import of geometry and application of boundary conditions; Solution of problems on laminar flow using FLUENT; Introduction to LabVIEW and NI-DAQ.

Teaching Schedule - Theory with Weightages (%)

No. of Units	Topic	Per cent Covered
1	Importance of computerization in food industry, operating environments and information systems for various types of food industries,	7
2 – 3	Supervisory control and data acquisition (SCADA); SCADA systems hardware, firmware, software and protocols, landlines, local area network systems, modems; Spreadsheet applications: Data interpretation and solving problems, preparation of charts, use of macros to solve engineering problems, use of add-ins, use of solver;	12
4 – 5	Web hosting and webpage design; file transfer protocol (FTP), on-line food process control from centralized server system in processing plant;	12
6 – 7	Use of MATLAB in food industry; computing with MATLAB, script files and editor/debugger, MATLAB help system, problem solving methodologies, numeric, cell, arrays, matrix operations, user defined functions, programming using MATLAB; debugging MATLAB programs, applications to simulations; Plotting and model building in MATLAB, X-Y plotting functions, subplots and overlay plots, special plot types, interactive plotting in MATLAB, function discovery, regression, the basic fitting interface, three dimensional plots;	12
8	Introduction to toolboxes useful to food industry, curve fitting toolbox, fuzzy logic toolbox, neural network toolbox, image processing toolbox, statistical toolbox;	7
9 – 11	Introduction to computational fluid dynamics (CFD), governing equations of fluid dynamics; Models of flow, substantial derivative, divergence of velocity, continuity, momentum and energy equations; Physical boundary conditions, discretization; Applications of CFD in food and beverage industry;	19
12 – 13	Introduction to CFD software, GAMBIT and FLUENT software; LabVIEW – LabVIEW environment: Getting data into computer, data acquisition devices, NI-DAQ, simulated data acquisition, sound card, front panel/block diagram, toolbar/tools palette;	12
14 – 16	Components of a LabVIEW application: Creating a VI, data Flow execution, debugging techniques, additional help, context help, tips for working in LabVIEW; LabVIEW typical programs: Loops, while loop, for loop, functions and sub Vis, types of functions, searching the functions palette, creating custom sub Vis, decision making and file I/O, case structure, select (if statement), file I/O; LabVIEW results: Displaying data on front panel, controls and indicators, graphs and charts, arrays, loop timing, signal processing, textual math, math script.	19
	Total	**100**

Practical Exercises

No. of Units	Topic	Number of Experiments
1	Introduction to various features in spreadsheet; Solving problems using functions in spreadsheets; Use of Add-Ins in spread sheet and statistical data analysis using Analysis Tool pack; Solution of problems on regression analysis using Analysis Tool pack in spreadsheet; Solution of problems on optimization using solver package in spreadsheet;	10
2	Introduction to MATLAB; Writing code using MATLAB programming; Solution of problems using Curve Fitting Toolbox in MATLAB; Solution of problems using Fuzzy Logic Toolbox in MATLAB; Solution of problems using Neural Network Toolbox in MATLAB; Solution of problems using Image Processing Toolbox in MATLAB;	7
3	Introduction to GAMBIT software; Creation of geometry for laminar flow through pipe using GAMBIT;	7
4	Introduction to FLUENT software; Import of geometry and application of boundary conditions; Solution of problems on laminar flow using FLUENT;	6
5	Introduction to LabVIEW and NI-DAQ.	2
	Total	**32**

TEXT BOOK

Sr. No.	Name of Book	Author	Publisher
1	Computer Applications in Food Technology: Use of Spreadsheets in Graphical, Statistical and Process Analysis	R. Paul Singh	Academic Press, London. 2014
2	Introduction to LabVIEW: 3-Hour Hands-On	National Instruments Corporation	NI, Austin, Texas. 2005
3	Practical SCADA for Industry	David Bailey and Edwin Wright	Elsevier, Burlington, MA 2003

REFERENCE BOOKS

Sr. No.	Name of Book	Author	Publisher
1	Introduction to MATLAB for Engineers	William J. Palm	3rd Ed. McGraw-Hill Companies, Inc., NY, USA. 2011
2	Computational Fluid Dynamics in Food Processing	Da-Wen Sun	CRC Press, Boca Raton, FL, USA. 2007
3	Web Design: A Complete Introduction	Nigel Chapman and Jenny Chapman	John Wiley & Sons, USA. 2006