Bridge Courses

FOR

STUDENTS

Passed B.Sc./ B.Com./ B.A. with Mathematics at 10+2 level or at Graduation Level

Master of Computer Application
(MCA)

(W. E. F. 2020-21)

MAULANA AZAD NATIONAL URDU UNIVERSITY
SCHOOL OF TECHNOLOGY
DEPARTMENT OF CS&IT

DURATION
Two semesters

Total Credits: 14

L-T-P stands for number of contact hours as Lecture-Tutorial-Practical in a week.

Bridge Courses (BC)

Course Code	Course Title	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
MMBC101PCT	Discrete Mathematics	BC	30	70	100	3-1-0	4
MMBC102PCT	Information & Communication Technology	BC	30	70	100	3-1-0	4
MMBC103PCT	Introduction to Computer System & Hardware	BC	30	70	100	3-1-0	4
MMBC160PCP	Problem Solving using 'C' Language Lab	BC	50	50	100	0-0-4	2
					Total	**9-3-4**	**14**

Course Code		Course Title	Lecture			Semester: Bridge
MMBC101PCT		Discrete Mathematics	L	T	P	
			3	1	0	

Scheme of Instruction			Scheme of Examination		
No. of Periods	:	60 Hrs.	Maximum Score	:	100
Periods/ Week	:	4	Internal Evaluation	:	30
Credits	:	4	End Semester	:	70
Instruction Mode	:	Lecture	Exam Duration	:	3 Hrs.

Course Objectives:
To Understand the fundamental concepts of Discrete Mathematics
Apply logical reasoning to solve a variety of problems.
To Study and identify a real life problems and computing requirements for its solution
Course Outcomes:
Develop mathematical and logical thinking
express real life problems it in terms of predicates, quantifiers, and logical connectives and obtained its solution
Utilize the concepts of relations and functions to solve simple real life problems.

Detailed Contents:	
Unit: 1	Mathematical Logic:Statements and notations, Logical Connectives, Compound statements, Well-formed formulas, Truth Tables, tautology, implications and equivalence of statements, Normal forms: disjunctive & Conjunctive normal forms and simplification, Quantifiers, universal quantifiers.Predicates: Predicative logic, Free & Bound variables, Rules of inference,
Unit: 2	Relations and Functions:Relations: Review of set concepts, Relations and its representations, Properties of binary relation –Reflexive, irreflexive, symmetric, Asymmetric, transitive, Equivalence, Inverse & Composition of a relation, closure of relations, its types, Warshall Algorithm, Partial ordering relation, Hasse diagram, minimal elements, upper bound, lower bound, LatticesFunctions: definition, floor functions, ceiling functions, surjective, injunctive and bijective functions, Inverse Function, Composition of functions, recursive Functions, Pigeon hole principles and its application.
Unit: 3	Elementary Combinatorics:Basics of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial and Multinomial theorems, the principles of Inclusion – Exclusion, Derangements – Nothing in its right place integer solutions to linear equations
Unit: 4	Graph Theory:Basic concept, Graphs and their properties, Degree, Connectivity, Path, Cycle,, simple and weighted graph, complete graph, regular graph, Perfect Graph, Multi graphs, bipartite graph, complete bipartite, Sub Graph, Isomorphism, complement of graph, connected graphs, paths-simple, elementary, circuit – simple, elementary, Edge connectivity, vertex connectivity, Eulerian path and Eulerian circuit, planar graph
Unit: 5	Introduction, Applications of Trees, Tree Traversal, Trees and Sorting, Spanning Trees, Minimum Spanning Trees.
Examination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which is mainly end semester examination.	

Text Books:	
1	Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw – Hill
2	Ralph P. Grimaldi, Discrete And Combinatorial Mathematics An Applied Introduction
Reference Books	
1	C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw – Hill.

2	Schaum's Outlines Series, Seymour Lipschutz, Marc Lipson, Discrete Mathematics, Tata McGraw – Hill

Course Code	Course Title	Lecture			Semester: Bridge
		L	T	P	
MMBC102PCT	Information & Communication Technology	3	1	0	

Scheme of Instruction			Scheme of Examination		
No. of Periods	:	60 Hrs.	Maximum Score	:	100
Periods/ Week	:	4	Internal Evaluation	:	30
Credits	:	4	End Semester	:	70
Instruction Mode	:	Lecture	Exam Duration	:	3 Hrs.

Course Objectives:
1. Vision and Introduction to Computer System.
2. Understand Computer Networks.
3. Data and Knowledge Management in ICT.
4. Understand the effect of using ICT and its applications.

Course Outcomes:
1. be able to explain and demonstrate various components of Computer.
2. be able to analyse the role and importance of ICT in the modern world;
3. be able to investigate and propose various requirements of ICT for real world applications;
4. be able to evaluate a variety of existing and developing architecture technologies for ICT;
5. be able to describe and evaluate different applications of the ICT.

Detailed Contents:	
Unit: 1	**ICT**: General abbreviations and terminology, Basics of Internet, Intranet, Browsers, Methods of communication such as fax, Email, Audio/Tele and Video Conferencing, Digital Initiatives in Higher Education, ICT and Governance
Unit: 2	**Basic Computer Networks:** Routers, hubs, bridges, switches and proxy servers, WiFi, LiFi, HiFi, WiMax, Bluetooth, Infrared and ISP. Local Area Network (LAN), Metropolitan Area Networks (MAN), Wireless Local Area Network (WLAN) and Wide Area Network, (WAN), difference between LANs, WLANs, MAN and WANs and their characteristics, Communication Protocols.
Unit: 3	**Data and its Types:** Data Interpretation, Sources, acquisition and classification of Data, Quantitative and Qualitative Data, Graphical representation (Bar-chart, Histograms, Pie-chart, Table-chart and Line-chart) and mapping of Data, Data Interpretation, Data and Governance, Confidentiality and Security of Data.
Unit: 4	**Effect of Using ICT and Ways in which it is used**: Software Copyright, Hacking, Viruses, Employment Patterns, IT in the home, Information from the Internet, Health and Safety, Communication, Data-handling, Measurement, Control and Modelling.
Unit: 5	**Applications of ICT:** Learning Management System including Teaching Support System: Traditional, Modern and ICT based (MOOCs). Publicity, Manufacturing, Finance, Education, Travel & Leisure, Banking, Medicine, Libraries, Expert Systems, Retail.
Examination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which is mainly end semester examination.	

Text Books:	
1	Norton, P. (2000). *Peter Norton's introduction to computers*. Glencoe/McGraw-Hill.
2	Sargent, B., Watson, D., & Brown, G. (2015). *Cambridge IGCSE ICT 2nd Edition*. Hodder Education.

| 1 | Arulsamy, S., & Sivakumar, P. (2009). *Application of ICT in Education.* Neelkamal Pub. |
| 2 | Runkler, T. A. (2012). Data Analytics. *Wiesbaden: Springer. doi, 10*, 978-3. |

Course Code	Course Title	Lecture			Semester: II
		L	T	P	
MMBC103PCT	Introduction to Computer system and hardware	2	0	0	
Scheme of Instruction				Scheme of Examination	
No. of Periods	:	60 Hrs.	Maximum Score	:	100
Periods/ Week	:	4	Internal Evaluation	:	30
Credits	:	2	End Semester	:	70
Instruction Mode	:	Lecture	Exam Duration	:	3 Hrs.

Course Objectives:
1. Understand the usage of computers and why computers are essential society.
2. At the end of the program the students will be able to understand the fundamentals of Hardware.
Course Outcomes:
1) Utilize the Internet Web resources and evaluate on-line e-business system.
2) Solve common computer problems using appropriate Information Technology applications and systems.
3) Identify categories of programs, system software and applications. Organize and work with files and folders.

Detailed Contents:	
Unit: 1	Introduction to Computer, Organization of computer. Software and hardware, Input/output devices.Operating System Basics & Installation: Introduction to OS, Types of Operating systems, System files FAT and NTFs, Windows 7, Windows 10, LINUX and UBUNTU
Unit: 2	Introduction to Internet and Intranet, basic networking concepts, network topologies: LAN, WAN, MAN, PAN, CAN, NFC, LORA WAN. Networking Model: The OSI model, TCP/ IP Model, Network adapters, Introducing protocols, Cabling and troubleshooting
Unit: 3	Introduction to various networking devices: Routers, Switches, Modems, Hubs etc. Wired and Wireless technology, Network configuration: MAC address (physical address) Setting IP addresses, Sharing files and folders, Network troubleshooting, PING test, ipconfig etc.
Unit: 4	Introduction to computer hardware, components of mother boards & its types-ports, slots, connectors, add on cards, Power supply units, and cabinet types. Storage devices: Primary & secondary storage
Unit: 5	Hardware Trouble Shooting: Printers ,Microphone, Scanner, Network, Hardware failure, Testing, CDROM, Hard disk drive, Monitor, Mother Board, Sound Card, Video Card, graphics card.
Examination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which is mainly end semester examination.	

Text Books:	
1	Deborah Morley and Charles S. Parker; Fundamentals of Computers; Cengage Learning, India edition; 2009.
2	Alexis Leon and Mathews Leon; Fundamentals of Information Technology; Vikas Publication, Chennai
Reference Books:	
1	Pc Hardware: The Complete Reference by ZACKER and CRAIG, McGraw Hill

2	Exploring Computer Systems: The Illustrated Guide to Understanding Computer Systems, Hardware & Networks
	Wilson, Kevin

Course Code		Course Title	Lecture			Semester:
			L	**T**	**P**	**Bridge**
MMBC160PCP		Problem Solving Using C language (Lab)				
			0	0	4	

Scheme of Instruction			Scheme of Examination		
No. of Periods	:	60 Hrs.	Maximum Score	:	100
Periods/ Week	:	4	Internal Evaluation	:	30
Credits	:	2	End Semester	:	70
Instruction Mode	:	Lecture	Exam Duration	:	3 Hrs.

Course Objectives:

1. To, formulate simple algorithms for arithmetic and logical problems, translate the algorithms to programs (in C language),
2. To test and execute the programs and correct syntax and logical errors,
3. To solve numerical method problems, namely rot finding of function, differentiation of function and simple integration.

Course Outcomes:

1. To develop efficient algorithms for solving a problem and implementation.
2. To use the various constructs of a programming language viz. conditional, iteration and Recursion.
3. To use simple data structures like arrays, stacks and linked list in solving problems. Handling File in "C".

Detailed Contents:

Unit: 1	Introduction to Programming-The Basic Model of Computation, Algorithms, Flow-charts/pseudocodes, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation. Algorithms for Problem Solving-Exchanging values of two variables, , Decimal to Binary conversion, reversing digits of an integer, GCD of two numbers, Test prime, sorting numbers., square root of a number, factorial computation, Fibonacci sequence, Evaluate 'sin x' as sum of a series, Reverse array, largest number in an array, upper triangular matrix, multiplication of two matrices, Evaluate a Polynomial.
Unit: 2	Character set, Variables and Identifiers, Built-in Data Types, Variable Definition, Arithmetic operators and Expressions, Constants and Literals, Simple assignment statement, Basic input/output statement, Simple 'C' programs. Conditional Statements and Loops .Decision making within a program, Conditions, Relational Operators, Logical Connectives, if statement, if-else statement, Loops: while loop, do while, for loop, Nested loops, Infinite loops, Switch statement, structured Programming.
Unit: 3	Arrays-One dimensional arrays: Array manipulation; Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in an array; Two dimensional

	arrays, Addition/Multiplication of matrices, Transpose of matrix; Null terminated strings as array of characters, string functions. Storage Classes Scope and extent,: extern and static. Pointers-Address operators, pointer type declaration, pointer assignment, pointer initialization, pointer arithmetic, functions and pointers, Arrays ,Pointers, and structures, dynamic memory allocation.
Unit: 4	Functions- Top-down approach of problem solving, Modular programming and functions, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Block structure, Passing arguments to a Function: call by reference, call by value, Recursive Functions, arrays as function arguments. Structures and Unions Structure variables, initialization, structure assignment, nested structure, structures and functions, structures and arrays: arrays of structures, structures containing arrays, unions.
Unit: 5	Self-Referential Structures and Linked Lists -Creation of a singly connected linked list, Traversing a linked list, Insertion into a linked list, Deletion from a linked list File Processing-Concept of Files, File opening in various modes and closing of a file, Reading from a file, Writing onto a file.

Examination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which is mainly end semester examination.

Text Books:	
1	1. Byron S Gottfried "Programming with C" Second edition, Tata McGrawhill, 2007
2	R.G. Dromey, "How to solve it by Computer", Pearson Education, 2008
Reference Books:	
1	Kanetkar Y, "Let us C", BPB Publications, 2007.
2	Hanly J R & Koffman E.B, "Problem Solving and Programm design in C", Pearson