

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB
Syllabus of B. Sc. Cyber Security
(Effective for 2020-2021 Admission Session)
Choice Based Credit System
140 Credit (3-Year UG) MAKAUT Framework
w.e.f 2020-21

2nd Semester

Subject Type	Course Name	Course Code	Credit Distribution			Credit Points	Mode of Delivery			Proposed Moocs
			Theory	Practical	Tutorial		Offline	Online	Blended	
CC 3	Computer Architecture & Object Oriented Concepts	CYS (T) 201	4	0	0	6	✓			As per MAKAUT Notification
		CYS 291	0	2	0					
CC 4	Data Structures & Algorithms	CYS (T) 202	4	0	0	6	✓			
		CYS 292	0	2	0					
GE 2	Students will have to choose from the GE Basket				6			✓		
AECC 2	Environmental Science	CYS 265	2	0	0	2	✓			
Semester Credits						20				

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Course: Computer Architecture & Object-Oriented Concepts

Credits- 4T+2P

Course Objective: The course is designed to provide an elaborate idea about the different memory systems and buses and introduce processor architecture to students. Also give them a knowledge about object oriented programming concepts to enable them to develop efficient codes.

Sl	Course Outcome	Mapped modules
1	Remember & Understand the structure, function and characteristics of computer systems	M1, M2
2	Remember & Understand the design of the various functional units and components of computers	M2 ,M3
3	Understand and identify the elements of modern instructions sets and their impact on processor design.	M1, M4
4	Understand & Apply the function of each element of a memory hierarchy	M1, M3,M4
5	Analyse the Structure and Input & Output using C++	M5, M6
6	Application & Analysis using guided competitive programming laboratory work	M5 ,M6

Theory- CYS(T) 201

Module Number	Content	Total Hours	%age of questions	Blooms Level (if applicable)	Remarks (If any)
M 1	Computer Organization & Memory System	10	20	1,2	
M 2	Computer Arithmetic	5	25	1,2	
M 3	Input and Output System	10	30	2	
M 4	Instruction Set and addressing modes	10	25	2,3	
		35	100		

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Practical- CYS 291

Module Number	Content	Total Hours	%age of questions	Blooms Level (if applicable)	Remarks (If any)
M 5	Concepts of OOP & Basics of C++	10	40	4	
M 6	Objects and Classes	10	60	3,4	
		20	100		

Detailed Syllabus

Module I: Computer Organization & Memory System (10L)

Computer types, Structure with basic computer components, Function in brief with instruction fetch and execute, Interrupts and I/O communication, Interconnection structure, bus interconnection, Multiple Bus hierarchies, Elements of bus design Performance metrics and measurement.

Memory hierarchy, Main memory definition, types of main memory, types of RAM, ROM, difference between SRAM & DRAM. Cache memory, Cache memory mapping – Direct, Associative, Set Associative, Virtual memory, mapping using pages, page fault, mapping using segments, TLB

Module II : Computer Arithmetic (5L)

Addition and Subtraction algorithm of sign magnitude number. Addition and subtraction algorithm for signed 2's complement data. Multiplication algorithm, Booth's algorithm and division algorithm.

Module III : Input and Output System (10L)

Peripheral devices, Input – output interface, Isolated I/O, Memory mapped I/O, Asynchronous data transfer: strobe & handshaking, Programmed I/O, Interrupt initiated I/O, Basic idea of DMA

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Module IV : Instruction Set and addressing modes (10L)

Instruction codes, Direct address, Indirect address & Effective address, List of basic computer registers, Computer instructions: memory reference, register reference & input – output instructions, Block diagram & brief idea of control unit of basic computer, Instruction cycle

Module V: Concepts of OOP & Basics of C++ (10L)

Introduction to OOP, Procedural vs OOP, Program structure, namespace, identifiers, variable, constants, enum, operators, typecasting, control structure. Simple functions, call and return by reference, inline function, overloading of functions, friend functions

Module VI : Objects and Classes (10L)

Basic of objects and classes in C++, Private and public, static data and function member, constructor and their types, destructor, Inheritance, Polymorphism

Text Books:

1. Computer System Architecture, M. Morris Mano, PEARSON
2. Computer Organization & Architecture – Designing For Performance, William Stallings, PEARSON
3. Computer Architecture & Organisation, J.P. Hayes, TATA MCGRAW HILL
4. Computer Organization and Architecture, T. K. Ghosh, TATA MCGRAW-HILL
5. Computer Architecture, Behrooz Parhami, OXFORD UNIVERSITY PRESS
5. Object Oriented Programming With C++, E Balagurusamy, TMH
6. Mastering Object Oriented Programming in C++, R.S. Salaria, Khanna

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Course: Data Structures and Algorithms

Credits- 4T+2P

Course Objective: The course is designed to introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms. In addition, another objective of the course is to develop effective software engineering practice, emphasizing such principles as decomposition, procedural abstraction, and software reuse.

Sl	Course Outcome	Mapped modules
1	Remember & Understand how the choice of data structures and algorithm design methods impacts the performance of programs.	M1
2	Remember & Understand how to solve problems using data structures such as linear lists, stacks, queues, hash tables, binary trees	M4, M5
3	Understand and identify the ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs	M1, M2, M3, M4, M5, M6
4	Understand & Apply the appropriate data structure and algorithm design method for a specified application	M2 M3,M4, M5, M6
5	Analyse the ability to apply design and development principles in the construction of software systems of varying complexity	M2, M5, M6
6	Application & Analysis using guided competitive programming laboratory work	M4, M5 ,M6

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Theory- CYS(T) 202

Module Number	Content	Total Hours	%age of questions	Blooms Level (if applicable)	Remarks (If any)
M 1	Concepts of Abstract data type	4	10	1,2	
M 2	Data Structure using Array	4	20	1,2	
M 3	Searching and Sorting	6	20	2	
M 4	Linked List	5	20	2,3	
M5	Trees	6	10	2,3	
M6	Graphs & Hashing	10	20	2,3	
		35	100		

Practical- CYS 292

Module Number	Content	Total Hours	%age of questions	Blooms Level (if applicable)	Remarks (If any)
M 2	Data Structure using Array	2	20	1,2	
M 3	Searching and Sorting	4	20	2	
M 4	Linked List	4	20	2,3	
M5	Trees	5	20	2,3	
M6	Graphs & Hashing	5	20	2,3	
		20	100		

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Detailed Syllabus-

Module I: Concepts of Abstract data type(4L)

Concept of abstract data types, Structure, union, enum, pointer to structure, Self-referential structure, Pointer to pointer

Module II: Data Structure using Array(4L+2L)

stack, queue, circular queue, priority queue, dequeue and their operations and applications.

Module III: Searching and Sorting(6L+4L)

Searching: linear search, Binary search, their comparison, Sorting: insertion sort, Selection sort. Quick sort, Bubble sort Heap sort, Comparison of sorting methods , Analysis of algorithm, complexity using big 'O' notation

Module IV: Linked List(5L+4L)

Linear link lists, doubly linked lists, stack using linked list, queue using linked list, circular linked list and their operations and applications.

Module V: Trees (6L+5L)

Binary trees, binary search trees, representations and operations, thread representations, sequential representations, B tree B+ tree,

Module VI: Graphs & Hashing (10L+5L)

Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs, Graph Traversal: Depth first search and Breadth first search. Spanning Trees, minimum spanning Tree, Shortest path algorithm. Definition of hashing, Hashing functions, Load factor and collision, open addressing (linear probing) and chaining method to avoid collision.

Text Books

- 1.Data structure using c and c++ - Tanenbaum
- 2.Fundamentals of Data structure in c++ - E.Horwitz,Sahni,D.Mehta

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AECC 2- Environmental Science

Semester Credits- 2T

Course Objective: The course is designed to provide a working knowledge of environment, ecology and physical sciences for problem solving. The learner will be able to remember, understand and apply the taught concepts and methods involving social and environmental processes for betterment of environmental health and safety.

COURSE OUTCOMES (CO):

Sl	Course Outcome	Mapped modules
1	Be able to remember the basic concepts related to environment & ecology	M1,M2
2	Be able to remember & understand the scientific problem related to air, water, noise & land pollution	M1, M2
3	Be able to understand environmental laws , regulations , guidelines and n applying those for maintaining quality of environmental health and safety .	M1, M2,M3

Module Number	Content	Total Hours	%age of questions	Covered CO	Blooms Level
Module 1	Environmental Concepts	7	30%	1,2	L1
Module 2	Resources & Pollution	6	30%	2,3	L1, L2

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Module 3	Environment Management	7	40%	1,2,3	L2,L3
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SYLLABUS

Module 1: Environmental Concepts – Definition & basic concept of Environment & Ecology, man, society & environment, their interrelationship, Elements of ecology elements of ecology - species, population, community, definition of ecosystem- Structure & function of ecosystem (Bio geo chemical cycles, food chain, energy flow, ecological pyramid), Biodiversity & its threats and remedies. [7]

Module 2: Resources & Pollution – renewable & non-renewable resources, Bio-degradable and non-biodegradable pollutants, Sources & Effects of Pollution, Methods of Control (Air, Water. Land, & Noise)

Module 3: Environment Management - Concept & scope of environment Management, National environmental policy & Environmental Legislations in India, Environment Management System – ISO 14000, Environmental Audit, Eco mark, green Industry, Cases on Environment Impact Assessment.

REFERENCES

Suggested Readings

1. N.K. Oberoi: Environmental Management, Excel Books
2. G.N. Pandey: Environmental Management, Vikas
3. K.M. Agrawal & P.K. Sikdar: Text Book of Environment, MacMillan
4. L.W. Canter: Environmental Impact Assessment, McGraw Hill
5. M.P. Poonia & S.C. Sharma, Environmental Studies, Khanna Publishing House (AICTE Recommended Textbook – 2018)
6. Masters, G. M., "Introduction to Environmental Engineering and Science", Prentice-Hall of India Pvt. Ltd.,1991.
7. De, A. K., "Environmental Chemistry", New Age International
8. Fundamentals of Ecology -Odum, E.P.

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9. Instant notes on Ecology -Mackenzie, A., Ball, A.S. and Virdee, S.R. (1999) Viva Books
10. G. Dasmahapatra – Basic Environmental Engineering & Elementary Biology, Vikas Publication
11. Environmental Science, Cunningham, TMH
12. Environmental Pollution Control Engineering, C.S.Rao, New Age International
13. Environmental Science, Wright & Nebel, PHI
14. Environmental Pollution Analysis, S.M.Khopkar, New Age International