Choice Based Credit System

140 Credits for 3-Year UG

MAKAUT Framework

w.e.f. AY 2020-21

MODEL CURRICULUM

For

B.Sc in Information Technology (BSCIT)

Course Title

Course Name:	B.Sc in Information Technology (BSCIT)
Formal Abbreviation:	BSCIT
Proposed Date of Introduction:	NOVEMBER 2020

Organizational Arrangements

Managing Faculty:	Faculty from Computer Science, Information Technology
Collaborating Faculties: consultant	Professionals from MCA, Computer Science Background
External Partners:	To be decided

Nature of Development

The proposal involves:

⊗ A new course

☐ Redevelopment or diversification of an existing course

Objective

BSCIT - is one of the most sought after career oriented professional programs offered at the bachelor's level. This degree course opens up innumerable career options and opportunities to the aspiring IT professionals both in India and abroad.

Course

▪ Three – Year full-time B.Sc in Information Technology (**BSCIT**) (Six – Semester).

▪ Minimum number of class room contact teaching for BSCIT (**B.Sc in Information Technology**) programme should be 140 credits (one credit equals 10 hours) and Internship / Project should be 12 credits i.e., Total 128 + 12 = 140 credits.

▪ Specialization: Students can opt for anyone Specialization; Data Warehousing and Mining/ Data,Visualization Using Business Intelligence/Information and Cyber Security, Cyber Laws and Ethics/ E-commerce/Internet of Things

▪ As per UGC guidelines, a student can opt for Hons. in a specific stream for which he/she needs to acquire 140 credit points along with additional 16 credit points that can be acquired by undertaking online courses as prescribed by the university under MOOCS basket.

Reasons for Introduction of Course

B.Sc in Information Technology is a 3 years professional course in Computer Programming, Database Management System, Computer Networking, Artificial Intelligence & Machine Learning, Computer Architecture. This proposed course is divided in six semesters and each semester will have five different papers. One can join the course after passing common entrance test (CET) conducted by MAKAUT, WB.

Eligibility Criteria

Interested aspirants for the course are required to fulfill the below-mentioned eligibility criteria.

- A candidate should have cleared class 12 (10+2 or equivalent) / higher secondary examination with English & Mathematics/Computer Application/ Computer Science

Notification for admission to the BSc.IT programme will be published and classes will start around the commencement of the academic session.

Admission Process: Through CET Exam

Course Structure

Subject Type	Semester I	Semester II	Semester III	Semester IV	Semester V	Semester VI
CC	C1, C2	C3, C4	C5, C6,C7	C8,C9,C10	C11,C12	C13,C14
DSE					DSE1, DSE2	DSE3, DSE4
GE	GE1	GE2	GE3	GE4		
AECC	AECC 1	AECC 2				
SEC			SEC 1	SEC 2		
	4 (20)	4 (20)	5(26)	5(26)	4 (24)	4 (24)

B.Sc in INFORMATION TECHNOLOGY

Curriculum Structure

1st Semester ()

Subject Type		Course Code	Course Name	Credit Points	Credit Distribution			Mode of Delivery			Proposed MOOCs
					Th	Pr	Tu	Offline	Online	Blended	
CC	CC1	BSCIT101	Data Structure and algorithm using C	6	4	2				YES	
	CC2	BSCIT102	Fundamental of Programming with Python	6	4	2				YES	
*GE	GE1	BSCIT 103	Any One from the List of Generic Elective / Interdisciplinary	6	5		1			YES	
AECC	AECC 1	BSCIT (HU) 101	Technical English for	2	2					YES	
Semester Credits				**20**							

2ND Semester ()

Subject Type		Course Code	Course Name	Credit Points	Credit Distribution			Mode of Delivery			Proposed MOOCs
					Th	Pr	Tu	Offline	Onlin	Blende	
CC	CC3	BSCIT201	OOPs and Programming with JAVA	6	4	2				YES	
	CC4	BSCIT202	Computer Organization and Architecture	6	5		1			YES	
*GE	GE2	BSCIT 203	Any One from the List of Generic Elective / Interdisciplinary Courses	6	5		1			YES	
AECC	AECC 2	BSCIT(HU)	Environment and Ecology	2	2					YES	
Semester Credits				**20**							

3rd Semester

Subject Type		Course Code	Course Name	Credit Points	Credit			Mode of Delivery			Proposed MOO
					Th	Pr	Tu	Offline	Online	Blended	
CC	CC5	BSCIT 301	Design Analysis and Algorithm	6	5		1			YES	
	CC6	BSCIT 302	Database Management System	6	4	2				YES	
	CC7	BSCIT 303	Information System Analysis and Design	6	5		1				
*GE	GE3	BSCIT 304	Any One from the List of Generic Elective / Interdisciplinary	6	5		1			YES	
SEC	SEC 1	BSCIT 305	GUI PROGRAMMING WITH .NET	2		2				YES	
Semester				**26**							

4th Semester ()

Subject Type		Course Code	Course Name	Credit Points	Credit Distribution			Mode of Delivery			Proposed MOOCs
					Th	Pr	Tu	Offline	Onlin	Blende	
CC	CC8	BSCIT 401	Operating System with UNIX Programming	6	4	2				YES	
	CC9	BSCIT 402	Artificial Intelligence & Machine Learning	6	5		1			YES	
	CC10	BSCIT 403	Computer Networking	6	5		1	YES			
*GE	GE4	BSCIT 404	Any One from the List of Generic Elective / Interdisciplinary	6	5		1			YES	
SEC	SEC2	BSCIT 405	Data Science Using Python Tools	2	2					YES	
Semester Credits				**26**							

5th Semester

Subject Type		Course Code	Course Name	Credit Points	Credit Distribution			Mode of Delivery			Proposed MOOCs
					Th	Pr	Tu	Offline	Onlin	Blende	
CC	CC11	BSCIT 501	Management Information System	6	4	2				YES	
	CC12	BSCIT 502	Cloud Computing	6	5		1			YES	
DSE	DSE1	BSCIT 503 A/B/C	Data Warehousing and Mining/ Data Visualization Using Business Intelligence/ Information and Cyber Security	6	5		1			YES	
	DSE2	BSCIT 504	Minor Project and Industrial Training	6	4	2				YES	
Semester Credits				**24**							

6th Semester ()

Subject Type		Course Code	Course Name	Credit Points	Credit Distribution			Mode of Delivery			Proposed MOOCs
					Th	Pr	Tu	Offline	Onlin	Blended	
CC	CC13	BSCIT 601	Web Technology	6	4	2				YES	
	CC14	BSCIT 602	Multimedia	6	5		1			YES	
DSE	DSE 3	BSCIT 603 A/B/C	Cyber Laws and Ethics/ E-commerce/Internet of Things	6	5		1			YES	
	DSE4	BSCIT 604	Major Project and	6							
Semester Credits				**24**							

List of Discipline Specific Elective Course:

DSE 1	DATA WAREHOUSING AND MINING/ DATA VISUALIZATION USING BUSINESS INTELLIGENCE/INFORMATION AND CYBER SECURITY
DSE 2	MINOR PROJECT AND INDUSTRIAL TRAINING
DSE 3	CYBER LAWS AND ETHICS/ E-COMMERCE/INTERNET OF THINGS
DSE 4*	MAJOR PROJECT AND GRAND VIVA

List of General Elective papers –Interdisciplinary:

GE 1	MATHEMATICS FOR COMPUTER SCIENCE PART 1
GE 2	MATHEMATICS FOR COMPUTER SCIENCE PART 2
GE 3	BASICS OF DIGITAL MARKETING
GE 4	BUSINESS RESEARCH METHODS: TOOL & TECHNIQUES
GE 5	BUSINESS STATISTICS
GE 6	

Any one from the list of Skill Enhancement Course:

SEC 1	GUI PROGRAMMING WITH .NET
SEC 2	DATA SCIENCE USING PYTHON TOOLS

Core Papers

BSC in INFORMATION TECHNOLOGY

Semester : I	
CC1 DATA STRUCTURE AND ALGORITHM USING C	**CC2** FUNDAMENTALS OF PROGRAMMING WITH PYTHON
Semester : II	
CC3 OOPs AND PROGRAMMING WITH JAVA	**CC4** COMPUTER ORGANIZATION AND ARCHITECTURE

Semester : III		
CC5 DESIGN ANALYSIS AND ALGORITHM	**CC6** DATABASE MANAGEMENT SYSTEM	**CC7** INFORMATION SYSTEM ANALYSIS AND DESIGN
Semester : IV		
CC8 OPERATING SYSTEM WITH UNIX PROGRAMMING	**CC9** ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	**CC10** COMPUTER NETWORKING

Semester : V	
CC11 MANAGEMENT INFORMATION SYSTEM	**CC12** CLOUD COMPUTING
Semester : VI	
CC13 WEB TECHNOLOGY	**CC14** MULTIMEDIA

PROGRAM OUTCOMES:

Serial No	Program Outcome	Mapped Courses
1	Understanding of Data structures using C Language	CC1(BSCIT101)
2	Understanding of Programmimg with Python and Python Tools,JAVA, DOT NET, UNIX	CC2(BSCIT102),CC3(BSCIT201),SEC1(BSCIT305),SEC2(BSCIT405),CC8(BSCIT401)
3	Learning Techinal English	AECC1(BSCIT(HU)101)
4	Learning Computer Organization and Architecture	CC4 (BSCIT202)
5	Learning Environment and its Ecology	AECC2 (BSCIT(HU)201),
6	Learning the Design Analysis and algorithm , Information System and its analysis	CC5(BSCIT301), CC7(BSCIT303)
7	Learning the basics of Database management, Computer Networking,Artificial Intelligence along with Machine Learning	CC6(BSCIT302), CC10(BSCIT403),CC9(BSCIT402)
8	Learning the basics and different types of MIS	CC11(BSCIT501)
9	Learning Web technology,Multimedia,Cloud Computing	CC13(BSCIT601),CC14(BSCIT602),CC12(BSCIT502)
10	Learning the basics of Operating System	CC8(BSCIT401)

SEMESTER 1

Paper Name: Data Structure and Algorithm with C++
Code : BSCIT101
Contact: 4L+2P
Credits: 6
Allotted Hrs: 60

Course Objectives:

CO1. To understand and identify the different types of data.
CO2. To understand the pointers, structures and self referential structure.
CO3. To learn the implementation of different types of memory allocation.
CO4. To learn File Management and the application.
CO5. To understand the implementation of Data Structure using Array.
CO6. To gain the proper knowledge of sorting, searching of data and their complexity analysis.
CO7. To understand the implementation of Linked list.
CO8. To understand the concept of tree and their different implementations.
CO9. To understand the graphs and their operations.
CO10.To learn the hash functions and their different functionalities.

Course Outcomes:

Sl. No.	Course Outcome	Mapped Module
1	Ability to understand the basic structures of data	Module 1
2	Ability to understand and use of the pointer, Self referential structure	Module 2
3	Ability to understand static and dynamic memory allocation in memory using malloc(),calloc(),realloc(), free().	Module 3
4	Ability to understand File Management and the application using different functions.	Module 4
5	Ability to use and implement Data Structure using Array	Module 5
6	Ability to do different types of Searching and Sorting	Module 6
7.	Ability to implement different types of Linked List	Module 7
8.	Ability to grasp the concept of different types of tree and their implementations.	Module 8
9.	Ability to understand of different types of graphs and their operations.	Module 9
10.	Ability to understand of Hashing and their different functionalities.	Module 10

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 2.

Module II: Dynamic Memory Allocation (4L)

Difference between static and dynamic memory allocation, Using functions such as malloc(), calloc(), realloc(), free().

Module III: File Management (4L) Application of functions such as fopen(), fclose(), getc(), putc(), fprintf(), fscanf(), getw(), putw(), command line argument

Module IV: Data Structure using Array(4L)

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

Module V: Searching and Sorting(6L)

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 VI: Linked List(4L)

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

Module VII: Trees (5L)

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

Module VIII: Graphs (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

Module IX: Hashing (4L)

Definition, Hashing functions, Load factor and collision, open addressing (linear probing) and chaining method to avoid collision

Reference Books:

1. Data Structures, R.S. Salaria, Khanna Publishing House
2. Data Structures in C, Ajay Agarwal, Cyber Tech
3. Data Structures Using C, Radhakrishnan&Shrinivasan, ISTE/EXCEL BOOKS
4. C and Data Structure,Radhaganesan,Scitech
5. Data Structure Using C & C++, Tannenbaum, PHI
6. Mastering Algorithms with C,Loudon,SPD/O'REILLY
7. Expert Data Structures with C, R.B. Patel, Khanna Publishing House

Module No.	Content	Total Hours	%age of questions	Covered CO	Covered PO	Blooms Level (If applicable)	Remarks (If any)
Module 1	Understanding the basics of data Structures	2	5	1	1		
Module 2	Understanding the pointer	2	5	1	1		
Module 3	Static and dynamic memory	4	10	1	1		
Module 4	File Management	4	10	3	1		
Module 5	Data Structure using Array	4	10	4	1		
Module 6	Searching and Sorting	6	15	5	1		
Module 7	Linked List	4	10	6	1		
Module 8	Trees	5	12.5	7	1		
Module 9	Graphs	5	12.5	8	1		
Module 10	Hashing	4	10	9	1		

Paper: Fundamental of Programming with Python
Code : BSCIT102
Contacts Hours/ Week : 4L + 2P
Credits : 6

Course Objectives:

CO1. To understand and identify the different types of data.
CO2. To learn the use of Python variables, expressions, statements.
CO3. To learn how to use Python function.
CO4. To understand different types of conditional operators.
CO5. To understand different types of Iteration loops.
CO6. To understand different types of Python recursion.
CO7. To understand different uses of string.
CO8. To learn the concept of List in python.
CO9. To learn the concept of dictionaries & lists in python.
CO10.To learn the concept of tuple in python.
CO11.To learn the concept of Classes and Objects in python.

Course Outcomes:

Sl. No.	Course Outcome	Mapped Module
1	Ability to understand the basics of Python	Module 1
2	Ability to understand and use of Python variables, expressions, statements.	Module 1
3	Ability to understand Python Functions.	Module 1
4	Ability to understand different types of conditional operators	Module 2
5	Ability to understand different types of Iteration loops	Module 2
6	Ability to understand different types of Python recursion	Module 3
7.	Ability to use Accessing values in string, Updating strings, Slicing strings using string methods	Module 3
8.	Ability to grasp the concept of List in python	Module 3
9.	Ability to understand brief idea of dictionaries & lists	Module 3
10.	Ability to understand Tuples	Module 3
11.	Ability to understand Classes and Objects	Module 4

Module I: Introduction to Python(12L)

1. Introduction to Python
2. Python variables, expressions, statements : Variables,Keywords, Operators& operands, Expressions, Statements, Order of operations, String operations, Comments, Keyboard input, Example programs
3. Functions : Type conversion function, Math functions, Composition of functions, Defining own function, parameters, arguments, Importing functions, Example programs

Module II: Conditions&Iterations(8L)

1. Conditions: Modulus operator, Boolean expression, Logical operators, if, ifelse, if-elseif-else, Nested conditions, Example programs
2. Iteration :while, for, break, continue, Nested loop, Example programs

Module III: Recursion,Strings,List,Dictionaries,Tuples(10L)

1. Recursion :Python recursion, Examples of recursive functions, Recursion error, Advantages & disadvantages of recursion
2. Strings : Accessing values in string, Updating strings, Slicing strings, String methods – upper(), find(), lower(), capitalize(), count(), join(), len(), isalnum(), isalpha(), isdigit(), islower(), isnumeric(), isspace(), isupper() max(), min(), replace(), split(), Example programs
3. List:Introduction, Traversal, Operations, Slice, Methods, Delete element, Difference between lists and strings, Example program
4. Dictionaries :Introduction, Brief idea of dictionaries & lists
5.Tuples : Introduction, Brief idea of lists & tuples, Brief idea of dictionaries & tuples

Module IV: Classes&Objects(10L)

Classes &Objects : Creating class, Instance objects, Accessing attributes, Built in class attributes, destroying objects, Inheritance, Method overriding, Overloading methods, Overloading operators, Data hiding, Example program

Reference Books:

1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Introduction to Computing and Problem Solving with Python, J. Jose, Khanna Publications
3. Python Programming, SeemaThareja, Pearson
4. Learn Python The Hard Way, Zed A. Shaw, ADDISON-WESLEY
5. Learning Python, Mark Lutz, O'REILY
6. Programming In Python, Dr. Pooja Sharma, BPB
7. Python Programming - Using Problem Solving Approach, ReemaThareja, OXFORD UNIVERSITY PRESS

Module No.	Content	Total Hours	%age of questions	Covered CO	Covered PO	Blooms Level (If applicable)	Remarks (If any)
Module 1	Basics of Python	2	5	1	2		
Module 2	Python variables, expressions, statements	5	12.5	2	2		
Module 3	Python Functions	5	12.5	3	2		
Module 4	Conditional operators	4	10	4	2		
Module 5	Iteration	4	10	5	2		
Module 6	**Recursion**	2	5	6	2		
Module 7	**Strings**	2	5	7	2		
Module 8	**List**	2	5	8	2		
Module 9	**Dictionaries**	2	5	9	2		
Module 10	**Tuples**	2	5	10	2		
Module 11	**Classes & Objects**	10	25	11	2		

Paper Name: Technical English for Engineers
Code: BSCIT(HU)101
Contact: 2L
Credits:2

Course Objectives:

1. To understand English Grammar and Correction of sentences.
2. To write good Essay.
3. To understand and Read Comprehension.
4. To understand how to write Business Correspondence things.
5. To learn Report Writing.
6. To develop good Communication skills.
7. To gain the confidence and take part in Group discussion.

Course Outcomes:

Sl. No.	Course Outcome	Mapped Module
1	Ability to understand Grammar,Correction of sentences.	Module 1
2	Ability to write Essay	Module 2
3	Ability to get Reading Comprehension	Module 3
4	Ability to write Business Correspondence things	Module 4
5	Ability of Report Writing	Module 5
6	Ability of smart Communication / Public Speaking skills	Module 6
7.	Ability to take part in Group discussion	Module 7

Module I:
Grammar,Correction of sentence, Vocabulary / word formation, Single word for a group of words, Fill in the blank, transformation of sentences, Structure of sentences – Active / Passive Voice – Direct / Indirect Narration
Module II:
Essay – Descriptive – Comparative – Argumentative – Thesis statement- Structure of opening / concluding paragraphs – Body of the essay
Module III:
Reading Comprehension – Global – Contextual – Inferential – Select passages from recommended text
Module IV:
Business Correspondence – Letter Writing – Formal. Drafting. Biodata- Resume'- Curriculum Vitae
Module V:
Report Writing – Structure , Types of report – Practice Writing
Module VI:
Communication / Public Speaking skills , Features of effective speech, verbal-nonverbal
Module VII:
Group discussion – principle – practice

Reference Books:

1. Mark MaCormack : "Communication"
2. John Metchell" How to write reports"
3. S R Inthira& V Saraswathi" Enrich your English – a) Communication skills b) Academic skills " Publisher CIEFL & OUP
4. R.C. Sharma and K.Mohan , "Business Correspondence and Report Writing " , Tata McGraw Hill , New Delhi , 1994
5. L.Gartside , "Model Business Letters" , Pitman , London , 1992
6. Longman , "Longman Dictionary of Contemporary English" (or 'Oxford Advanced Learner's Dictionary of Current English' ,
OUP , 1998.
7. Maxwell Nurnberg and RosenblumMorris , "All About Words" , General Book Depot, New Delhi , 1995
8. A Text Book for English foe Engineers & Technologists

Module No.	Content	Total Hours	%age of questions	Covered CO	Covered PO	Blooms Level (If applicable)	Remarks (If any)
Module 1	Grammar, Correction of Sentences	5	10	1	3		
Module 2	Essay	3	15	2	3		
Module 3	Reading Comprehension	3	20	3	3		
Module 4	Business Correspondence	2	20	4	3		
Module 5	Report Writing	2	10	5	3		
Module 6	Communicati on / Public Speaking skills	2	10	6	3		
Module 7	Group discussion	3	15	7	3		

[NOTE: FOR **BSc IT 103**, ANY ONE FROM THE LIST OF GENERIC ELECTIVES / INTERDISCIPLINARY COURSES.]

SEMESTER 2

Paper Name: OOPS and Programming With JAVA
Code :BSCIT201
Contact: 4L+2P
Credits: 6

Course Objectives:

1. To understand the concept of Class,Data,Polymorphism,Inheritence,Dynamic Binding
2. To understand the concept of Overview of JAVA
3. To understand the different types of natural Data type, Variable and Constants token in

JAVA

4. To understand the concept of Control Statement of JAVA
5. To understand the **Iteration Statement, Arrays and Vector, Classes and Objects, Inheritance.**
6. To understand **Packages, Interfaces, Exception Handling, Multithreaded Programming, : Applets, Abstract Window Toolkit**

Course Outcomes:

Sl. No.	Course Outcome	Mapped Modules
1	Students will able to understand **Oops Concept**	Module 1
2	Students will able to understand Java features, JVM, Comparison between Java and C++, Idea of any Java	Module 2
3	Students will able to understand Data Types, variables and constants Tokens in Java (Identifiers, Literals, Keywords, Operator	Module 3
4	Students will able to understand control statement - Simple if statement, if…else statement, Nesting of if-else statement, switch statement	Module 4
5	Students will able to understand For loop, While loop, Do-While loop	Module 5
6	Students will able to understand 1D and 2D array, vector concepts	Module 6
7	Students will able to understand Creating main() in a separate class, Methods with parameters, Methods with a return type, Method overloading, Passing	Module 7
8	Students will able to understand Basic concepts, types of inheritance, use of super keyword, overriding methods. 9. Module IX: StringandStringBuffer(2L) Use of different	Module 8
9	Students will able to understand User defined package, import package, Class path, How to create	Module 9
10	Students will able to understand User defined package, import package, Class path, How to create interface, use and extend interface	Module 10
11	Students will able to undertand Byte Streams, Input Stream, Output Stream Character Streams (Reader, Writer), How Files and Streams Work, Working with Reader classes (InputStreamReader, BufferedReader)	Module 11
12	Students will able to understand Overview, Thread Life cycle, Advantages of multithreading over multi-tasking Thread Creation and simple programs, Synchronized threads, Synchronized Methods	Module 12
13	Students will able to understand Applet vs. Application, Applet class, Advantages of Applet, Applet Lifecycle My First Applet, Applet tag, How to run applet	Module 13

14	Students will able to understand GUI Components, Interface and Classes of AWT Package, Labels, Buttons, Check Boxes, Radio button, Text Area, Text Field, Scrollbar, Panels, Layout managers, Simple event driven programming with Text Field and Button	Module 14

Module I: Oops Concept (4L)

Object, Class, Data abstraction, Data encapsulation, Inheritance, Polymorphism, Dynamic binding

Module II: An overview of Java (2L).

Java features, JVM, Comparison between Java and C++, Idea of any Java Development Kit (JDK), learn to run java program through command line and with any JDK

Module III: Data Concept (2L)

Data Types, variables and constants Tokens in Java (Identifiers, Literals, Keywords, Operator)

Module IV: Control Statements (2L)

Simple if statement, if…else statement, Nesting of if-else statement, switch statement

Module V: Iteration Statement (2L) For loop, While loop, Do-While loop **Module VI: Arrays and Vector (2L)**

1D and 2D array, vector concepts

Module VII: Classes and Objects (3L)

Creating main() in a separate class, Methods with parameters, Methods with a return type, Method overloading, Passing
Objects as Parameters, Passing Values to methods and Constructor, Abstract classes

Module VIII: Inheritance (2L)

Basic concepts, types of inheritance, use of super keyword, overriding methods. 9. Module IX: StringandStringBuffer(2L) Use of different functions

Module X: Packages, Interfaces (3L)

User defined package, import package, Class path, How to create interface, use and extend interface

Module XI: Exception Handling (2L)

Overview, What is Exceptions and handling exception?, Compile time errors Run time errors, try…catch, Using Multiple catch Blocks, finally Block, Throwing an Exception, Using the throw and throws Statement.

Module XII: Stream (3L)

Byte Streams, Input Stream, Output Stream Character Streams (Reader, Writer), How Files and Streams Work, Working with
Reader classes (InputStreamReader, BufferedReader)

Module XIII: Multithreaded Programming (3L)

Overview, Thread Life cycle, Advantages of multithreading over multi-tasking Thread Creation and simple programs, Synchronized threads, Synchronized Methods

Module XIV: Applets (4L)

Applet vs. Application, Applet class, Advantages of Applet, Applet Lifecycle My First Applet, Applet tag, How to run applet

Module XV: Abstract Window Toolkit (4L)

GUI Components, Interface and Classes of AWT Package, Labels, Buttons, Check Boxes, Radio button, Text Area, Text Field, Scrollbar, Panels, Layout managers, Simple event driven programming with Text Field and Button

Reference Books:

1. Let Us JAVA 2 Edition, YashavantKanetkar BPB Publications
2. Programming with JAVA 5th Edition, E Balagurusamy, TMH
3. Core JAVA, TanweerAlam, Khanna Publishing House

Module No.	Content	Total Hours	%age of questions	Covered CO	Covered PO	Blooms Level (if applica	Remarks (if any)
Module 1	**Oops Concept**	4	10	1	2		
Module 2	**An overview of Java**	2	5	2	2		
Module 3	**Data Concept**	2	5	3	2		
Module 4	**Control Statements**	2	10	4	2		
Module 5	**Iteration Statement**	2	10	5	2		
Module 6	**Arrays and Vector**	2	10	6	2		
Module 7	**Classes and Objects**	3	5	7	2		
Module II Unit 8	**Inheritance**	3	10	8	2		
Module 9	**Packages, Interfaces**	3	10	9	2		
Module 10	**Exceptional Handling**	2	10	10	2		
Module 11	**Stream**	3	3	11	2		
Module 12	**Multithreaded Programming**	3	5	12	22		
Module 13	**Applets**	4	5	13	2		

Module14	**Abstract Window Toolkit**	4	2	14	2		

Code :BSCIT202
Contact: 5L+1T
Credits: 6
Allotted Hrs: 60

Course Objectives:

1. To understand the concept of **Data Representation, Computer arithmetic,**
2. To understand the concept of **Register transfer and micro-operations**
3. To understand the different types of **Basic Computer organization and design, Micro programmed control**
4. To understand the concept of **Central processing unit**
5. To understand the **Pipeline and vector processing**
6. To understand **output organization, Memory organization**

Course Outcomes:

Sl. No.	Course Outcome	Mapped Modules
1	Students will able to understand Number Systems –Complement, Fixed point representation, Floating point representation	Module 1
2	Students will able to understand different algorithm of sign magnitude numbers	Module 2
3	Students will able to understand Register, Bus Memory transfers, Micro operations ,One stage logic circuit	Module 3
4	Students will able to understand Instruction codes, basic computer registers, computer instructions, Instruction cycle	Module 4
5	Students will able to understand Control memory, Address sequencing	Module 5
6	Students will able to understand register organization, Stack organization, Evaluation of arithmetic expression using stack, Instruction format, Types of CPU organization (single accumulator, general register & stack organization)	Module 6/7
7	Students will able to understand Peripheral devices, Input – output interface, Isolated I/O, Memory mapped I/O, 4. Asynchronous data transfer: strobe & handshaking, Basic idea of DMA & DMAC, Input – output processor	Module 8
8	Students will able to understand Memory hierarchy, Main memory definition, types of main memory, types of RAM, ROM, difference between SRAM & DRAM, Cache memory, Cache memory mapping, CAM, hardware organization of CAM, Virtual memory, mapping using pages, page fault, mapping using segments, TLB, Auxiliary memory, diagrammatic representation of magnetic disk & hard disk drive, Definitions of seek time, rotational delay, access time, transfer time, latency	Module 9

Module I: Data Representation (4L)
Number Systems – decimal, binary, octal, hexadecimal, alphanumeric representation, 2. Complements – 1's complement, 2' complement, 9's complement, 10' complement, (r-1)'s complement, r's complement, 3. Fixed point representation – Integer representation, arithmetic addition, arithmetic subtraction, overflow, decimal

fixed point representation, 4. Floating point representation, 5. IEEE 754 floating point representation

Module II: Computer arithmetic (5L)
1. Addition algorithm of sign magnitude numbers, 2. Subtraction algorithm of sign magnitude numbers, 3. Addition algorithm
of signed 2's complement data, 4. Subtraction algorithm of signed 2's complement data, 5. Multiplication algorithm, Booth's
algorithm, 6. Division algorithm

Module III: Register transfer and micro-operations(5L)
Register transfer language, 2. Register transfer, 3. Bus system for registers, 4. Memory transfers – memory read, memory write, 5. Micro operations – register transfer micro operations, arithmetic micro operations, logic micro operations, shift micro operations, 6. Binary adder, binary adder subtractor, binary incrementer, arithmetic circuit for arithmetic micro operations, 7. One stage logic circuit, 8. Selective set, Selective complement, Selective clear, Mask, Insert, Clear

Module IV: Basic Computer organization and design (4L)
1. Instruction codes, 2. Direct address, Indirect address & Effective address, 3. List of basic computer registers, 4. Computer instructions: memory reference, register reference & input – output instructions, 5. Block diagram & brief idea of control unit of basic computer, 6. Instruction cycle

Module V: Micro programmed control (2L)
Control memory, 2. Address sequencing, 3. Micro program examples

Module VI: Central processing unit (5L)
1. General register organization, 2. Stack organization, Register stack, Memory stack, Stack operations – push & pop, 3. Evaluation of arithmetic expression using stack, 4. Instruction format, 5. Types of CPU organization (single accumulator, general register & stack organization) & example of their instructions, 6. Three, two, one & zero address instruction, 7. Definition and example of data transfer, data manipulation & program control instructions

Module VII: Pipeline and vector processing (3L)
Parallel processing, 2. Flynn's classification, 3. Pipelining, Example of pipeline, space time diagram, speedup, 4. Basic idea of arithmetic pipeline, example of floating point addition/ subtraction using pipeline

Module VIII: Input – output organization(6L)
1. Peripheral devices, 2. Input – output interface, 3. Isolated I/O, Memory mapped I/O, 4. Asynchronous data transfer: strobe
& handshaking, 5. Programmed I/O, 6. Interrupt initiated I/O, 7. Basic idea of DMA & DMAC 8. Input – output processor

Module IX: Memory organization (6L)
1. Memory hierarchy, 2. Main memory definition, types of main memory, types of RAM, ROM, difference between SRAM & DRAM, 3. Cache memory, Cache memory mapping – Direct, Associative, Set Associative, 4. CAM, hardware organization of CAM, 5. Virtual memory, mapping using pages, page fault, mapping using segments, TLB, 6. Auxiliary memory, diagrammatic representation of magnetic disk & hard disk drive, 7. Definitions of seek time, rotational delay, access time, transfer time, latency

Reference 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, BehroozParhami, OXFORD UNIVERSITY PRESS

Module No.	Content	Total Hours	%age of questions	Covered CO	Covered PO	Blooms Level (if applicable)	Remarks (if any)
Module 1	**Data Representation**	4	10	1	4		
Module 2	**Computer arithmetic**	5	10	1.2	4		
Module 3	**Register transfer and micro-operations**	5	15	3	4		
Module 4	**Basic Computer organization and design**	4	10	8	4		
Module 5	**Micro programmed control**	2	10	7	4		
Module 6	**Central processing unit**	5	10	6	4		
Module 7	**Pipeline and vector processing**	3	10	7	4		
Module 8	**output organization**	6	10	4	4		
Module 9	**Memory organization**	6	15	5	4		

Paper Name: Environment and Ecology
Code :BSCIT(HU)201
Contact: 2L
Credits:2

Course Objectives:

1. To understand the concept of General Basic ideas of environment, Sustainable Development
2. To understand the concept of Anthropogenic degradation
3. To understand the different types of Ecology Elements of ecology,
4. To understand the concept of Air pollution and control Atmospheric Composition
5. To understand the Water Pollution and Control Hydrosphere, Land Pollution Lithosphere
6. To understand **the** Noise Pollution Definition of noise, Environmental Management

Course Outcomes:

Sl. No.	Course Outcome	Mapped Modules

1	Students will able to understand basic ideas of environment, basic concepts, man, society & environment, their interrelationship, Sustainable Development.,Materials balance, Natural environmental Hazards,Anthropogenic degradation.	Module 1
2	Students will able to understand systems,ecology, species, population, community, ecosystem,Biodiversity	Module 2
3	Students will be able to understand different types of pollution	Module 3/4/6
4	Students will be able to understand Internal structure of earth, rock and soil,. Solid waste management and control (hazardous and biomedical waste).	Module 5
5	Students will be able to understand Environmental impact assessment, Environmental Audit, Environmental laws and protection act of India, Different international environmental treaty/ agreement/ protocol.	Module 7

Module I:

General Basic ideas of environment, basic concepts, man, society & environment, their interrelationship. Mathematics of population growth and associated problems, Importance of population study in environmental engineering, definition of resource, types of resource, renewable, non- renewable, potentially renewable, effect of excessive use vis-à-vis population growth, Sustainable Development.

Materials balance: Steady state conservation system, steady state system with non conservative pollutants, step function. Environmental degradation: Natural environmental Hazards like Flood, earthquake, Landslide-causes, effects and control/management;

Anthropogenic degradation like Acid rain-cause, effects and control. Nature and scope of Environmental Science and

Engineering.

Module II:

Ecology Elements of ecology: System, open system, closed system, definition of ecology, species, population, community, definition of ecosystem- components types and function. 1L Structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems, Mangrove ecosystem (special reference to Sundar ban); Food chain [definition and one example of each food chain], Food web. 2L Biogeochemical Cycle- definition, significance, flow chart of different cycles with only elementary reaction [Oxygen, carbon, Nitrogen, Phosphate, Sulphur]. 1L Biodiversity- types, importance, Endemic species, Biodiversity Hot-spot, Threats to biodiversity, Conservation of biodiversity.

Module III:

Air pollution and control Atmospheric Composition: Troposphere, Stratosphere, Mesosphere, Thermosphere,Tropopause

and Mesopause. Energy balance:Conductive and Convective heat transfer, radiation heat transfer, simple global temperature model [Earth as a black body, earth as albedo], Problems.Green house effects: Definition, impact of greenhouse gases on the global climate and consequently on sea water level, agriculture and marine food.Global warming and its consequence, Control of Global warming. Earth's heat budget. Lapse rate: Ambient lapse rate Adiabatic lapse rate, atmospheric stability, temperature inversion (radiation inversion). Atmospheric dispersion: Maximum mixing depth, ventilation coefficient,

effective stack height, smokestack plumes and Gaussian plume model. Definition of pollutants and contaminants, Primary and secondary pollutants: emission standard, criteria pollutant. Sources and effect of different air pollutants- Suspended particulate matter, oxides of carbon, oxides of nitrogen, oxides of sulphur, particulate, PAN. Smog, Photochemical smog and London smog. Depletion Ozone layer: CFC, destruction of ozone layer by CFC, impact of other green house gases, effect of ozone modification. Standards and control

measures: Industrial, commercial and residential air quality standard, control measure (ESP. cyclone separator, bag house, catalytic converter, scrubber (ventury), Statement with brief reference).

Module IV:
Water Pollution and Control Hydrosphere, Hydrological cycle and Natural water. Pollutants of water, their origin and effects:
Oxygen demanding wastes, pathogens, nutrients, Salts, thermal application, heavy metals, pesticides, volatile organic compounds. River/Lake/ground water pollution: River: DO, 5 day BOD test, Seeded BOD test, BOD reaction rate constants, Effect of oxygen demanding wastes on river[deoxygenation, reaeration], COD, Oil, Greases, pH. Lake: Eutrophication [Definition, source and effect]. Ground water: Aquifers, hydraulic gradient, ground water flow (Definition only) Standard and control: Waste water standard [BOD, COD, Oil, Grease], Water Treatment system [coagulation and flocculation, sedimentation and filtration, disinfection, hardness and alkalinity, softening] Wastewater treatment system, primary and secondary treatments [Trickling filters, rotating biological contractor, Activated sludge, sludge treatment, oxidation ponds] tertiary treatment definition. Water pollution due to the toxic elements and their biochemical effects: Lead, Mercury, Cadmium, and Arsenic

Module V:
Land Pollution Lithosphere; Internal structure of earth, rock and soil 1L Solid Waste: Municipal, industrial, commercial, agricultural, domestic, pathological and hazardous solid wastes; Recovery and disposal method-Open dumping, Land filling, incineration, composting, recycling. Solid waste management and control (hazardous and biomedical waste).

Module VI:
Noise Pollution Definition of noise, effect of noise pollution, noise classification [Transport noise, occupational noise, neighbourhood noise] Definition of noise frequency, noise pressure, noise intensity, noise threshold limit value, equivalent noise level, Noise pollution control.

Module VII:
Environmental Management: Environmental impact assessment, Environmental Audit, Environmental laws and protection act of India, Different international environmental treaty/ agreement/ protocol.

Reference Books:
1. Masters, G. M., "Introduction to Environmental Engineering and Science", PrenticeHall of India Pvt. Ltd., 1991.

Module No.	Content	Total Hours	%age of questions	Covered CO	Covered PO	Blooms Level (if applicable)	Remarks (if any)
Module 1	General Basic ideas of environment	5	15	1	5		
Module 2	Ecology Elements of ecology	3	15	2	5		
Module 3	Air pollution and control Atmospheric Composition:	5	15	3	5		
Module 4	Water Pollution and Control Hydrosphere	3	15	4	5		

Module 5	Land Pollution Lithosphere	1	15	5	5		
Module 6	Noise Pollution Definition of noise	1	10	6	5		
Module 7	Environmental Management	2	15	7	5		

[NOTE: FOR **BSc IT 203**, ANY ONE FROM THE LIST OF GENERIC ELECTIVES / INTERDISCIPLINARY COURSES.]