Credit Structure for B.Tech. (Information Technology)

(For newly admitted students from session 2019-20)

Credit Courses											
	Category Semesters	I	II	III	IV	V	VI	VII	VIII	Total	Min. Req.
Undergraduate Core Courses (158 min. credits)	Basic Sciences & Maths (BSM)	9	14	9	4	-	-	-	-	**36**	**36**
	Engineering Fundamentals (EF)	11	7	6	2	-	-	-	-	**26**	**24**
	Department Core (DC)	-	-	10	15	19	24	10	4	**82**	**78**
	Management (M)	-	-	-	3	3	-	-	-	**6**	**6**
	Humanities & Social Science Core (HSSC)	4	-	-	-	-	-	-	-	**4**	**4**
	Project (P)	-	-	-	-	-	-	5	5	**10**	**10**
Undergraduate Programme Electives (22 min. credits)	Programme Electives (PE)	-	-	-	-	-	-	8	8	**16**	**16**
	Open Electives (OE)	-	-	-	-	-	-	-	4	**4**	**3**
	Humanities & Social Science Electives (HSSE)	-	3	-	-	-	-	-	-	**3**	**3**
Min. Credits Required (158+22=180)	**Total**	**24**	**24**	**25**	**24**	**22**	**24**	**23**	**21**	**187**	**180**

Audit Courses		
	Total	Min. Req.
(Min. 3 Credits audit subjects from other departments will be offered during Semester I-V)	21	15
Seminar	3	3
Industrial/Practical Training (IPT)	1	1

Course Structure of BTech (Information Technology)

Credit Value

1 Period Lecture=1 Credit **1 Period Tutorial=1 Credit** **2 Period Practical=1 Credit**

Freshman Year, Semester-I

S.N.	Category	Paper Code	Subject	L	T	P	Credit
1.	BSM	BAS-01	Engineering Mathematics-I	3	1	0	4
2.	BSM	BAS-02	Engineering Physics-I	3	1	2	5
3.	EF	BIT-01	Fundamentals of Information Technology	3	1	-	4
4.	EF	BEE-01	Principles of Electrical Engineering	3	1	2	5
5.	HSSC	BAS-03	Professional Communication	3	1	0	4
6.	EF	BIT-02	Software Tools-I	0	0	4	2
7.	AC		Audit Course				-
			Total	**15**	**5**	**8**	**24**

Freshman Year, Semester-II

S.N.	Category	Paper Code	Subject	L	T	P	Credit
1.	BSM	BAS-07	Engineering Mathematics-II	3	1	0	4
2.	BSM	BAS-08	Engineering Physics-II	3	1	2	5
3.	BSM	BAS-14	Graph Theory	3	1	2	5
4.	EF	BIT-03	Programming Fundamentals	3	1	2	5
5.	HSSE	BAS-**	Humanities & Social Science Electives	2	1	0	3
6.	EF	BCE-10	Engineering Graphics	0	0	4	2
7.	AC		Audit Course				-
			Total	**14**	**5**	**10**	**24**

Sophomore Year, Semester-III

S.N.	Category	Paper Code	Subject	L	T	P	Credit
1.	BSM	BAS-01	Discrete Mathematics	3	1	0	4
2.	BSM	BAS-24	Applied Computational Methods	3	1	2	5
3.	EF	BIT-11	Switching Theory & Logic Design	3	1	-	4
4.	DC	BIT-12	Data Structures	3	1	2	5
5.	DC	BIT-13	Object Oriented Programming	3	1	2	5
6.	EF	BIT-14	Software Tools-II	0	0	4	2
7.	AC		Audit Course				-
			Total	**15**	**5**	**10**	**25**

Sophomore Year, Semester-IV

S.N.	Category	Paper Code	Subject	L	T	P	Credit
1.	BSM	BAS-26	Optimization Techniques	3	1	0	4
2.	M	MBA-113	Management Information System	2	1	-	3
3.	DC	BIT-15	Design&Analysis of Algorithm	3	1	2	5
4.	DC	BIT-16	Computer Organization & Architecture	3	1	2	5
5.	DC	BIT-17	Database Management System	3	1	2	5
6.	EF	BIT-18	Software Tools-III	0	0	4	2
7.	AC		Audit Course				-
			Total	**14**	**5**	**10**	**24**

Junior Year, Semester-V

S.N.	Category	Paper Code	Subject	L	T	P	Credit
1.	M	MBA-02	Engineering & Managerial Economics	2	1	0	3
2.	DC	BIT-26	Operating System	3	1	2	5
3.	DC	BIT-27	Computer Networks	3	1	2	5
4.	DC	BIT-28	Software Engineering	3	1	2	5
5.	DC	BIT-29	Automata Theory	3	1	-	4
6.	AC		Audit Course				-
			Total	**14**	**5**	**06**	**22**

Junior Year, Semester-VI

S.N.	Category	Paper Code	Subject	L	T	P	Credit
1.	DC	BIT-31	Data Mining & Ware Housing	3	1	0	4
2.	DC	BIT-32	Artificial Intelligence	3	1	2	5
3.	DC	BIT-33	Machine Learning	3	1	2	5
4.	DC	BIT-34	Wireless Sensor Network & IoT	3	1	2	5
5.	DC	BIT-35	Network Security & Cryptography	3	1	2	5
6.	AC	BIT-30	Seminar	-	-	6	-
			Total	**15**	**5**	**08**	**24**

Senior Year, Semester-VII

S.N.	Category	Paper Code	Subject	L	T	P	Credit
1.	DC	BIT-41	Graphics & Visual Computing	3	1	2	5
2.	DC	BIT-42	Mobile Computing	3	1	2	5
3.	PE-1	BIT-*	Programme Elective-1	3	1	0	4
4.	PE-2	BIT-*	Programme Elective-2	3	1	0	4
5.	P	BIT-40	Project Part-1	0	0	10	5
6.	AC	BIT-45	Industrial/Practical Training	0	0	2	-
			Total	**12**	**4**	**14**	**23**

Senior Year, Semester-VIII

S.N.	Category	Paper Code	Subject	L	T	P	Credit
1.	DC	BIT-43	Distributed System	3	1	0	4
2.	PE-3	BIT-*	Programme Elective-3	3	1	0	4
3.	PE-4	BIT-*	Programme Elective-4	3	1	0	4
4.	OE	BOE-*	Open Elective Offered by other dept.	3	1	0	4
5.	P	BIT-50	Project Part-2	0	0	10	5
			Total	**12**	**4**	**10**	**21**

Engineering Fundamentals & Departmental Core (Information Technology)

Sr. No.	Paper Code	Subject	Prerequisite	L	T	P	Credit
1.	BIT-01	Fundamentals of Information Technology	-	3	1	0	4
2.	BIT-02	Software Tools-I	-	0	0	4	2
3.	BIT-03	Programming Fundamentals	-	3	1	2	5
4.	BIT-11	Switching Theory & Logic Design	-	3	1	0	4
5.	BIT-12	Data Structures	-	3	1	2	5
6.	BIT-13	Object Oriented Programming	-	3	1	2	5
7.	BIT-14	Software Tools-II	-	0	0	4	2
8.	BIT-15	Design & Analysis of Algorithm	-	3	1	2	5
9.	BIT-16	Computer Organization & Architecture	-	3	1	2	5
10.	BIT-17	Database Management System	-	3	1	2	5
11.	BIT-18	Software Tools-III	-	0	0	4	2
12.	BIT-26	Operating System	-	3	1	2	5
13.	BIT-27	Computer Networks	-	3	1	2	5
14.	BIT-28	Software Engineering	-	3	1	2	5
15.	BIT-29	Automata Theory	-	3	1	0	4
16.	BIT-31	Data Mining & Ware Housing	-	3	1	0	4
17.	BIT-32	Artificial Intelligence	-	3	1	2	5
18.	BIT-33	Machine Learning	-	3	1	2	5
19.	BIT-34	Wireless Sensor Network & IoT	-	3	1	2	5
20.	BIT-35	Network Security & Cryptography	-	3	1	2	5
21.	BIT-30	Seminar	-	0	0	6	0
22.	BIT-41	Graphics & Visual Computing	-	3	1	2	5
23.	BIT-42	Mobile Computing	-	3	1	2	5
24.	BIT-40	Project Part-1	-	0	0	10	5
25.	BIT-45	Industrial/Practical Training	-	0	0	2	0
26.	BIT-43	Distributed System	-	3	1	0	4
27.	BIT-50	Project Part-2	Project-1	0	0	10	5

Programme Electives (Information Technology)

Sr. No.	Paper Code	Subject	Prerequisite	L	T	P	Credit
		PE-1 & PE-2					
1.	BIT-51	.Net Technology	-	3	1	0	4
2.	BIT-52	Advanced JAVA	-	3	1	0	4
3.	BIT-53	Real Time System	-	3	1	0	4
4.	BIT-54	Artificial Intelligence Search Methods for problem Solving	-	3	1	0	4
5.	BIT-55	Aspect Oriented Programming	-	3	1	0	4

6.	BIT-56	Big Data Computing	-	3	1	0	4
7.	BIT-57	Blockchain Architecture Design and Use Cases	-	3	1	0	4
8.	BIT-58	Cloud Computing and Distributed Systems	-	3	1	0	4
9.	BIT-59	Compiler Design	-	3	1	0	4
10.	BIT-60	Computer Vision: Foundations and Applications	-	3	1	0	4
11.	BIT-61	Functional Programming	-	3	1	0	4
12.	BIT-62	Data Science for Engineers	-	3	1	0	4
13.	BIT-63	Database Administration with ORACLE	-	3	1	0	4
14.	BIT-64	Deep Learning	-	3	1	0	4
		PE-3 & PE-4					
15.	BIT-65	Android Programming	-	3	1	0	4
16.	BIT-66	Embedded System	-	3	1	0	4
17.	BIT-67	Hardware Modelling using Verilog	-	3	1	0	4
18.	BIT-68	Hardware Security	-	3	1	0	4
19.	BIT-69	High Performance Computing	-	3	1	0	4
20.	BIT-70	Introduction to Parallel Programming in Open MP	-	3	1	0	4
21.	BIT-71	Linux Administration & Networking	-	3	1	0	4
22.	BIT-72	Digital Signal Processing	-	3	1	0	4
23.	BIT-73	Multi-Core Computer Architecture – Storage and Interconnects	-	3	1	0	4
24.	BIT-74	Network Programming	-	3	1	0	4
25.	BIT-75	Parallel Algorithms	-	3	1	0	4
26.	BIT-76	Scalable Data Science	-	3	1	0	4
27.	BIT-77	Software Design, Construction & Quality Management	-	3	1	0	4
28.	BIT-78	Software Verification & Validation	-	3	1	0	4

Open Electives for other department

Sr. No.	Paper Code	Subject	Prerequisite	L	T	P	Credit
1.	BOE-25	Linux & Shell Programming	-	3	1	0	4
2.	BOE-26	Web Technology	-	3	1	0	4
3.	BOE-27	Digital Forensic & Cyber Laws	-	3	1	0	4
4.	BOE-28	Network Security	-	3	1	0	4

Audit Courses for BTech (IT)

S.N.	**Category**	**Paper Code**	**Subject**	**L**	**T**	**P**	**Credit**
1.	AC	BAS-05	Environment & Ecology	2	1	0	-
2.	AC	BEC-01	Fundamentals of Electronics Engineering	2	1	0	-
3.	AC	BCS-13	Internet & Java Programming	3	1	2	-
4.	AC	BCS-53	LAMP Technology	3	1	0	-
5.	AC	BCS-73	Neural Network & Fuzzy Systems	3	1	0	-
6.	AC	BEE-15	Introduction to Microprocessors	3	1	2	-
7.	AC	MAS-109	Foreign Language- French	2	1	0	-
8.	AC	MAS-109	Foreign Language- German	2	1	0	-
9.	AC	MAS-109	Foreign Language- Spanish	2	1	0	-

Humanities & Social Science Electives (HSSE)

S.N.	Category	Paper Code	Subject	L	T	P	Credit
1.	AC	BAS-10	Technical Writing	2	1	0	3
2.	AC	BAS-11	Human Values & Professional Ethics	2	1	0	3
3.	AC	BAS-12	Industrial Psychology	2	1	0	3

4.	AC	BCS-13	Industrial Sociology	2	1	0	3

Computer Fundamental (CF)courses for BBA

S.N.	Category	Paper Code	Subject	L	T	P	Credit
1.	CF	BIT-81	Fundamentals of Computer Applications	2	0	0	2
2.	CF	BIT-82	IT Tools for Business	2	0	2	3

Syllabus (B.Tech.-I)

BIT-01 **Fundamentals of Information Technology**

Course category : Engineering Fundamentals (EF)

Pre-requisite Subject : NIL

Contact hours/week : Lecture: 3, Tutorial: 1 , Practical: 0

Number of Credits : 4

Course Assessment methods : Continuous assessment through tutorials, attendance, home assignments, quizzes and Three Minor tests and One Major Theory Examination

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. understand the basics of computers Hardware/Software
2. understand the importance of data compression and the algorithms for lossy and lossless data compression
3. understand the concept of operating system and fundamentals of computer networking

UNIT-I **9**

Introduction to Computer Hardware/Software: Processor, Motherboard, I/O Devices, peripherals, Memory Types & Hierarchy: Cache, Primary & Secondary memories with examples, Concept of Computer Languages: Low-Level, Assembly and High-Level, System Software: Assembler, Compiler, Interpreter, Loader/Linker

UNIT-II **9**

Data & Information, Digital representation of Information, Number Systems & Comparisons: Binary, Octal, Decimal, Hexadecimal, Text Representation: ASCII, EBCDIC, Unicode, Multimedia Data, Data Compression Types and Techniques: Lossy / Lossless, Huffman, Shannon-Fano, Dictionary Based Compression techniques

UNIT-III **9**

Operating System: Concept, Functions, Types, Single-user/Multi-user operating system, Architectural differences, Shell fundamentals, Exemplary commands: Internal & External, Basics of Primary and Secondary Memory Management

UNIT-IV **9**

Network Basics: Concept, Types, Transmission modes, Topologies, OSI & TCP/IP Models: Functions of different Layers, concept of MAC, IP (Private/Public) and TCP addresses, Basic Introduction to CSMA/CD, IP & TCP/UDP and HTTP Protocols, Current Internet Applications

Text Books & References

1. Mark Nelson and Jean-Loup Gailly"The Data Compression Book", M&T Books, A Division of MIS: Press,Inc.
2. K Sayood, "Introduction to Data Compression" 3/e, Elsevier 2006
3. Forouzan, Data Communication and Networking, TMH
4. Silberschatz, A., Galvin, P. and Gagne, G., Applied Operating Systems Concepts, John Wiley& Sons Inc.

BIT-02 **Software Tools-I**

Course category : Engineering Fundamentals (EF)

Pre-requisite Subject : NIL

Contact hours/week : Lecture: 0, Tutorial: 0 , Practical: 4

Number of Credits :2

Course Assessment methods : Continuous assessment through Viva-voce, Practical work/Record, attendance and Major Practical Examination

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Understanding of Booting Process and installation of Operating system
2. Usage of Operating system commands
3. Understanding of Shell and its usage as a programming language
4. Understanding of Computer Networking concepts

Experiments

1. Understanding CMOS settings of operating system
2. Installation of Linux operating system using virtualization technique
3. Understanding and practice of various Linux commands
4. Creation/usage of various types of files supported by Linux
5. Practice of Computer networking commands
6. Programs using shell programming

BIT-03 **Programming Fundamentals**

Course category : Engineering Fundamentals (EF)

Pre-requisite Subject : NIL

Contact hours/week : Lecture: 3, Tutorial: 1, Practical: 2

Number of Credits : 5

Course Assessment methods : Continuous assessment through tutorials, attendance, home assignments, quizzes and Three Minor tests and One Major Theory Examination

Course Outcomes : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Describing the basics of terminologies used in computer programming.
2. Practicing C language programming by writing, compiling and debugging the code.
3. Designing programs involving simple statements, conditional statements, iterative statements, array, strings, functions, recursion and structure.
4. Discussing the dynamic memory allocations and use of the pointers.
5. Applying basic operations on files through programs.
6. Studying and implementing the codes using macros, preprocessor directives and command line arguments

UNIT-I **9**

Basics of Computers and Programming: Functional diagram of computer; Language Processors; Approaches to problem solving, Concept of algorithm and flow charts. **Simple Statements:** Datatypes; Tokens and its types; Variable declaration and initialization; User defined type declaration: typedef, enum; Comments; Format specifiers; Standard I/O: taking input and displaying output; **Operators:** types, precedence and associativity; Expressions; Type conversion, C short-hands.

UNIT-II **9**

Conditional Statements: Simple if, if-else, nested if-else, else-if ladder, switch statements, nested switch, advantages of switch over nested if, restrictions on switch values. **Iterative Statements:** Concepts of entry and exit controlled loops; Uses of for, while and do while loops; Nested Loops; Printing various patterns using nested loops; Using break, continue and goto statements.

UNIT-III **9**

Arrays: Single-dimensional, multi-dimensional array and their applications; declaration and manipulation of arrays; strings and string handling functions. **Pointers:** Pointer and address arithmetic; dereferencing; pointers and arrays; dynamic memory allocation and de-allocation. **Functions:** Function prototype; Arguments and its types: actual, formal and default arguments; Scope of a variable; Argument passing methods; Passing pointer as the function argument; Recursion: types, advantages and disadvantages; Storage class specifies; Character test functions.

UNIT-IV **9**

Structure: Declaring and defining structures; Array within structure; Array of structure; Defining and using some data structures: Stack, Queue, and Linked lists. **File Handling:** Types of files; Text files and different operations on text files, opening a file, closing a file;Data structure of a file; EOF; I/O operations on files; Random access to the files. **Standard C Preprocessors & C Library:** Pre-processor, Directives, Macro, Macro substitution; Conditional Compilation; Command Line Arguments; Standard C Library.

Text Books & References

1. Brian W. Kernighan and Dennis M. Ritchie, "The C programming language", Pearson
2. E. Balagurusamy, "Programming in ANSI C", McGraw Hill Education
3. Yashavant Kanetkar, "Let Us C", bpb publication
4. Jeri R. Hanly, Elliot B. Koffman, "Problem Solving and Program Design in C", Pearson
5. Herbert Schildt,"C: The Complete Reference",McGraw Hill Education

EXPERIMENTS

Implementing programs in following categories using programming language 'C':

1. Programs of simple statements, conditional statements and iterative statements with their applications.
2. Programs of single and multi dimensional arrays and their applications.
3. Programs of strings and their applications
4. Programs of pointer and their applications
5. Programs of function and their applications
6. Programs of structure and their applications
7. Codes of file handling and management
8. Codes with Preprocessor, Macro, Conditional Compilation and Command Line Arguments

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Syllabus (B.B.A.-I)

FUNDAMENTALS OF COMPUTER APPLICATIONS

BIT-81 **2 Credits (2-0-0)**

Unit I

Defining computer; Input Devices: Keyboard, Mouse, Data Scanning Devices; Output Devices: Monitors, Printers; Processor; Primary Memory: RAM, ROM, PROM, EPROM, EEPROM; Internal Memory; Secondary Memory

Unit II

Number Systems: Decimal Number System, Binary Number System, Octal Number System and Hexa Decimal Number, Conversions from one Number System to another, Binary Arithmetic, 1's compliment, 2's compliment

Unit III

Operating System Concepts: Definition & Types of Operating System, Functions of Operating System, Introduction to Windows Operating System

Unit IV

Data Communication and Networks: Networking Models, Communication Channels, Types of Networks: LAN, MAN, WAN, Network Topologies, Introduction to Internet, latest trends in Web applications

Reference Books:-

1. Govindraju, S. - Introduction to Computer Science
2. Jain, V.K. - Computer and Beginners
3. Sinha, P.K. - Fundamentals of Computers
4. Ram, B. - Computer Fundamentals
5. Rajaraman - Fundamental of Computers
6. Saxena, Vikas Publishing House: A first Course in Computers