KOLHAN UNIVERSITY

Chaibasa, Jharkhand, India

Proposed Syllabus for
Four Year Undergraduate Programme (FYUGP)
of

Bachelor of Science in Information Technology (B.Sc. IT)

Semester - 2

With Effect From
Academic Year 2022 - 2023

As Per Revised Curriculum and Credit Framework for the FYUGP under the provisions of NEP - 2020

B.Sc.I.T. Course Structure F.Y.U.G.P.(Semester -II)

Sem	Paper Code	Paper Title	L-T-P	Credits	Contact Hours
II	AEC-2	*Language and Communication Skills*: (English)		2	
	SEC-2	Skill Enhancement Course-2		3	
	MDC-2	Multi-disciplinary Course-2		3	
	MN- 2A (Theory)	Entrepreneurship Development	3-0-0	3	45
	MN-2A (Practical)	Entrepreneurship Development Lab	0-0-1	1	30
	MJ-2(Theory)	Data Structures using C	3-0-0	3	45
	MJ-3(Theory)	Digital Electronics	3-0-0	3	45
	MJ(Practical-2)	Data structure using C and Digital Electronics Lab	0-0-2	2	60
	Total Credits			20	

MN-2A: ENTREPRENEURSHIP DEVELOPMENT		
3 Credits	**45 Class Hours**	**Semester II.**

OBJECTIVES

It provides exposure to the students to the entrepreneurial cultural and industrial growth so as to prepare them to set up and manage their own small units.

Detailed Syllabus:

Unit-1	**Introduction:** The entrepreneur **(8 Classes)** Definition, emergence of entrepreneurial class; Definition and concern of Entrepreneurship, role of social economic environment; classification, Characteristics and importance of entrepreneur; leadership; risk taking ; decision making and business planning, Role of entrepreneur
Unit-2	**Promotion of a venture:** **(8 Classes)** Opportunities analysis; external environmental analysis (economic, social and technological, competitive factors), legal requirements of establishment of a new unit and rising of funds; Venture capital sources and documentation required.
Unit-3	**Entrepreneurial Behaviour:** **(10 Classes)** Innovation and entrepreneur (Concept, Creativity, Invention & Innovation, Strategy for Innovation, Effective Commercialization, Innovation and Intellectual Property Rights), entrepreneurial behavior and Psycho- theories. Entrepreneurial Development Programmes (EDP): EDP, their role, relevance and achievements; role of government in organizing EDP's critical evaluation.
Unit-4	**Entrepreneurship & Innovation:** **(12 Classes)** Overview of project identification, search of a business idea, Identification of project, Business Opportunities, Understanding Design Thinking {concept and scope, key factors of design thinking, benefits, phases (Empathize, Define, Ideate, Prototype, Test)} Creativity: Creativity, identification creative tools (S-C-A-M-P-E-R), Vertical thinking, lateral thinking, Critical Thinking, Phases of decision making, Critical thinking and objectivity, Applying structured knowledge to unstructured problems, Domain criteria, traditional and out-of-the-box thinking.
Unit-5	**Legal and ethical considerations:** **(7 Classes)** Legal forms of business organization, ethical Issues and social responsibilities of an entrepreneur

Books:

1. Vasant, DCSAI; Entrepreneurship, Himalaya Publishing House, 2003.
2. Taneja &S.L. Gupta.; Entrepreneurship Development, 2003.
3. Pandey , I.M.; venture capital- The Indian Experience, Prentice Hall of India, 2003.
4. Tandon B.C,''Environment and Entrepreneur '',Chug publication, Allahabad.

MN–2 (Pr): Entrepreneurship Development Lab		
1Credit	**15 Class Hours (30 Hours)**	**Semester II.**

Practical Work

1	Case studies of successful entrepreneurs
2	Conducting mock interviews: testing initiatives, team spirit and leadership
3	Conducting meeting: purpose, procedure, participation, physical arrangements, recording and writing of minutes.
4	Share Your Story: Identify area of innovation and prepare a project of design thinking in the area of Your choice and present it through Sketch modeling (Preparing project proposal)
5	Conduct Market survey to know the demand for different products.
6	Presentations by the students (Individual, Groups)

MJ–2 (Th): Data Structures using C		
3 Credit	**45 Class Hours**	**Semester II.**

Objectives

- To know details about the Data Structure
- Applications, advantages and limitations of various data structures.
- To know real life use and implementation of various data structures.
- Analyse and compare the different algorithms.

Course Outcomes

After the completion of this course, students will be able to:

- Understand the properties of various data structures.
- Identify the strength and weaknesses of different data structures.
- Design and employ appropriate data structures for solving computing Problems.
  Analyze and compare the efficiency of algorithms.

Detailed Syllabus:

Unit 1 5 classes	**Algorithms and Analysis of Algorithms**: Definition, Structure and Properties of Algorithms, Development of an Algorithm, Data Structures and Algorithms, Data Structure – Definition and Classification, Efficiency of Algorithms, Asymptotic Notations, Average, Best and Worst case Complexities.
Unit 2 10 classes	**Arrays, Stacks and Queues**: Array Operations, Number of Elements in an Array, Representation of Arrays in Memory, Applications of Array, Stack- Introduction, Stack Operations, and Applications of Stack., Queues-Introduction,Operations on Queues, Circular Queues, Other Types of Queues, Applicationsof Queues.
Unit 3 10 classes	**Linked List, Linked Stacks and Linked Queues**: Singly Linked Lists, Circularly Linked Lists, Doubly Linked Lists, Applications of Linked Lists. Introduction to Linked Stack and Linked Queues, Operations on Linked Stacks and Linked Queues, Implementations of Linked Representations, Applications of Linked Stacks and Linked Queues.
Unit 4 10 classes	**Trees, Binary Trees, BST, and Graph**: Trees: Definition and Basic Terminologies, Representation of Trees, Binary Trees: Basic Terminologies and Types, Representation of Binary Trees, Binary Tree Traversals Introduction, BST: Definition and Operations, Graph-: Definition and adjacency lists & adjacency matrix Operations.
Unit 5 10 classes	**Sorting and searching**: Introduction, Selection Sort, Insertion Sort , Quick Sort, Bubble Sort, Heap Sort. Searching: Introduction, Sequential Search and Binary Search.

Books:

1. BalujaG S, “Data Structure through C”, Ganpat Rai Publication, New Delhi, 2015.
2. Horowitz E., Sahni S., Susan A., “Fundamentals of Data Structures in C”, 2nd Edition, University

MJ–3 (Th): Digital Electronics		
3 Credit	**45 Class Hours**	**Semester II.**

Objectives

- Understand the Truth Table.
- Identify the number of variables and their simplification importance.
- Understand different circuits for the implementation of Boolean equations.
- Identify Register Transfer, Micro-operations and Central Processing Unit
- Describe performance evaluation of computers, computer architecture and organization, computer arithmetic, Memory and CPU design.

Course Outcomes

After the completion of this course, students will be able to:

- Minimize the circuit diagrams by use of K-Map concepts and Boolean Algebra.
- Analyse the outcome of the circuit designed.
- Comprehend the digital design logic
- Design and Analysis of a given digital circuit – combinational and sequential
- Use Boolean simplification techniques to design a combinational hardware circuit

Detailed Syllabus:

Unit 1 7 classes	**Binary Systems And Data Representation:** Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Complements, Subtraction of Unsigned Numbers, Fixed-Point Representation, Floating-Point Representation, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic.
Unit 2 12 classes	**Digital Logic Circuits**: Digital Computers, Logic Gates, Boolean algebra, Complement of a Function, Map Simplification, Product-of-sum simplification, Don't care conditions. **Combinational Logic:** Combinational Logic Circuits & Realisation with Logic Gates – Half & Full Adders and codes, Multiplexers, De-multiplexes, Encoders, Decoders, Codes Converters, Sequential Circuits, JK, RS, T, D, Master – Slaves Flip – Flop.
Unit 3 6 classes	**Digital Components**: Integrated Circuits, Registers, Register with parallel load, Shift Registers, Bidirectional Shift Registers, Binary Counters, Binary counter with parallel load, Synchronous and Asynchronous Counters.
Unit 4 8 classes	**Central Processing Unit**: Introduction, General Register Organization, Stack Organization, Register Stack, Memory Stack, , Evaluation of Arithmetic Expressions, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Program Interrupt, Types of Interrupts, Reduced Instruction Set Computer (RISC).
Unit 5 12 classes	**Memory Organization:** Memory Hierarchy, Main Memory, RAM and ROM Chips, Memory Address Map, Auxiliary Memory, Magnetic Disks and Tape, Associative Memory, Hardware Organization, Read/Write Operation, Cache Memory, Associative Mapping, Direct Mapping, Virtual Memory, Address Space and Memory Space, Address Mapping Using Pages, Associative Memory Page Table, Page Replacement, Memory Management Hardware.

Books:

1) M.Morris Mano- Digital Design, 3rd Edn, Pearson Education, New Delhi - 2005.
2) B.Ram –Fundamental of Microprocessors And Microcontrollers –Dhanpat Rai Publications,Eighth Edition.

MJ–2 (Pr): PRACTICAL For MJ-2 & MJ-3		
2 Credit	**30 Classes (60 Hours)**	**Semester II**

List of Programs as Assignments for MJ-2:

- Program to implement stack using arrays.
- Program to convert infix notation to postfix notation using stacks.
- Program to implement queue using arrays.
- Program to implement circular queue using arrays.
- Program to create add remove & display element from single linked list.
- Program to count number of nodes in linear linked list.
- Program to accept a singly linked list of integers & sort the list in ascending order.
- Program to represent polynomial using linked list.
- Program for the creation of binary tree, provide insertion & deletion in c.
- Program for pre-order, post-order & in-order traversals of a binary tree using non recursive.
- Program to count no, of leaves of binary tree.
- Program to implement bubble sort program using arrays.
- Program to implement merge sort using arrays.
- Program to implement selection sort program using arrays.
- Program to implement insertion sort program using arrays.
- Program to implement linear search using arrays.
- Program to implement binary search using arrays.

List of Programs as Assignments for MJ-3:

- Explore the working principles of basic logic gates like AND, OR, NOT, NAND, NOR and XOR. Build and analyze logic circuits using truth tables and Boolean expressions.
- Create practical examples of combinational circuits such as encoders, decoders, multiplexers, and demultiplexers using logic gates.
- Learn about flip-flops, registers, and counters.