Paper code : ELL:205
Paper Name : Electronic Lab II (Digital Electronics)

List of Experiments:

1. Verification of Basic logic gates
2. Verification of EX-OR and EX-NOR gate
3. Verification of Universal logic gates.
4. Verification of De-Morgan's 1st law.
5. Verification of De-Morgan's 2nd law.
6. Universal building block using NAND gate
7. Universal building block using NOR gate
8. Study of Half Adder
9. Study of Full Adder.
10. Study of Half Sub tractor
11. Study of Full Sub tractor.
12. 4-1 Multiplexer
13. 8-1 Multiplexer
14. 1-4 De-multiplexer
15. 1-8 De-multiplexer
16. Encoders
17. Decoders
18. 4-bit counters
19. Decade counters
20. Down counters

Paper Code : SWL:206
Paper Name : Software Lab II (Data Structure in C)

1. An array A contains 25 positive integers. Write a program in C which will find out the number of odd and even numbers in that array.
2. Write a program in C for traverses a Linear Array with a lower bound and upper bound.
3. Write a program in C to insert an element in the Kth position of an array size 20.
4. Consider two single dimensional arrays of size 20 and 30 respectively. Write a program in C to find out the elements which are common in both arrays.
5. Write a program in C to delete duplicate elements from an array of 20 integers.
6. Write a C program for multiplication of two spare matrix.
7. Write a C Program to count the numbers of elements in a linked list.
8. Consider that a single linked list contains the following elements :
   Roll_no. : integer
   Name : string of maximum of 25 Character
   Avg_no : float.
   Write a program in C to represent a single linked list with the above elements.
9. Write a C program to insert an ITEM after a given node in a Linked list.
10. Write a C program to find the location of the last node in a sorted linked list.
11. Write a C program to delete an element from a linked list the first node N contains the given ITEM of information.
12. Write a C program to implement circular linked list.
13. Write a C program to implement doubly linked list.
14. Write a program in C to implement stack using array.
15. Write a program in C to implement stack using linked list.
16. Write a program in C to transform the following infix expression to postfix expression :
    (A + B ^D)*(D/E)
17. Write a program in C to find the Fibonacci sequence upto 10th term.
18. Write a program in C to implement queue using array.
19. Write a program in C to implement queue using linked list.
20. Write a program in C to implement circular queue.
21. Write a program in C to implement priority queue.
22. Write a program in C for preorder traversal of a binary tree using stack.
23. Write a program in C for inorder traversal of a binary tree using stack.
24. Write a program in C for postorder traversal of a binary tree using stack.
25. Write a program in C to insert new nodes to a binary search tree and delete a node from binary search tree.
26. Write a program in C to find the location of the first node containing ITEM and also find the location of an edge in the graph G.
27. Write a program in C to insert new nodes to a graph G and delete a node from a graph G.
28. Write a program in C to implement Breadth-First Search.
29. Write a program in C to implement Depth-First Search.
30. Write a program in C to implement Bubble Sort.
31. Write a program in C to implement Quick sort.
32. Write a program in C to implement Selection sort.
33. Write a program in C to implement Merge sort.
34. Write a program in C to implement Linear search.
35. Write a program in C to implement Binary search.

24. ENG(BSC/BCA/BBA)205 : B.SC/BCA/BBA ENGLISH PAPER II (Short Stories, Drama, Grammar & Language Skills)

100 marks: External exams 70 marks (Pass mark 31.5); Internal Assessment: 30 marks (Pass mark=13.5) Time: 3 hours
2 credits

Objectives: To teach the students compositional/ communicative skills and analysis of texts.
Descriptive & Objective/short answer type questions as indicated : 70 marks

TO TEACH IN THE SECOND SEMESTER

Unit I: Short Stories (14 marks) 1 question of 10 marks; 2 objective/short answer questions of 2 marks each.

1. **Ruskin Bond: *The Thief***
2. **Chinua Achebe: *Marriage is a Private Affair***
3. **W. Somerset Maugham: *The Verger***

[From *NU Anthology of Prose & Short Stories 2012]*

Unit II: Drama (14 marks) 1 question of 10 marks; 2 objective/short answer questions of 2 marks each.

1. **Fritz Karinthy: *Refund***
2. **Norman McKinnel: *The Bishop's Candlesticks***

[From Satyanarain Singh. *Selected One Act Plays. Chennai: Macmillan, 2006*.]

Unit III: Grammar (14 marks: 7 questions of 2 marks each =14)

i. Pair of Words. ii. Idioms iii. Tenses iv. Modals v. Applied Grammar (Choosing of correct words given within brackets)

Unit IV: Composition (14 marks)

1. **Comprehension (Reading & understanding of an unknown passage, vocabulary)**

Unit V: Language Skills: (1 question of 14 marks)

1. **Précis Writing**

Recommended Reading

1. Green, David (1992) *Contemporary English Grammar Structures and Composition*. Calcutta: Macmillan.
2. Wren, P.C. & Martin, H. (1992) *High School English Grammar and Composition*. New Delhi: S. Chand & Co.
3. Quirk, Randolf & et al. (2010) *A Comprehensive Grammar of the English Language*. New Delhi: Pearson.
***4. The Nagaland University Anthology of Prose and Short Stories*. New Delhi: Macmillan.**

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Paper Code : MAT:201
Paper Name : **Mathematics II**

Teaching Hours (Per Week)		**Examination Scheme**		
TH. (hours)	Pr. (hours)	Internal	External	Total
		Th. (marks)	Th. (marks)	100 (marks)
3		30	70	

Lectures = 68 Hours

Objective:
Mathematics is about pattern and structure; it is about logical analysis, deduction, calculation within these patterns and structures. When patterns are found, often in widely different areas of science and technology, the mathematics of these patterns can be used to explain and control natural ha ppenings and situations.
Qualifying in mathematics helps in having a wide range of career choices. The abilities

- to use logical thought,
- to formulate a problem in a way which allows for computation and decision,
- to make deductions from assumption,
- to use advanced concepts,

are all enhanced by a mathematics course.

Detailed Syllabus

UNIT I
SETS & RELATIONS **14 Hrs.**

Definition -Operation on sets, Principal of Inclusion and Exclusion, Difference and symmetric difference of sets, Cartesian products and results related to Cartesian products. Relations- Types of relations, Equivalence relations, .

UNIT II
CO-ORDINATE GEOMETRY: **14 Hrs**
Concept of limits, fundamental theorems on Limits(without proof),
3Dimensional geometry:-co-ordinates of points in space,results of points in space and lines in space,Equation of straight lines in space- vector form,Cartesian form.

UNIT III
PROBABILITY: **14 Hrs.**

Introduction,Sample,Space and events, Conditional Probability, Independent events, Addition and Multiplication theorem on probability, Random variables,Mathematical Expectation, Theorems on Expectations, Variance of a variable in terms of Expectations.

UNIT IV
TRIGONOMETRY : **14 Hrs.**

Trigonometric or Circular Functions,Conditional Identities involving the angles of a triangle, Trigonometric equations,Graphs of trigonometric functions.

UNIT V

FUNCTIONS: **13 Hrs.**

Types of Functions-one to one, onto, into and inverse functions, composition of functions-inverse of composition of functions, Logarithmic and exponential functions,Factorial Functions,Fibonacci sequence.

RECOMMENDED BOOKS

1. Elements of Discrete Mathematics- C. L L IU
2. Discrete Mathematics- a)Semyour Lipschutz, Marc Lipson ,b) Vinay Kumar.
3. Fundamentals of Statistics- S.C.Gupta
4. Business Mathematics- Thukral J.K

Paper Code : DSC:203

Paper Name : Data Structure in C

Teaching Hours (Per Week)		**Examination Scheme**		
TH. (hours)	Pr. (hours)	Internal	External	Total
		Th. (marks)	Th. (marks)	100 (marks)
4		30	70	

Lectures = 68 Hours

"Data Structures is a subject of primary importance to the discipline of Computer Science. Organization or structuring data is vital to the design and implementation of efficient algorithm and program development. In fact any discipline in Science requires efficient problem solving using computers."

Detailed Syllabus

UNIT I

Introduction **5Hrs.**

Definition of data structure, data structure operations. Algorithms : Complexity, Time Space tradeoff, Complexity of Algoritms, Asymptotic Notations for Complexity of Algorithms, Subalgorithms, Variables, data.

UNIT II

Arrays, Linked Lists, Stacks and Queue **25 Hrs.**

Introduction, Linear arrays, Representation of linear arrays in memory, Address calculation of using row and column major ordering, Traversing linear arrays, Inserting and Deleting, Multidimensional arrays: Representation of Two-Dimensional arrays in memory, Pointers: Pointers arrays, Matrices, Sparse Matrices.

Linear Lists:

Linked Lists, Representation of Linear Lists in memory, Traversing a Linked List, Searching a linked List, Memory allocation: Garbage collection, overflow and underflow, Insertion into a linked list, Deletion from linked list, Circular linked lists, Doubly linked lists, Header linked lists.

Stacks and Queue

Stacks : Definition, Array representation of stacks, Linked representation of stacks, Polish notation, Evaluation of a Postfix Expression, Transforming Infix Expressions into Postfix Expressions.

Queues : Definition, Array representation of Queues, Linked representation of Queues, Circular queues, Priority Queue and D-Queue.

UNIT III

Trees **13 Hrs.**

Introduction and Definition of Trees, Tree Terminology, Binary Tree, Representing Binary Tress in Memory, Traversing Binary Tree: Preorder, In-order, Post-ordered traversal, Traversal algorithms using

stacks, Headed nodes: Threads (definition only), Binary Search trees, Searching and Inserting in Binary Search trees, Deleting in a Binary search tree. AVL trees, m-trees and B-Trees (definition only).

UNIT IV

Graphs **13 Hrs.**

Introduction, Graph theory terminology: Graph and multigraphs. Directed Graphs, Sequential representation of graphs: Adjacent matrix, Path matrix, Linked representations of a Graph, Operations on Graphs: Searching in a Graph, Inserting in a graph, Traversing a graph : Breadth- First search, Depth-Final search, Spanning tree (definition only).

UNIT V

Sorting and Searching **12 Hrs.**

Sorting, Bubble Sort, Insertion sort, Quick Sort, Selection sort, Merging, Merge-sort. Searching : Sequential and binary searches, Indexed search, Hashing Schemes

RECOMMENDED BOOKS

Main Book:

1. Seymour Lipchutz, “Theory and Problems of Data Structures”, Tata Mc Grew

Reference Book:

1. Robert Kruse, C.L Tondo and Bruce Leung, “Data Structure and Programming in C”, Pearson Education.

2. Yedidyah Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, “Data Structure using C and C++”, Pearson Education 2nd Edition.

3. Seymour Lipschutz and G A Vijayalakshmi Pai, “Data Structures”, Tata Mc Grew Hills

4. Robert Lafore, “ Sams Teach Yourself Data Structures and Algorithms in 24 Hours”, Sams Techmedia

5. Alfred V Aho, John E Hopcroft and Jeffery D Ullman, “ Data Structures and Algorithms”, Pearson Education.

6. Samiran Chattopadhyay, Debabrata Ghosh Dastidar and Matagini Chattopadhyay, “ Data Structures through C Language”, BPB Publication.

Paper Code : DEL:204

Paper Name : Digital Electronics

Teaching Hours (Per Week)		**Examination Scheme**		
TH. (hours)	Pr. (hours)	Internal	External	Total
		Th. (marks)	Th. (marks)	100 (marks)
4		30	70	

Lectures = 68 Hours

Objective of the Digital Electronics:

Digital circuits, which are the basic building blocks of a computer, are introduced in this module to let the students know what activities it does behind the computing environment. This course portrays excellent ideas of the logic gates available and data processing to make students understand the concept better with the analogue and digital signals while computing.

UNIT 1 : DIGITAL LOGIC AND ARITHMETIC CIRCUITS **17** HOURS

Introduction to number systems – Binary to decimal conversion – Decimal to binary conversion – Octal numbers – Hexadecimal numbers – Excess-3 code – Gray code.

Logic gates – NOT, OR, AND – Universal NAND and NOR gates – EX-OR and EX-NOR gates – De-Morgan's Theorems – Universal building blocks (NOT, OR, AND) Binary addition and subtraction – 1's complement – 2's complement – Adders (half & full) – Subtractor (half & full).

UNIT 2 : COMBINATIONAL AND DATA PROCESSING CIRCUITS **8** HOURS

Boolean algebra – Sum of products method – Product of methods – Truth table of Karnaugh map – Pairs, Quads and Octet – Karnaugh map simplification – Digital Logic families and their parameters.

Multiplexer and demultiplexers – 4X1 Multiplexer – 8X1 Multiplexer – 16X1 Multiplexer – 1X4 De-multiplexer – 1X8 De-multiplexer – Decoder – BCD-to-decimal decoder – Encoder – Parity Checkers.

UNIT 3 : FLIP-FLOPS AND MEMORIES **9** HOURS

Flip-flops – Types of flip-flop – RS (NAND and NOR) flip-flop – Edge triggered D flip-flop – Edge triggered T flip-flop – Edge triggered JK flip-flop – Master-Slave flip-flop – Triggering, propagation delay time, setup time, hold time.

Memories – ROM, RAM, EPROM, EEPROM – Volatile and non-volatile – Static and dynamic RAM.

UNIT 4 : REGISTERS AND DIGITAL COUNTERS **17** HOURS

Registers – Introduction- Modes of operation of register (SISO, SIPO, PISO and PIPO). ***Counters*** – Asynchronous counter- Synchronous counter – Ripple counters – MOD-7 ripple counter – Decade counter – 4 bit down counter – Up/down counter.

UNIT 5 : ANALOGUE AND DIGITAL INTERFACE **17** HOURS

Analogue to digital converters – Parallel Comparator A/D converter – Dual slope converter – Successive approximation method – Counter type converter.

Digital to analogue converters – Binary weighted D/A converter – R/2R ladder network converter – Bus standards – Introduction to microprocessor – 8-bit and 16 bit processor.

Objective of the Digital Electronics:

Digital circuits, which are the basic building blocks of a computer, are introduced in this module to let the students know what activities it does behind the computing environment. This course portrays excellent ideas of the logic gates available and data processing to make students understand the concept better with the analogue and digital signals while computing.

RECOMMENDED BOOKS

Main Reading:

1. Digital Principles and Applications, Donald P Leach, Malvino, McGraw Hill
2. Digital Electronics, Prof. C. Kumar and Selvakumar, N.V Publications

Supplementary Books

1. Modern Digital Electronics, Satish Jain, Tata McGraw Hill
2. Fundamentals of Digital Electronics and its Application, V.M. RAO and R.K. SRIVASTAVA
3. Analog and Digital Electronics, Bhupesh Bhatia, Sunil Paliwal, Balvir Singh, Navneet
4. Digital Electronics Demystified, Predko
5. Digital And Linear Integrated Circuits, A.P.Godse, U.A.Bakshi
6. Introduction to Digital Electronics (Essential Electronics), John Crowe and Barrie Hayes-Gil
7. Digital Electronics , D C Green
8. Digital Electronics: Principles, Devices and Applications, Anil K. Maini