Department of Computer Science and Engineering
National Institute of Technology Calicut

NIT Campus (PO), Calicut-673601, India

DCC Meeting Minutes

Date: 05-06-2023 **Time: 02:30 PM to 03:30 PM** **Venue: CSED Seminar Hall**

Agenda Items:

1. **Ratification of the minutes of the DCC meeting held on 23/05/2023**
2. **Action Taken Action Pending Report of the last DCC meeting**
3. **1st Year Btech Syllabus**
4. **Committee for Written test and Interview of PhD admission 2023**
5. **Committee for Written test and Interview of M Tech AI-DA 2023**

The DCC meeting started at CSED Seminar Hall at 2:30 PM. The Chairperson welcomed all members to the meeting.

Agenda Item 1: Ratification of the minutes of the DCC meeting held on 23/05/2023.

The DCC ratified the confirmation of the minutes of the DCC meeting held on 23/05/2023.

Agenda Item 2: Action Taken Action Pending Report.

There are no actions taken and acting pending, as per last DCC meeting.

Agenda Item 3:1st Year Btech Syllabus

Dr. Vinod Pathari, the coordinator of the Department B.Tech Curriculum Committee, presented the proposed syllabus for the courses offered to the 1st year Btech students (Annexure I). After a comprehensive discussion, DCC approved the proposal and recommended it to BoAC.

Agenda Item 4: Committee for Written test and Interview of PhD admission 2023

Dr Jimmy Jose, the coordinator of the PHD Committee, presented the proposal (Annexure II) for formation of the committee responsible for conducting the written test and interview of PHD admissions 2023 and DCC approved the proposal.

Agenda Item 5: Committee for Written test and Interview of M Tech AI-DA 2023

Prof Abul Nazeer K A, coordinator of the MTech AI-DA, presented the proposal (Annexure III) for formation of the committee responsible for conducting the written test and interview of M Tech AI-DA 2023 and DCC approved the proposal.

The meeting ended at 03:30 PM on 05/06/2023.

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Annexure - I

CS1001E COMPUTER PROGRAMMING

Pre-requisites: NIL

L	T	P	O	C
3	0	0	6	3

Total Lecture Sessions: 39

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Analyse a computational problem and design approaches for solving it

CO2: Design algorithms for simple computational problems

CO3: Illustrate algorithmic solutions in the C programming language

Module 1: Introduction to Computing (6 Lecture Sessions)

Fundamentals of Computing: historical perspective, early computers. Formal problem specification, pseudocode and flowcharts. Memory, Variables, Values, Instructions, Programs.

Module 2: Data Types, Operators, Expressions and Statements (15 Lecture Sessions)

Variables and constants - declarations - arithmetic and logical operators Assignment operator Input/output. Control Flow: Statements and blocks if-else, switch, while, for and do-while statements break and continue goto and labels.

Module 3: Functions and Program structure (8 Lecture Sessions)

Basics of functions, Parameter passing, scope rules, recursion.

Module 4: Aggregate data types and File Management (10 Lecture Sessions)

Single and multidimensional arrays, structures and unions, Pointers to arrays and structures -passing arrays and pointers as arguments to functions
File management - opening and closing files, reading and writing to files operations on files.

References:

1. B. S. Gottfried, *Programming with C (Schaum's Outline Series)*, 2nd ed. McGraw-Hill, 1996.
2. S. C. Kochan, *Programming in C*, Sams Publishing, 3rd ed. 2004.
3. B. W. Kernighan and D. M. Ritchie, *The C Programming Language*, 2nd ed. UK: Prentice Hall, 1988.
4. W. Kernighan and B. Pike, *The Practice of Programming*, UK: Addison-Wesley, 1999
5. H. M. Deitel and P. J. Deitel, *C: How to program*, 8th ed. Pearson Education, 2015.

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CS1002E INTRODUCTION TO COMPUTING SCIENCE

Pre-requisites: NIL

L	T	P	O	C
3	0	0	6	3

Total Lecture Sessions: 39

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Illustrate the elements of computing system and representation of data in computing system

CO2: Illustrate the functions and features of system software

CO3: Apply computational thinking skills to analyse and solve problems efficiently and effectively

Module 1: Elements of Computing Systems (11 hours)

Brief introduction to history of computing - Von Neumann Architecture - Data Representation: binary numbering system, representation of numeric, text and image data - Basic logic gates : half adder- Logic gates as building blocks of a computer - Components of a modern computer system : Basics of ALU, Memory and Control Unit Instruction set - Fetch-execute process of assembly code, execution of simple programs like adding two numbers.

Module 2: Overview of Systems Software (11 hours)

Concept of system software - assembly language translation and loading - compilers and language translation, introduction to the general structure of a compiler in brief - operating systems and application interface - user interface - efficient allocation of resources - system security - safe use of resources

Module 3: Computational Thinking (17 hours)

What is Computational Thinking Sample Datasets - Iterator Flowcharts - Variables: Count Sum Average Accumulator - Filtering: Simple Conditions, Compound Conditions, Looking for a data element, Dynamic Conditions (Maximum Minimum) - Data types: Basics - Compound data types: Subtypes - Pseudocode

References:

1. G. Michael Schneider and Judith Gersting, *Invitation to computer science*, 1st ed. India: Cengage Learning, 2022.
2. G. Venkatesh and Madhavan Mukund, *Computational Thinking: A Primer for Programmers and Data Scientists*, 1st ed. India: Notion Press, 2021.

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CS1003E DISCRETE STRUCTURES-I

Pre-requisites: NIL

L	T	P	O	C
3	0	0	6	3

Total Lecture Sessions: 39

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Classify a relation as equivalence relation/partial order/lattice and perform closure operations.

CO2: Formulate and solve recurrence equations describing the complexity of recursive algorithms

CO3: Formulate elementary problems with graphs and identify elementary algorithmic methods to solve them.

Module 1: Sets and Relations (12 Lecture Sessions)

Sets and Relations: countable and uncountable sets, diagonalization, equivalence relations and partitions, posets and lattices, digraph representation for relations, adjacency matrix/list representations, transitive closure computation - Floyd Warshall algorithm.

Module 2: Recurrences (13 Lecture Sessions)

Induction and Counting: mathematical Induction - review and examples, pigeonhole principle and inclusion exclusion principle. Recurrences: inductive formulations and iterative solution methods, applications to analysis of recursive algorithms, solution by the method of generating functions.

Module 3: Graph Theory (14 Lecture Sessions)

Graph Theory: elementary properties of graphs and trees, BFS and DFS algorithms, bipartite graphs and properties, two colouring of bipartite graphs, Eulerian and Hamiltonian graphs, matching and Hall's matching condition, planar graphs and five colour theorem, five colouring algorithm.

References:

1. R. P. Grimaldi and B. V. Ramana, *Discrete and Combinatorial Mathematics: An Applied Introduction,* 5th ed. India: Pearson Education, 2006.
2. L. Lovasz, J. Pelikan, and K. Vesztergombi, *Discrete Mathematics: Elementary and Beyond*, 1st ed. Springer, 2003
3. B. Kolman, R. Busby and S. C. Ross, *Discrete Mathematical Structures,* 6th ed. India: Pearson Education, 2015.

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CS1091E PROGRAMMING LABORATORY

Pre-requisites: NIL

L	T	P	O	C
0	0	3	3	2

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Demonstrate an ability to work in a UNIX environment

CO2: Demonstrate an ability to develop algorithmic solutions for simple computational problems

CO3: Implement algorithmic solutions using the C programming language

Syllabus:

Linux, Editor, Compiler and Debugger - Introduction to C programming - Statements, Assignment statements, Control Statements, Loop Statements - Arrays-Strings - Pointers - Functions - Recursion - Structures and Union - File Input Output

References:

1. B. S. Gottfried, *Programming with C (Schaum's Outline Series)*, 2nd ed. McGraw-Hill, 1996.
2. S. C. Kochan, *Programming in C,* Sams Publishing, 3rd ed. 2004.
3. B. W. Kernighan and D. M. Ritchie, *The C Programming Language,* 2nd ed. UK: Prentice Hall, 1988.
4. W. Kernighan and B. Pike, *The Practice of Programming,* UK: Addison-Wesley, 1999.
5. H. M. Deitel and P. J. Deitel, *C: How to program,* 8th ed. Pearson Education, 2015.

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CS1011E PROGRAM DESIGN

Pre-requisites: NIL

L	T	P	O	C
3	0	0	6	3

Total Lecture Sessions: 39

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Design, analyse and prove the correctness of simple, iterative and recursive algorithms.

CO2: Analyse algorithms for sorting and searching.

CO3: Select appropriate data structure for solving a given problem.

Module 1: Searching and Asymptotic Analysis (09 Lecture Sessions)

Review of Programming Constructs - Conditional, Iterative and Control constructs, Functions, Recursion, Searching - Linear and Binary, correctness and step count analysis, Asymptotic notation for complexity analysis.

Module 2: Sorting Algorithms (10 Lecture Sessions)

Sorting - Insertion and Selection sorts, Divide and conquer, Merge Sort, Quick sort, Linear and External Sorting. Correctness, Analysis and Applications of sorting.

Module 3: Basic Data Structures (10 Lecture Sessions)

Pointers and dynamic memory allocation, Strings manipulation using Multidimensional arrays and pointer arrays, Abstract Data Types, Lists - Singly and doubly linked list, Stacks, Queues using array and pointer based implementations.

Module 4: Trees and Hashing (10 Lecture Sessions)

Introduction to Graphs, Trees, Binary trees, Heaps, Heap Sort and Priority queues. Binary search trees, and traversal algorithm, Hashing - Chaining and open addressing methods

References:

1. A. V. Aho, J. E. Hopcroft, and J. D. Ullman, *Data Structures and Algorithms*, 1st ed. Addison-Wesley, 1983.
2. T. H. Cormen, C. E. Leiserson, R. L. Rivest and C. Stein, *Introduction to Algorithms*, 3rd ed. MIT Press, 2009.
3. E. Horowitz, S. Sahni and D. Mehta, *Fundamentals of Data Structures in C++*, 2nd ed. Universities Press, 2008.
4. S. Dasgupta, C. H. Papadimitriou and U. Vazirani. *Algorithms* 1st ed. McGraw-Hill, 2006.

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CS1012E LOGIC DESIGN

Pre-requisites: NIL

L	T	P	O	C
3	0	0	6	3

Total Lecture Sessions: 39

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Assess various number systems and apply them in digital design.

CO2: Design logic functions utilising logic gates and programmable logic.

CO3: Design simple digital systems.

Module 1: Number theory and boolean algebra (10 Lecture Sessions)

Number systems and codes, Boolean algebra: postulates and theorems, constants, variables and functions, switching algebra, Boolean functions and logical operations, Karnaugh map: prime cubes, minimum sum of products and product of sums.

Module 2: Design and analysis of combinational logic (10 Lecture Sessions)

Quine-McCluskey algorithm, prime implicant chart, cyclic prime implicant chart, Petrick's method, Combinational Logic: introduction, analysis and design of combinational logic circuits, parallel adders and look-ahead adders, comparators, decoders and encoders, code conversion, multiplexers and demultiplexers, parity generators and checkers

Module 3: Design of digital logic devices (09 Lecture Sessions)

Programmable Logic Devices, ROMs, PALs, PLAs, Introduction to sequential circuits, memory elements, latches

Module 4: Design and analysis of sequential logic (10 Lecture Sessions)

Flip-flops, analysis of sequential circuits, state tables, state diagrams, design of sequential circuits, excitation tables, Mealy and Moore models, registers, shift registers, counters

References:

1. T. L. Floyd and R. P. Jain, *Digital Fundamentals*, 8th ed. Pearson Education, 2006.
2. C. H., Roth Jr. and L. L. Kinney, *Fundamentals of Logic Design*, 6th ed. Cengage Learning, 2009.
3. M. M. Mano and M. D. Ciletti, *Digital Design*, 4th ed. Pearson Education, 2008.
4. B. J. LaMeres, *Introduction to Logic Circuits & Logic Design with Verilog*, 1st ed. Springer, 2017.

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CS1013E DISCRETE STRUCTURES-II

Pre-requisites: NIL

L	T	P	O	C
3	0	0	6	3

Total Lecture Sessions: 39

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Formulate and solve problems in propositional/predicate logic and perform formal deductions

CO2: Apply elementary algebraic and number theoretic concepts to solve modular linear equations and related problems.

CO3: Draw elementary probabilistic inferences and compute mathematical expectation in simple algorithmic and combinatorial problems.

Module 1: Logic, Sets, and Relations (13 Lecture Sessions)

Propositional Logic: formulas and truth assignments, logical consequences and deductions, formula equivalences, inference by contradiction and contraposition, resolution algorithm

Predicate Logic: quantifiers, deduction rules, models and satisfiability.

Module 2: Algebra and Number Theory (13 Lecture Sessions)

Algebra: Elementary properties of groups, rings, integral domains and fields - Lagrange's theorem.

Number Theory and Applications: Euclid's algorithm, complexity analysis - solution to congruences, modular exponentiation and inversion, Euler's theorem and Fermat's theorem, Fermat's test for primality. Chinese remaindering, overview of RSA cryptosystem.

Module 3: Probabilistic Method (13 Lecture Sessions)

Elementary combinatorics - ball- bin problems, discrete probability, conditional probability and probabilistic reasoning - expectation and conditional expectation, probabilistic method, applications to algorithm design - expected and average case analysis.

References:

1. R. P. Grimaldi and B. V. Ramana, *Discrete and Combinatorial Mathematics: An Applied Introduction,* 5th ed. India: Pearson Education, 2006.
2. I. M. Copi, *Symbolic Logic*, 5th ed. India: Pearson Education, 2015.
3. K. Ireland and M. Rosen, *A classical Introduction to Modern Number Theory*, 2nd ed. India: Springer, 1990.
4. L. Lovasz, J. Pelikan and K. Vesztergombi, *Discrete Mathematics: Elementary and Beyond*, 1st ed. Springer, 2003.

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CS1092E PROGRAM DESIGN LABORATORY

Pre-requisites: NIL

L	T	P	O	C
1	0	3	5	3

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Implement fundamental algorithms like sorting and searching.

CO2: Implement basic data structures like list, stack, queue and tree.

CO3: Develop efficient algorithmic solution for a given problem and implement the solution using appropriate data structures.

Syllabus / List of Experiments:

Theory

Review of dynamic memory allocation - use of pointers - review of recursion. File organization.

Practical

1. Iterative and recursive algorithms
2. Linear and Binary search implementations
3. Sorting: Insertion sort, Selection sort and Linear sort implementations
4. Quick sort and Merge sort implementations
5. Stack and Queue implementation using arrays and linked list
6. Binary tree representation, Arithmetic expression to postfix
7. Postfix to expression tree, tree traversal and evaluation
8. Heap sort and priority queue implementation
9. Binary search tree - insert, delete and search.

References:

1. T. H. Cormen, C. E. Leiserson, R. L. Rivest and C. Stein, *Introduction to Algorithms*, 3rd ed. MIT Press, 2009.
2. E. Horowitz, S. Sahni and D. Mehta, *Fundamentals of Data Structures in C++*, 2nd ed. Universities Press, 2008.
3. M. A. Weiss, *Data structures and algorithm analysis in C*, 2nd ed. Addison-Wesley, 1997.

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CS2019E PROFESSIONAL ETHICS

Pre-requisites: NIL

L	T	P	O	C
1	0	0	2	1

Total Lecture Sessions: 13

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Develop a clear understanding of human values and use it as the basis for all the activities.

CO2: Understand and follow the ethical aspects of the engineering profession.

CO3: Align with the Code of Ethics prescribed by ACM/IEEE in all professional activities.

CO4: Assimilate the elements of academic integrity and Honour Codes, and adopt them in all relevant activities.

Module 1: Human Values (3 Lecture Sessions)

Morals, values and ethics – integrity – work ethic – service learning – civic virtue – sharing – honesty – courage – valuing time – cooperation – commitment – empathy – self-confidence – character.

Module 2: Ethics in Professional Practice (6 Lecture Sessions)

Ethics in professional context – ethical basis of engineering activities – ethical responsibilities to consumers and customers – safety and risk – ethics in management of intellectual property – environmental matters and sustainability.

Module 3: Code of Ethics and Academic Integrity (4 Lecture Sessions)

Code of Ethics as prescribed by professional bodies like ACM and IEEE – elements of Academic Integrity: honesty, trust, fairness, respect, responsibility – plagiarism as a violation of academic integrity – Honour Codes: specifying the expected ethical standards from the stakeholders of an organisation.

References:

1. R.S. Naagarazan, *A Textbook on Professional Ethics and Human Values*, 3rd edn., New Age International Pvt. Ltd., 2022.
2. A.F. Bainbridge, *Ethics for Engineers: A Brief Introduction*, CRC Press, 2021.
3. E.G. Seebauer and R.L. Barry, *Fundamentals of Ethics for Scientists and Engineers*, 1st ed., OUP India, 2008.
4. "ACM Code of Ethics and Professional Conduct", acm.org. https://www.acm.org/code-of-ethics, (accessed June 1, 2023).
5. "IEEE Code of Ethics", ieee.org. https://www.ieee.org/about/corporate/governance/p7-8.html, (accessed June 1, 2023).
6. International Center for Academic Integrity, academicintegrity.org. https://academicintegrity.org/, (accessed June 1, 2023).

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Annexure II

Committee for PHD Written Test and Interview

Faculty Volunteers for QP Preparation

Discrete Structures	Data Structures and Algorithms	Computer Programming
• Dr. Renjith P • Dr. Anand Babu	• Dr. A Sudarshan Chakravarthy • Dr. Venkatarami Reddy	• Dr. Joe Cherri Ross • Dr. Manjusha K

Faculty for Coordination of Online Written Test

- Dr. Renjith P
- Dr. Lijiya

Faculty who are planning to take PhD Students for this session:

Name	Stream
Renjith P	Theory
Anand Babu.N.B	Theory
Nirmal Kumar Boran	Systems
Venkatarami Reddy Chintapalli	Systems
Arun Raj Kumar P	Systems
A Sudarshan Chakravarthy	Systems
Amit Praseed	Applied Computing
Joe Cheri Ross	Applied Computing
M. Prabu	Applied Computing
Raju Hazari	Applied Computing
Gopakumar G	Applied Computing
Pranesh Das	Applied Computing
JAYARAJ P B	Applied Computing
pournami p n	Applied Computing
Lijiya A	Applied Computing
Manjusha K	Applied Computing

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Annexure III

Committee for MTech AI and DA Written Test and Interview

1. Written Test:

Dr. Muralikrishnan K, Dr. Lijiya A, Dr. Hiran V Nath, Dr. Anand Babu N B, Dr. Amit Praseed

2. Interview (Selection Committee)

HOD, Programme Coordinator, Dr. Saidalavi Kalady, Dr. Gopakumar G, Dr. Lijiya A, Dr. Jayaraj P B, Dr. Pournami P N, Dr. Anu Mary Chacko, Dr. Jay Prakash, Dr. Pranesh Das

3. Screening and Logistics:

(Screening of applications, Sending Call Letters, Preparation of Results)
Dr. Gopakumar G, Dr. Anu Mary Chacko, Dr, Pranesh Das, CSED office

4. Technical Committee (Eduserver, Network, IMS):

Dr. Saidalavi Kalady, Dr. Pournami P N, Dr. Hiran V Nath, Dr. Jayaraj P B

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