

# Syllabus of UNDERGRADUATE DEGREE COURSE

## Computer Science and Engineering



Rajasthan Technical University, Kota  
Effective from session: 2021 – 2022



# RAJASTHAN TECHNICAL UNIVERSITY, KOTA

## Syllabus

### II Year-III Semester: B.Tech. Computer Science and Engineering

#### 3CS2-01: Advanced Engineering Mathematics

Credit-3  
3L+0T+0P

Max. Marks : 100 (IA:30, ETE:70)  
End Term Exam: 3 Hours

SN	CONTENTS	Hours
1	<b>Random Variables:</b> Discrete and Continuous random variables, Joint distribution, Probability distribution function, conditional distribution. Mathematical Expectations: Moments, Moment Generating Functions, variance and correlation coefficients, Chebyshev's Inequality, Skewness and Kurtosis.	7
2	<b>Binomial distribution</b> , Normal Distribution, Poisson Distribution and their relations, Uniform Distribution, Exponential Distribution. Correlation: Karl Pearson's coefficient, Rank correlation. Curve fitting. Line of Regression.	5
3	<b>Historical development</b> , Engineering Applications of Optimization, Formulation of Design Problems as a Mathematical Programming Problems, Classification of Optimization Problems	8
4	<b>Classical Optimization using Differential Calculus:</b> Single Variable and Multivariable Optimization with & without Constraints, Langrangian theory, Kuhn Tucker conditions	6
5	<b>Linear Programming:</b> Simplex method, Two Phase Method and Duality in Linear Programming. Application of Linear Programming: Transportation and Assignment Problems.	14
<b>TOTAL</b>		<b>40</b>

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## Syllabus

### II Year-III Semester: B.Tech. Computer Science and Engineering

#### 3CS1-02/4CS1-02: Technical Communication

Credit-2  
2L+0T+0P

Max. Marks : 100 (IA:30, ETE:70)  
End Term Exam: 2 Hours

SN	CONTENTS	Hours
1	<b>Introduction to Technical Communication-</b> Definition of technical communication, Aspects of technical communication, forms of technical communication, importance of technical communication, technical communication skills (Listening, speaking, writing, reading writing), linguistic ability, style in technical communication.	4
2	<b>Comprehension of Technical Materials/Texts and Information Design &amp; development-</b> Reading of technical texts, Reading and comprehending instructions and technical manuals, Interpreting and summarizing technical texts, Note-making. Introduction of different kinds of technical documents, Information collection, factors affecting information and document design, Strategies for organization, Information design and writing for print and online media.	6
3	<b>Technical Writing, Grammar and Editing-</b> Technical writing process, forms of technical discourse, Writing, drafts and revising, Basics of grammar, common error in writing and speaking, Study of advanced grammar, Editing strategies to achieve appropriate technical style, Introduction to advanced technical communication. Planning, drafting and writing Official Notes, Letters, E-mail, Resume, Job Application, Minutes of Meetings.	8
4	<b>Advanced Technical Writing-</b> Technical Reports, types of technical reports, Characteristics and formats and structure of technical reports. Technical Project Proposals, types of technical proposals, Characteristics and formats and structure of technical proposals. Technical Articles, types of technical articles, Writing strategies, structure and formats of technical articles.	8
<b>TOTAL</b>		<b>26</b>

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## Syllabus

### II Year-III Semester: B.Tech. Computer Science and Engineering

#### 3CS3-04: Digital Electronics

Credit-3  
3L+0T+0P

Max. Marks : 100 (IA:30, ETE:70)  
End Term Exam: 3 Hours

SN	CONTENTS	Hours
1	<b>Fundamental concepts:</b> Number systems and codes, Basic logic Gates and Boolean algebra: Sign & magnitude representation, Fixed point representation, complement notation, various codes & arithmetic in different codes & their inter conversion. Features of logic algebra, postulates of Boolean algebra. Theorems of Boolean algebra.	8
2	<b>Minimization Techniques and Logic Gates:</b> Principle of Duality - Boolean expression - Minimization of Boolean expressions — Minterm - Maxterm - Sum of Products (SOP) – Product of Sums (POS) – Karnaugh map Minimization – Don't care conditions – Quine - McCluskey method of minimization.	8
3	<b>Digital Logic Gate Characteristics:</b> TTL logic gate characteristics. Theory & operation of TTL NAND gate circuitry. Open collector TTL. Three state output logic. TTL subfamilies. MOS& CMOS logic families. Realization of logic gates in RTL, DTL, ECL, C-MOS & MOSFET.	8
4	<b>Combinational Circuits:</b> Combinational logic circuit design, adder, subtractor, BCD adder encoder, decoder, BCD to 7-segment decoder, multiplexer demultiplexer.	8
5	<b>Sequential Circuits:</b> Latches, Flip-flops - SR, JK, D, T, and Master-Slave Characteristic table and equation, counters and their design, Synchronous counters – Synchronous Up/Down counters – Programmable counters – State table and state transition diagram ,sequential circuits design methodology. Registers –shift registers.	8
<b>TOTAL</b>		<b>40</b>

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## Syllabus

### II Year-III Semester: B.Tech. Computer Science and Engineering

#### 3CS4-05: Data Structures and Algorithms

Credit-3  
3L+0T+0P

Max. Marks: 100 (IA:30, ETE:70)  
End Term Exam: 3 Hours

SN	CONTENTS	Hours
1	Stacks: Basic Stack Operations, Representation of a Stack using Static Array and Dynamic Array, Multiple stack implementation using single array, Stack Applications: Reversing list, Factorial Calculation, Infix to postfix Transformation, Evaluating Arithmetic Expressions and Towers of Hanoi.	8
2	Queues: Basic Queue Operations, Representation of a Queue using array, Implementation of Queue Operations using Stack, Applications of Queues- Round Robin Algorithm. Circular Queues, DeQueue Priority Queues. Linked Lists: Introduction, single linked list, representation of a linked list in memory, Different Operations on a Single linked list, Reversing a single linked list, Advantages and disadvantages of single linked list, circular linked list, double linked list and Header linked list.	10
3	Searching Techniques: Sequential and binary search. Sorting Techniques: Basic concepts, Sorting by: bubble sort, Insertion sort, selection sort, quick sort, heap sort, merge sort, radix sort and counting sorting algorithms.	7
4	Trees: Definition of tree, Properties of tree, Binary Tree, Representation of Binary trees using arrays and linked lists, Operations on a Binary Tree, Binary Tree Traversals (recursive), Binary search tree, B-tree, B+ tree, AVL tree, Threaded binary tree.	7
5	Graphs: Basic concepts, Different representations of Graphs, Graph Traversals (BFS & DFS), Minimum Spanning Tree(Prims & Kruskal), Dijkstra's shortest path algorithms. Hashing: Hash function, Address calculation techniques, Common hashing functions, Collision resolution: Linear and Quadratic probing, Double hashing.	8
<b>TOTAL</b>		<b>40</b>

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## Syllabus

### II Year-III Semester: B.Tech. Computer Science and Engineering

#### 3CS4-06: Object Oriented Programming

Credit-3  
3L+0T+0P

Max. Marks : 100 (IA:30, ETE:70)  
End Term Exam: 3 Hours

SN	CONTENTS	Hours
1	Introduction to different programming paradigm, characteristics of OOP, Class, Object, data member, member function, structures in C++, different access specifiers, defining member function inside and outside class, array of objects.	8
2	Concept of reference, dynamic memory allocation using new and delete operators, inline functions, function overloading, function with default arguments, constructors and destructors, friend function and classes, using this pointer.	8
3	Inheritance, types of inheritance, multiple inheritance, virtual base class, function overriding, abstract class and pure virtual function	9
4	Constant data member and member function, static data member and member function, polymorphism, operator overloading, dynamic binding and virtual function	9
5	Exception handling, Template, Stream class, File handling.	6
TOTAL		40

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## Syllabus

### II Year-III Semester: B.Tech. Computer Science and Engineering

#### 3CS4-07: Software Engineering

Credit-3  
3L+0T+0P

Max. Marks : 100 (IA:30, ETE:70)  
End Term Exam: 3 Hours

SN	CONTENTS	Hours
1	Introduction, software life-cycle models, software requirements specification, formal requirements specification, verification and validation.	8
2	Software Project Management: Objectives, Resources and their estimation, LOC and FP estimation, effort estimation, COCOMO estimation model, risk analysis, software project scheduling.	8
3	Requirement Analysis: Requirement analysis tasks, Analysis principles. Software prototyping and specification data dictionary, Finite State Machine (FSM) models. Structured Analysis: Data and control flow diagrams, control and process specification behavioral modeling	8
4	Software Design: Design fundamentals, Effective modular design: Data architectural and procedural design, design documentation.	8
5	Object Oriented Analysis: Object oriented Analysis Modeling, Data modeling. Object Oriented Design: OOD concepts, Class and object relationships, object modularization, Introduction to Unified Modeling Language	8
TOTAL		40

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