



1.2.2 - Number of Add on /Certificate programs offered during the year

Syllabus of Courses

S. No.	Name of Course
1	AutoCAD
2	ANSYS
3	SolidWorks
4	CRT
5	C Programming
6	Data Structure & Algorithms
7	C++ Programming
8	Data Base Management System
9	Python



Auto-Cad

SESSION	TOPIC COVERED
1	About CADD CENTRE, Introduction of Engineering Drawings, Views, Introduction of AutoCAD, History, GUI, Units, Limits, Line, Circle, Erase, Trim, Extend
2	File Management- New, Open, Save, Close, Exit, Arc, Ellipse, Rectangle, Polygon, Move, Copy, Mirror, Offset.
3	CO-Ordinate System- Absolute, Relative- Rectangular, Polar, Zoom, Pan, Regenrate.
4	Array- Rectangular, Polar, Path, Array Edit
5	Ray Line, Construction Line, Multiline, Polyline, Spline
6	Rotate, Scale, Stretch, Lengthen, Isometric View
7	Hatch, Gradient, Hatched, Boundary, Region, Wipeout, Revision Cloud
8	Fillet, chamfer, Break, Join, Explode, Object Properties- color, Linetype, Itscale, line weight
9	Block- Make, Save, Insert Block Editor, Table, Text
10	Helix, Donut, Match Properties
11	Dimensions- Linear, Angular, aligned, radius, diameter, jogged, mleader, ordinate, baseline, continue, dim space, dim break, tolerance, centre mark, inspection, oblique, align text
12	Dimension Style- Modify, Override, Update, Reassociate Dimension.
13	Parametric Constraint, Geometric Constraint, Auto Constraint, Delete Constraint. Dimension Constraint, Dynamic Constraint, Constraint Bar. Layer tools, Layer State manager





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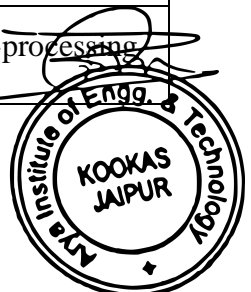
SESSION	TOPIC COVERED
14	Tools- Workspace, tool Palettes, Dynamic Block, Clear Screen, Command Line. Quick Select, Calculator, Draw Order, Isolate, Inquiry, DipalyImage. Group, Ungroup, Option
15	External Refrence, Xbind, Xopen, PDF Underlay, Raster Image, Hyperlink, OLE Object. Field, Update Filed
16	Edit- Copy, Copy with base point, copy link, paste, paste as block, paste Special, Paste to Orignal Co-ordinate. Import, Export, Etansmit, Dwg Convert,
17	Page Setup, Plot, Publish,
18	View- Zoom, Pan, Orbit, View Port.
19	Introduction Of 3D, 3D Views, Visual Style, Modeling- Box, Polysolid, Cylinder, Cone, Sphere, Pyramid, Wedge, Tours.
20	Extrude, Revolve, Sweep, Loft, Union, Subtract, Intersect, Presspull
21	Solid Editing-Face, Edge, Body
22	3D Opreations- move, rotate, align, mirror, array, Slice, Extract Edges, Extract Isolines,
23	Material Browser, Render





ANSYS

SESSION	TOPIC COVERED
1	Introduction to CAE, Boundary conditions, Elements and Element Shapes, General procedure to conduct FEA
2	Key Assumptions in FEA, Types of Engineering Analysis, Important terms and definitions, Classification of materials
3	System requirements, Starting ANSYS Workbench 14.0, ANSYS Workbench 14.0 GUI, Working on a Project
4	Units in ANSYS Workbench, ANSYS Workbench File format, Changing the unit system, Components of the system
5	Introduction to Modeling, Introduction to Design Modeler Window, Illustration1: I-section, Illustration 2: Spring Plate, Illustration 3: Clamp
6	Minor Project
7	Introduction, Extrusion, Revolution, Sweep, Sketching,
8	Introduction, Adding a hole, Adding a round, Adding a chamfer
9	Patterns, Assembly, Alternate solid modeler
10	Overview, Introduction, Parameters, Other cad systems, Surface and Line models,
11	Introduction to Engineering Workspace, Creating and Adding Materials, Assigning Material to the Clamp, Assigning Material to the Assembly Material to the Beam, Assigning
12	Practice
13	Introduction, Meshing of Plate with Holes, Generating the mesh, optimize the model and generating the local mesh (illustration through three examples), Assembly Meshing.
14	Introduction to Static Structural Analysis, Pre-processing, Solution, Post-processing





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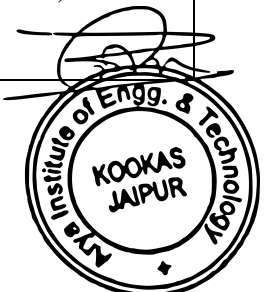
SESSION	TOPIC COVERED
15	Static Structural Analysis of: Cantilever Beam, Plate with a central circular holes, Plate with a square slot, Pressure vessel, Bracket, Clevis assembly
16	Introduction, Static loadings- ductile materials, Static loadings- Brittle materials, Fatigue loadingductile material,
17	Mini Project
18	Surface and line model, Introduction, Sheet with circular hole-plane stress, Pressure
19	Natural Frequencies, Introduction, Performing the Modal analysis, Specifying analysis settings, Modal analysis : Cantilever beam, Simply supported beam, Chime, Connecting rod, Motor cover, Assembly
20	Practice
21	Introduction, Buckling analysis of Fixed free column (flag pole) Pinned-pinned column, Built-up structure
22	Thermal Analysis, Important terms used in thermal analysis, Types of thermal analysis, Steady state thermal analysis of Car Disk Brake Rotor, Heat sink, Transient thermal analysis of Piston
23	Thermal stress Introduction, Thermal stress-uniform, temperature change, Thermal stress in a cylinder
24	Project





SolidWorks

SESSION	TOPIC COVERED
1	Introduction to CAD, CAE Features of SolidWorks,
2	SolidWorks Graphical User Interface - Feature manager design tree, Callouts, Handles, Confirmation corner, mouse buttons, keyboard shortcuts, Command Manager,
3	Sketch Tools - Fillet, Chamfer, Offset, Convert entities, Trim, Extend, Split, Jog, Mirror, Dynamic Mirror, Move, Copy, Rotate, Scale, Stretch, Sketch pattern
4	Creating Extrude features – Direction1, Direction2, From option, Thin feature, Applying draft, Selecting contours
5	Creating Revolve features – Selecting Axis, Thin features, Selecting contours
6	Creating Loft features – Selecting Profiles, Guide curves, Start/End Constraints, Centerline parameters, Sketch tools, Close loft.
7	Creating curves - Split curve, Project curve, Composite curve, Curve through points, Helix and Spiral
8	Creating Fillet features
9	Inserting Hole types
10	Creating Chamfer
11	Creating Shell
12	Creating Rib
13	Creating Pattern - Linear pattern, Circular pattern, Sketch driven pattern, Curve driven pattern, Table driven pattern, Fill pattern, mirror
14	Environment & Utilities - Working with views and manipulating views, Trouble shooting





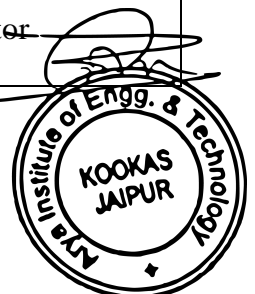
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SESSION	TOPIC COVERED
15	Assembly Modeling Tools
16	Introduction to Assembly Modeling & Approaches – Top down and Bottom up approach
17	Applying Standard Mates- Coincident, Parallel, Perpendicular, Tangent, Concentric, Lock, Distance, Angle
18	Applying Mechanical Mates – Cam, Hinge, Gear, Rack Pinion, Screw, Universal Joint. Creating Pattern - Assembly Pattern, Mirror
19	Manipulating Components - Rotating Components, Move Components, Detecting Interference
20	Creating Explode Views
21	Surface Modeling tools
22	Creating Extrude, Revolve, Swept, loft, Boundary surface.
23	Inserting Planar Surface, Offset Surface, Radiate Surface
24	Generating Drawing Views
25	Introduction To Angle Of Projection
26	Extending a surface, Surface fill, Ruled Surface, Trimming Surface, Replace Face
27	Creating Dimensions – Smart, Horizontal, Vertical, Baseline, Ordinate, Horizontal Ordinate, Vertical Ordinate Chamfer, Attach Dimensions, Align Collinear/Radial, Align Parallel/Concentric, Model Dimensions, Spell check
28	Sheet Metal Design
29	Concepts in Sheet metal design bend allowance bend deduction, K-factor





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SESSION	TOPIC COVERED
30	Inserting Base Flange, Sheet Metal Tab, Edge Flange, Miter Flange, Hem, Jog.
31	Inserting Cross Break, Welded Corner.
32	Adding Corner Trim, Lofted Trim
33	Conversion Of Solid Body To Sheet Metal.
34	Introduction to Weldment, 3D sketch, How to create user defined profile for structural member? How to insert structural member? How to apply gusset and fillet bead?





Campus Recruitment training (CRT)

O Verbal Ability Lecture Plan	
Lecture	Topic
1	Introduction to English related questions in a Campus Recruitment Test
2	Basic Concepts of Roots and Words, prefixes and suffixes
3	Synonyms and Antonyms, Analogies, Solving questions on "Odd Man Out"
4	Parts of Speech Part-1
5	Parts of Speech Part-2
6	Spotting Errors and Sentence Correction Part-1
7	Reading & Comprehension (RC) -- Tips for solving questions related to Passages -- Part-1
8	Ologies and Ographies and Idioms & Phrases
9	Ordering of Sentences (Para Jumbling)
10	Critical Reasoning-argument, conclusion, assumption, cause and effect, judgment
11	Spotting Errors and Sentence Correction Part-2
12	Reading & Comprehension (RC) -- Part-2
13	Spotting Errors and Sentence Correction Part-3 and Remaining part of Critical Reasoning





Soft Skills (Personality Development, Resume Building, Behavioral Skills and GD-PI Preparation) Lecture Plan

Lecture	Topic
1	Tips for writing effective resume
2	Reviewing the Resumes of the Students and providing feedback -- Session-1
3	Grooming & Behavioral Skills and their importance in GD & PI.
4	4 Preparation for GD --Part-1-- Tips for Participating effectively in a GD
5	SWOT Analysis overview
6	Reviewing the SWOT Analysis of students and providing feedback
7	Preparation for GD --Part-2 -- Overview of Most Common GD Topics
8	Preparation for PI-Part-1 --Preparation of Self Introduction and Review and Feedback on Self Introduction
9	Preparation for PI-Part-2 -- Preparing for FAQ's in a PI
10	Email Writing and Psychometric Test Preparation





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QA (Quantitative Aptitude) and LR (Logical Reasoning) Lecture Plan	
Lecture	Topic
1	Developing mental calculation and Time and Work and Pipes and Cistern
2	Simple & Compound Interest and Average
3	Percentage and Discounts and Profit & Loss
4	Ratio, Proportion, Mixtures and Partnership
5	Time and Distance, Train and Boats and Streams
6	Basics of Permutation & Combination and Probability.
7	Menstruation, Clock, Calendar and short tricks for faster calculation.
8	Basics of Geometry and Picture Reasoning
9	HCF-LCM, Decimal Fractions and Logarithms
10	Ages, Stocks and Shares and Races and Games
11	Data Interpretation (DI)-- Tables, Bar, Pie, Line Charts and other innovative set of Problems
12	Data Sufficiency (DS) - Tips for problem solving with practice exercises
13	Number and Alphabetical Series, Number and Missing Letter Puzzles and Artificial Language and Analogies
14	Syllogism and Blood Relationship
15	Miscellaneous Puzzles (Selected problems from the following books: George Summers and Shakuntala Devi) and Seating Arrangement
16	Dice, Cube and Cuboid, Problems (Building Logical Relationships and deductions) and Crypt Arithmetic



C Programming

1. C Basics

- History of C
- Characteristics of C
- C Program Structure
- Variables
 - Defining Global Variables
 - Printing Out and Inputting Variables
- Constants
- Arithmetic Operations
- Comparison Operators
- Logical Operators
- Order of Precedence

2. Conditionals

- The if statement
- The else operator
- The switch statement

3. Looping and Iteration

- The for statement
- The while statement
- The do-while statement
- break and continue statement

4. Arrays and Strings

- Single and Multi-dimensional Arrays
- Strings

5. Functions

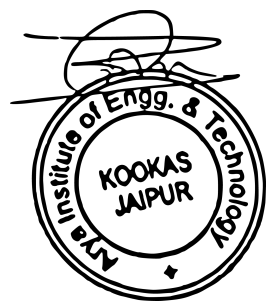
- void functions
- Functions and Arrays
- Function Prototyping

6. Further Data Types

- Structures
 - Defining New Data Types
- Unions
- Coercion or Type-Casting
- Enumerated Types
- Static Variables

7. Pointers

- What is a Pointer?
- Pointer and Functions
- Pointers and Arrays
- Arrays of Pointers
- Multidimensional arrays and pointers
- Static Initialization of Pointer Arrays
- Pointers and Structures
- Common Pointer Pitfalls
 - Not assigning a pointer to memory address before using it
 - Illegal indirection



Data Structure & Algorithms

1. STACK

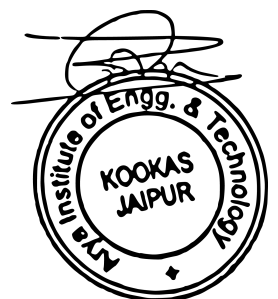
1. Definitions of Data, Info, Data Structure & Algorithm
2. Types/Classification of Data Structures
3. Operations on the Data Structures
4. Characteristics of Algorithm
5. What is Array?
6. Stack: Basic stack operation
7. Representation of a Stack using Static Array & Dynamic Array
8. Multiple stack implementation using single array
9. Stack Applications: Reversing list, Factorial Calculation,
10. Infix to postfix Transformation,
11. Infix to prefix Transformation,
12. postfix to prefix Transformation
13. Evaluating Arithmetic Expressions
14. Towers of Hanoi.

2. Queue:

15. Queue, Basic QUEUE Operations
16. Representation of a Queue using array, Implementation of Queue using stack
17. Applications of Queue-Round Robin Algorithm
18. Circular Queue-Insertion& Deletion in Circular Queue
19. DeQueue-Insertion and Deletion in Dequeue
20. Priority Queue, Representation of Priority Queue, Definition of Linked List
21. Singly Linked List and its representation in memory
22. Different Operations of linked list-Insertion in linked list
23. Deletion in linked list
24. Reversing a linked list, Advantages and disadvantages of linked list
25. Circular linked list, Doubly linked list, Header linked list

3. Searching and Sorting

26. Searching Techniques: Sequential and binary search.
27. Sorting Techniques: Basic concepts, Sorting by: bubble sort



- 28. Insertion sort
- 29. Selection sort
- 30. Quick sort
- 31. Heap sort
- 32. Merge sort
- 33. Radix sort

4. Tree

- 34. Definition of Trees, Binary Tree, Types of Binary Tree Based on distribution of nodes
- 35. Representation of Binary tree(linked list & array)
- 36. Traversing and insertion of Binary Tree
- 37. Preorder Traversal of a Binary Tree, Inorder Traversal of a Binary Tree, Post order Traversal of a Binary Tree
- 38. Binary Search Tree, Searching in BST
- 39. Insertion & Deletion of node in BST
- 40. AVL Tree, Rotations in AVL Tree, Insertion in AVL Tree
- 41. Deletion in AVL Tree
- 42. Threaded Binary Tree, One way Threading, Two way Threading
- 43. B-Tree
- 44. B+ Tree

5. Graph

- 45. Definition of Graph, Graph Terminology, Representation of Graph
- 46. Traversing of Graph(BFS and DFS)
- 47. Spanning Tree-Kruskal's Algorithm
- 48. Prims Algorithm
- 49. Shortest Path Problem-Dijkstra Algorithm



C++ Programming

Introduction

- 1 Introduction to different programming paradigms
- 2 A brief of Characteristics of OOP, class , data members .
- 3 An introduction to Access specifiers in C++
- 4 Review of Structures in C, Structure as user define data type, Accessing member of structure using structure variable
- 5 Pointer to structure
- 6 Passing structure to function (call by value and call by reference)

Introduction to Programming Paradigms, Basics of C++

- 7 Characteristics of OOP- Data hiding, Encapsulation, data security.
- 8 Process Oriented vs Object Oriented, Concept of Object and Class
- 9 Difference between Structure and Class, Structure of C++ Program,
- 10 Introduction to defining the function inside and outside the class, cin and cout
- 11 Keyword using, declaring class, creating object
- 12 Constructor and Destructor Function
- 13 Initializing member values with and without use of constructors, simple programs to access & manipulate data members
- 14 Dangers of returning reference to a private data member, constant objects and members function
- 15 friend functions
- 16 friend classes, Composition of classes
- 17 using this pointer creating and destroying objects dynamically using new and delete operators.
- 18 static class members
- 19 container classes
- 20 Iterators, proxy classes.

Operator Overloading

- 21 Fundamentals, Restrictions, Basic Examples
- 22 Operator functions as class members, Binary operator overloading
- 23 Operator functions as friend function, Binary operator overloading
- 24 Operator functions as class members, Unary operator overloading



25 Operator functions as friend function, Unary operator overloading

26 Converting between types

Inheritance

27 Base classes and derived classes, protected members, relationship between base class and derived classes constructors and destructors in derived classes

28 public, private and protected inheritance

29 relationship among objects in an inheritance hierarchy, Single level Inheritance and Multilevel Inheritance

30 virtual functions and dynamic binding, abstract classes

31 abstract classes, virtual destructor

Multiple Inheritance, Generic Programming, Exception Handling

32 Multiple Inheritance with example

33 virtual base classes, pointer to classes and class member

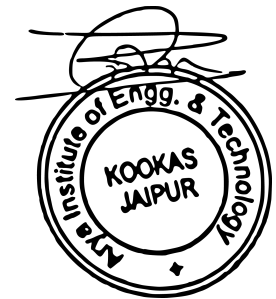
34 Function Templates

35 Class Templates

36 Exception Handling

37 Stream class

38 File handling in C++



Data Base Management System

INTRODUCTION TO DATABASE SYSTEMS

- 1 Overview and History of DBMS
- 2 File System v/s DBMS .Advantage of DBMS
- 3 Describing and Storing Data in a in DBMS
- 4 Database Languages, Transaction Management
- 5 Storage Management, Database Users
- 6 Structure of a DBMS

ENTITY RELATIONSHIP MODEL

- 7 Overview of Data Design Entities,
- 8 Attributes and Entity Sets, Relationship and Relationship Sets
- 9 Features of the ER Model- Key Constraints,
- 10 Participation Constraints, Weak Entities, Class Hierarchies
- 11 Aggregation, Conceptual Data Base
- 12 Design with ER Model-Entity v/s Attribute,

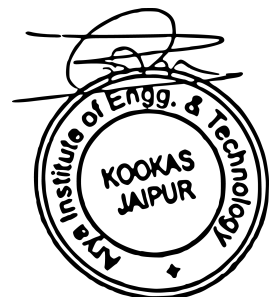
RELATIONSHIP ALGEBRA AND CALCULUS

- 13 Introduction and concept of Relational data model
- 14 Basic operations of Relational Algebra
- 15 Set operations and Additional relational algebra operations
- 16 Join operations of relational algebra

SQL

- 17 The Forms of a Basic SQL
- 18 Query
- 19 Joining tables and set operators
- 20 Union, Intersection and Except

SCHEMA REFINEMENT AND NORMAL FORMS



- 21 Introductions to Schema Refinement
- 22 Functional Dependencies,
- 23 first, second and third Normal form
- 24 Boyce-Codd Normal Forms
- 25 Normalization-Decomposition into BCNF Decomposition into 3-NF

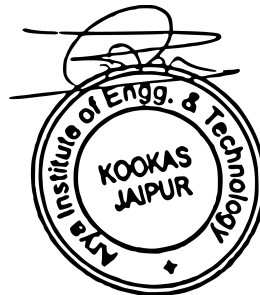
Transaction Processing:

- 26 Introduction-Transaction State, Transaction properties
- 27 Concurrent Executions
- 28 Need of Serializability
- 29 Concurrency Control: Implementation of Concurrency
- 30 Lock-based protocols
- 31 Timestamp-based protocols

Database Failure and Recovery

- 32 Database Failures
- 32 Recovery Schemes
- 34 Shadow Paging Log-based Recovery

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Python

Python Programming Basics for Beginners

- 1 Install Python IDE — How to Install Python on Windows [Pycharm IDE]
- 2 Python Hello World — Create Your First Python Program
- 3 Python print() Function — How to Print in Python with Examples
- 4 Python Variables — How to Define/Declare String Variable Types

Python Data Structure

- 1 **Python TUPLE** — Pack, Unpack, Compare, Slicing, Delete, Key
- 2 **Python Dictionary(Dict)** — Update, Cmp, Len, Sort, Copy, Items, str Example
- 3 **Python Dictionary Append** — How to Add Key/Value Pair
- 4 **Python Operators** — Arithmetic, Logical, Comparison, Assignment, Bitwise & Precedence
- 5 **Python Arrays** — Create, Reverse, Pop with Python Array Examples

Python Conditional Loops

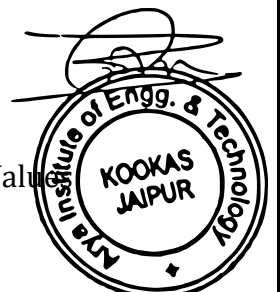
- 1 **Python Conditional Statements** — IF...Else, ELIF & Switch Case
- 2 **Python For & While Loops** — Enumerate, Break, Continue Statement
- 3 **Python break, continue, pass statements** — Learn with Example
- 4 **Python OOPs** — Class, Object, Inheritance and Constructor with Example

Python Strings

- 1 **Python Strings** — Replace, Join, Split, Reverse, Uppercase & Lowercase
- 2 **Python String strip() Function** — What is, Examples of strip() Function
- 3 **Python String count()** — Python String count() Method with Examples
- 4 **Python String format()** — What is, How works & Examples
- 5 **Python String len() Method** — Python string length | len() method Example
- 6 **Python String find() Method** — Python string.find() Method With Examples

Python Functions

- 1 **Python Main Function & Method Example** — Understand __main__
- 2 **Python Functions Examples** — Call, Indentation, Arguments & Return Value



- 3 **Lambda Functions in Python** — Python Lambda Functions with EXAMPLES
- 4 **Python abs() Function** — Absolute Value Examples
- 5 **Python round() Function** — What is the round() function in Python?
- 6 **Python range() Function** — Float, List, For loop Examples
- 7 **Python map() Function** — What is the map() function in Python? (With Examples)
- 8 **Python Timeit() with Examples** — What is Python Timeit()?
- 9 **Yield in Python Tutorial** — Generator & Yield vs Return Example
- 10 **Python Queue** — FIFO, LIFO Example
- 11 **Python Counter in Collections** — What is, Use & Examples
- 12 **Enumerate() Function in Python** — Loop, Tuple, String (Example)
- 13 **Python time.sleep()** — Add Delay to Your Code (Example)
- 14 **type() and isinstance() in Python** — What is, Syntax & Examples
- 15 **Python New Line** — How to Print WITHOUT Newline in Python

Python List

- 1 **Python List** — Comprehension, Append, Sort, Length, Reverse EXAMPLES
- 2 **Python Average** — Find AVERAGE of a List in Python with Example
- 3 **Python List count()** — Python List count() method with Examples
- 4 **Python remove Duplicates from a List** — Using Different Methods
- 5 **Remove element from a Python LIST** — [clear, pop, remove, del]
- 6 **Python List index()** — Python List index() method with Examples

