2018-19

VALUE ADDED COURSES

SHIVALIK
COLLEGE OF ENGINEERING

VALUE ADDED COURSES
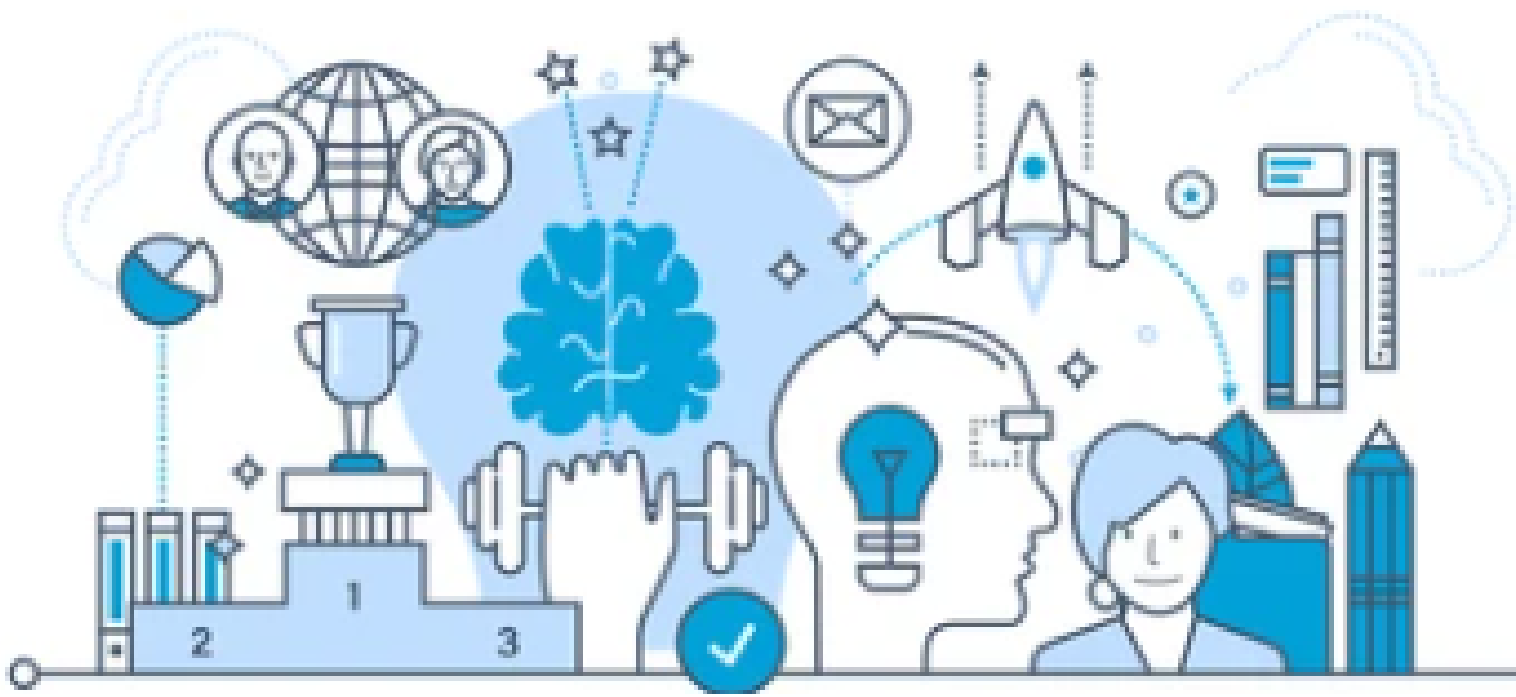
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1.Soft skill Grammer & Language

Course Code : VACAS01   **Total Duration : 45 Hrs**

COURSE OBJECTIVE:

The objective is to make students aware about the nitty-gritties of English as a language and also developing a vision about the pre-requisites of soft skills in corporate in general .

Course Content

Chapter 1

Introduction of Soft skills , Personality and its type Planning & Goal Setting

Chapter 2

Body Language,Behaviour & Its Type, Grooming – men and women, Presentation Skills,Listening

Chapter 3

Perception & Attitude, Public Speaking, Greeting, Etiquette, Thought Process, Introducing oneself

Chapter 4

Parts of Speech,Tense, Sentence Structure

Reference Books:

1. Soft Skills – Enhancing Employability: Connecting Campus with Corporate" by M S Rao
2. Personality Development and Soft Skills (Old Edition)" by Barun K Mitra

2.Logical reasoning

Course Code :VACAS02   **Total Duration : 40Hrs**

COURSE OBJECTIVE:

Developing a logical bent of mind so that they can approach the things in a more analytical way as this skill is usually tested in all spheres.

Chapter 1

Calendar , Odd One Out , Analogy Figure Counting ,Missing Numbers

Chapter 2

Number Series, Alphabet Series, Direction Sense

Chapter 3

Blood Relation, Cubes and Dices, Coding Decoding, Clocks

Chapter 4

Inequality, Ranking , Test , Syllogism Venn Diagram , Sitting Arrangement

Chapter 5

Input Output Data, Arrangement, Cryptoarithmetic,Visual Reasoning Decision Making ,Game Based Aptitude

Reference Books:

1. A Modern Approach To Verbal & Non-Verbal Reasoning by R.S. Aggarwal
2. A New Approach to Reasoning Verbal & Non-Verbal Book by B.S. Sijwalii and Indu Sijwali

3. Soft skill- Communication Training

Course Code :VACAS03   **Total Duration : 45Hrs**

COURSE OBJECTIVE:

Going one step ahead in developing grammatical skills so that students can appreciate the importance of communication as a stream.

Chapter 1

Public Speaking, Ethics and Values, Body Language, Positive Attitude

Chapter 2

Intrapersonal & Interpersonal Skills, Decision Making, Picture Perception, Communication (Verbal, Written, Business), ,Team Work

Chapter 3

Gerunds, Infinitives, Modals, Conjunction, Participles, Quantifiers, Preposition

Chapter 4

Emotional Intelligence Skills, Life Skills, Presentation on Soft Skills

Reference Books:

1. Soft Skills 3rd Edition: Personality Development for Life Success
   by Prashant Sharma

2.Personality Development Handbook Paperback – 25 January 2021
   by D. P. Sabharwal

4. Aptitude Quant

Course Code :VACAS04   **Total Duration : 30Hrs**

COURSE OBJECTIVE:
Developing skills like quick mathematical decision making as students are expected to solve questions in a very limited time span in actual placements.

Chapter 1

Average, Time and Work(Time and Work+Chain Rule+Pipes and Cisterns), Percentage, Profit and Loss, Ratio and Proportion, Partnership

Chapter 2

Mixture and Alligation, Time Speed and Distance(TSD+Problemson Trains+Races and Games+Boats ans Streams), Simple Interest, Compound Interest

Chapter 3

Algebra(Problems on Ages, AP GP, Sum(natural numbers,square,cube cube,even,odd), Linear Equation, Quadratic Equation), Permutation and Combination

Chapter 4

Divisibility Test, Cyclicity and Remainders, HCF and LCM, Surds and Indices, Set Theory, DI

Chapter 5

Elementry Stats,(Mean/Median/Mode), Trigonometry(Height and Distance), Mensuration, Geometry, Data Sufficiency

Reference Books:

1. Quantitative Aptitude for Competitive Examinations by R S Aggarwal
2. Quantitative Aptitude for CAT by Arun Shrama

5.Soft skill Grammar & Language

Course Code :VACAS05   **Total Duration : 30Hrs**

COURSE OBJECTIVE:
To hone the critical aspect of things and also develop their presentation ability so that they understand the essence of spontaneity and organized structured way to present their thoughts

Chapter 1

Writing Ability   , Email Writing & Etiquette, Extempore, PI Theory

Chapter 2

Group Discussion , Resume Writing   , Corporate Expectations   ,

Careers After UG, (With special ref. to modern world) , Work Culture

Chapter 3

Critical Reasoning : Strengthen, Critical Reasoning : Weaken, Critical

Reasoning : Paradox, Critical Reasoning : Inference

Chapter 4

Reading Comprehension, Para Jumble, Cloze Test

Refrences Books:

1. Soft Skills – Enhancing Employability: Connecting Campus with
   Corporate" by M S Rao

2. Personality Development and Soft Skills (Old Edition)" by Barun K
   Mitra

6. Aptitude-Company specific training

Course Code :VACAS06   **Total Duration : 30Hrs**

COURSE OBJECTIVE:

A recap of whatever we studied in the preceding semesters in Quant and Reasoning as per the requirement of companies

- Capsule Course Revision Of Entire Syllabus
- Company Specific Test

Chapter 1

Number System, LCM & HCF,Numbers & Decimal Fractions, Divisibility, Area, Shapes & Perimeter,Geometry,Averages, Equations, Ages,

Chapter 2

Probability, Percentages , Allegations and Mixtures, Ratios, Proportion, Work and Time, Speed Time and Distance

Chapter 3

Calendar , Odd One Out , Analogy Figure Counting ,Missing Numbers ,Number Series, Alphabet Series, Direction Sense

Reference books:

1. Quantitative Aptitude for Competitive Examinations by R S Aggarwal
2. A Modern Approach To Verbal & Non-Verbal Reasoning by R.S. Aggarwal

7. Soft skill –Personality development program

Course Code :VACAS07   **Total Duration : 30Hrs**

COURSE OBJECTIVE:

A recap of whatever we studied in the preceding semesters in Verbal and Soft Skills as per the requirement of companies.

- Capsule Course Revision Of Entire Syllabus
- Company Specific Test

Chapter 1 Body Language: Gestures; Facial Expressions; Importance of Eye Contact, Body Movement,

Chapter 2 Role of Formal Attire, Introduction to Grammar, Focus of Reading & Listening; Parts of Speech; Tense; Conjunction; Phrasal Verbs; Idioms,

Chapter3 Group Discussions: Tips for Success in GD's; How to Start, Lead and Conclude A GD; Types of GD; Do's & Don'ts and Mistakes to Avoid during a GD,

Chapter 4 Communication Skills:
Verbal Communication; Written Communication; Non Verbal Communication; Role of Communication in Business & Relationships; Barriers to Effective Communication,

Reference books:
1. Soft Skills 3rd Edition: Personality Development for Life Success by Prashant Sharma
2. Personality Development Handbook by D. P. Sabharwal

8. HUMAN VALUES

Course Code :VACAS08   **Total Duration: 35Hrs**

COURSE OBJECTIVE:

To develop the ability to distinguish between what is of value and what is superficial in life. • To develop the ability to face difficult situations in life boldly and resolve them confidently. • To enable students to progress from discrimination to commitment.

Chapter 1: Introduction to Value Education

• Introduction to Kotlin Programming Language

• Classes and Objects in Kotlin

• Functions and Lambdas in Kotlin

• Advanced Concepts in Kotlin

• Java Versus Kotlin

Chapter 2: Harmony in the Human Being

• Human Being is more than just the Body.

• Harmony of the Self ('I') with the Body.

• Understanding Myself as Co-existence of the Self and the Body.

• Understanding Needs of the Self and the needs of the Body.

• Understanding the activities in the Self and the activities in the Body

Chapter 3: Harmony in the Family and Society and Harmony in the Nature

• Comprehensive Human Goal: The Five Dimensions of Human Endeavour.

• Harmony in Nature: The Four Orders in Nature.

• The Holistic Perception of Harmony in Existence.

Chapter 4: Social Ethics

• The Basics for Ethical Human Conduct.

• Defects in Ethical Human Conduct.

• Holistic Alternative and Universal Order.

• Universal Human Order and Ethical Conduct.

REFERENCE BOOKS:

1.Corliss Lamont, Philosophy of Humanism

2.Gaur. R.R. , Sangal. R, Bagaria. G.P, A Foundation Course in Value Education, Excel Books, 2009.

9.PROFESSIONAL ETHICS

Course Code :VACAS09   **Total Duration: 35Hrs**

COURSE OBJECTIVE:
- To create awareness on professional ethics and Human Values.
- To provide basic familiarity about Engineers as responsible Experimenters, Research Ethics, Codes of Ethics, Industrial Standards.
- To inculcate knowledge and exposure on Safety and Risk.
- To expose students to right attitudinal and behavioural aspects

Chapter 1: Introduction to Value Education
Morals, values and Ethics, Integrity, Work ethic, Civic virtue , Valuing time, Cooperation, Commitment, Empathy, Selfconfidence , stress management, Senses of Engineering Ethics, Kohlberg"s theory, Gilligan"s theory, Models of professional roles, Uses of Ethical Theories.

Chapter 2: Research Ethics and Codes of Ethics:
Industrial standardization, ethical code and its importance, ethical accountability, law in engineering, engineering as social experimentation.

Chapter 3: Safety, Responsibilities and Rights:
Safety and Risk, Assessment of Safety and Risk, Risk Benefit Analysis and Reducing Risk collegiality, Collective Bargaining , Confidentiality , Conflicts of Interest, Professional Rights, Employee Rights, Intellectual Property Rights (IPR), Discrimination, Utilitarianism

Chapter 4: Professional Etiquette:
Etiquette at Meetings, Public Relations Office(PRO)'s Etiquettes, Technology Etiquette Phone Etiquette, Email Etiquette, Social Media Etiquette, Video Conferencing Etiquette, Interview Etiquette, Dressing Etiquettes : for Interview, offices and social functions, Ethical Values: Importance of Work Ethics.

REFERENCE BOOKS:
1.Professional Ethics: Need for the 21st Century Book by R. Subramanian
2.PROFESSIONAL ETHICS AND HUMAN VALUES by S. Dinesh Babu

10. PYTHON

Course Code :VACCS01   **Total Duration : 50Hrs**

COURSE OBJECTIVE :

Objective of this course is to enrich the trainees with the entire set of skills that are required to work with these python-based libraries. This training will be helping folks to achieve proficiency in introducing the concept of data science with the help of libraries that we will be covering here.

UNIT I: Data Frames I –Introduction

Intro to DataFrames I Module, Methods and Attributes between Series and DataFrames, Differences between Shared Methods, Select One Column from a DataFrame, Add New Column to DataFrame, Create New Column from Existing Column

UNIT II: Data Frames II –Filtering Data

This Module's Dataset + Memory Optimization, Filter a DataFrame Based on A Condition, Filter DataFrame with More than One Condition (AND - &), Filter DataFrame with More than One Condition (OR - |), Check for Null and Present DataFrame Values with the isnull and notnull Methods,

UNIT III: Data Frames III –Data Extraction

Intro to the DataFrames III Module + Import Dataset, Use the set_index and reset_index methods to define a new DataFrame index, Retrieve Rows by Index Position with iloc Accessor, Set Multiple Values in a DataFrame, Filter A DataFrame with the query method

UNIT IV: Working with text data

Intro to the Working with Text Data Section, Use the str.replace method to replace all occurrences of character with another, Filter a DataFrame's Rows with String Methods, Split Strings by Characters with the str.split Method

UNIT V: Multiindex

Intro to the MultiIndex Module, Create a MultiIndex on a DataFrame with the set_index Method, Change Index Level Name with the set_names Method, The unstack Method,

References:

• Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython 1st Editionby Wes McKinney (Author)

11. C++

Course Code :VACCS02   **Total Duration : 35Hrs**

COURSE OBJECTIVE :
Objective of this course is to the basic programming and OOPs concepts. Creating C++ programs. Tokens, expressions and control structures in C++. Arranging same data systematically with arrays. Classes and objects in C++.Constructors and destructors in C++, Files management and templates in C++, Handling exceptions to control errors

.**UNIT I:**
• Exploring Programming Basics and OOPs Concepts
• Introducing C ++ Programming
• Working with Tokens, Expressions and Control Structures in C++
• Managing Input and Output Data

UNIT II:
• Arranging the Same Data Systematically: Arrays
• Classes and Objects in C++
• Implementing OOPs Concepts in C++
• Constructors and Destructors

UNIT III:
• Groups of Statements: Functions
• Implementing Structures and Unions
• Pointing to a location: Pointers

UNIT IV:
• File Management in C++
• Templates in C++
• Handling Exceptions in C++
• Manipulating Strings in C++

UNIT V:
• Working with Pre-processor Directives
• Advanced Labs

References:
C++ Programming Language by BJARNE STROUSTRUP

12. CYBER SECURITY

Course Code :VACCS03   **Total Duration : 30Hrs**

COURSE OBJECTIVE :

This course focuses on the models, tools, and techniques for enforcement of security with some emphasis on the use of cryptography and also on analyzing and resolving security issues in networks and computer systems to secure an IT infrastructure.

UNIT I: Introduction to Cyber security & Ethical Hacking

Need of Cybersecurity, CIA Triad, Security Architecture, Security Governance, Security Auditing, Regulations & Frameworks, Ethical Hacking, Types of Hackers ,Phases of Ethical Hacking

UNIT II: Cryptography

Types of cryptography, Symmetric cryptography, Asymmetric cryptography, Hash functions, Digital signatures, Public Key Infrastructure (PKI), Attacks on cryptosystems

UNIT III: Computer Networks & Security

Introduction to Computer Network, Computer Networks – Architecture, Layered architecture, Open Systems Interconnect (OSI) Model, Transmission Control Protocol/Internet Protocol (TCP/IP),

UNIT IV: Application and Web Security

Web server architecture, Web server attacks, Countermeasures and patch management, Web application architecture, Web application attacks

UNIT V: IdAM (Identity and Access Management)

Authentication and authorization, Authentication and authorization principles, Regulation of access, Access administration, IdAM, Password protection, Identity theft

References:

• Social Engineering: The Science of Human Hacking Paperback by Christopher Hadnagy

• Hacking: The Art of Exploitation, 2nd Edition Paperback by
 Jon Erickson

13. Machine Learning

Course Code :VACCS04   **Total Duration : 35Hrs**

COURSE OBJECTIVE:

The main objective of this course is to enabling the student with basic knowledge on the techniques to build an intellectual machine for making decisions behalf of humans. This course covers the techniques on how to make learning by a model, how it can be evaluated, what are all different algorithms to construct a learning model.

UNIT I:

1. Introduction to machine learning
2. Linear prediction: Regression
3. Maximum likelihood
4. Regularizers, cross-validation, learning curves

UNIT II:

1. Optimisation
2. Classification: Linear classification, logistic regression
3. Classification: Support vector machines
4. Kernels

UNIT III:

1. Feed-forward neural networks
2. Backpropagation
3. Convolutional neural networks
4. Unsupervised learning: Clustering

UNIT IV:

1. Probabilistic modelling: EM Algorithm
2. Principal component analysis
3. Recommendation systems, collaborative filtering
4. Reinforcement learning

References:

1. Richard O. Duda, Peter E. Hart, David G. Stork, "Pattern Classification, Wiley, 2nd Edition".

 2. Christopher Bishop, "Pattern Recognition and Machine Learning, illustrated Edition, Springer, 2006

14. BIG DATA

Course Code :VACCS05   **Total Duration : 30Hrs**

COURSE OBJECTIVE:

Objective of this course is to the Big Data, i.e. storage, retrieval and processing of big data. In addition, it also focuses on the "technologies", i.e., the tools/algorithms that are available for storage, processing of Big Data. It also helps a student to perform a variety of "analytics" on different data sets and to arrive at positive conclusions.

.**UNIT I:**

• Introducing Data and Big Data

• Application of Big Data in Commercial Areas

• Big Data and Hadoop

• Exploring Analytics

UNIT II:

• Exploring R – Data Analytics Language

• Performing Statistics Concepts with R

• Introduction to Machine Learning

• Machine Learning and Hadoop

UNIT III:

• Data Mining and the Web

• Text Mining and Analytics

• Pattern Discovery in Data Mining

• Analysing Clusters in Data Mining

UNIT IV:

• Data Visualisation and Tools

• Exploring Mobile Analytics

• Exploring Real-world Analytical Organisations

• Part 8: Big Data in Different Industrie

References:

Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", 1 st Edition, Wrox, 2013.

2. Chris Eaton, Dirk Deroos et. al., "Understanding Big data", Indian Edition, McGraw Hill, 2015.

15.DevOps and RPA

Course Code :VACCS06   **Total Duration: 30Hrs**

COURSE OBJECTIVE:
To understand the DevOps Concepts and DevOps Tools
Deploying the main DevOps tools
To implement automated system update and DevOps lifecycle
To understand virtualization and performance
Providing the perfect security for the entire infrastructure

Chapter 1: Introduction to DevOps
• Dev and Ops
• DevOps definitions, Software Development Life Cycle and main objectives of the DevOps
• Infrastructure As A Code
• Prerequisites for DevOps
• Tools (Jenkins, Chef, Docker, Vagrant and so on.)
• Continuous Integration and Development

Chapter 2: Linux Concepts
• Linux Installation
• User Management
• Package Management
• Networking

Chapter 3: Configuration Management
• Chef/Puppet/Ansible Introduction
• Chef server Hands-on, workstation setup, Chef Distribution Kit and Concepts

Chapter 4: DevOps Project Work
• Project LAMP Setup
• Web layer
• DB Layer
• App Layer
• Monitoring

REFERENCE BOOKS:

1. Accelerated DevOps with AI, ML & RPA: Non-Programmer's Guide to AIOPS & MLOPS.

16. REVIT

Course Code :VACCE02   **Total Duration : 35Hrs**

COURSE OBJECTIVE :

This course aims to make the participants productive by giving them the ability to produce drawings and redefine images of buildings. Also, it will help you navigate user interface, architectural objects such as floor, walls, roofs, windows, and stairs. Covering the basics of Revit Architecture, This course will assist in the creation of schematic design through construction documentation.

Chapter 1: Introduction to BIM and Autodesk Revit
• BIM and Autodesk Revit
• Overview of the Interface
 • Starting Projects
• Viewing Commands

Chapter 2: Basic Drawing and Modify Tools
 • Using General Drawing Tools
• Editing Elements
 • Working with Basic Modify Tools
 • Working with Additional Modify Tools

Chapter 3 : Working with Doors and Windows
• Inserting Doors and Windows
• Loading Door and Window Types from the Library
• Creating Additional Door and Window Sizes

Chapter 4: Modeling Stairs, Railings, and Ramps
• Creating Component Stairs
 • Modifying Component Stairs
 • Working with Railings
• Sketching Custom Stairs
 • Creating Ramps

REFERENCE BOOKS:
I. Autodesk Revit 2020 Architectural Command Reference Paperback
II. Building information modelling (Global & Indian perspective)

17. TOTAL STATION

Course Code :VACCE03   **Total Duration : 40Hrs**

COURSE OBJECTIVE :

This course is designed to give an introduction into the use of a total station in construction and for use in industrial set out.
Trainers will introduce how to set up and co-ordinate the total station using the required software programmes available. Practical work will ensure the understanding and methodology to be fully explained and demonstrated in this introductory course.

COURSE CONTENT :

UNIT I

Introduction on Total Station instrument   Basic operational procedure on Total Station instruments of different types.

UNIT II

Application of Total Station instruments in civil constructions.   Missing line Measurement, Area determination, Remote elevation measurement, Remote distance measurement & Stake out etc.

UNIT III

Setting out of a Simple, Compound & Reverse curves

UNIT IV

Providing alignment of a road, pipe line & tunnel, longitudinal profile, cross section profile & contouring using total station instrument.

UNIT V

Data transformation & Various software packages for plotting process.

REFERENCE BOOKS:
- Surveying Volume II and III : B.C. Punmia
- Advance Surveying : R. Agor

18. ARC GIS

Course Code :VACCE04   **Total Duration : 42 Hrs**

COURSE OBJECTIVE :

 This course is designed to enhance skills to employers by working with actual spatial data & presenting the outputs as maps & spatial data analysis tasks, geo-processing and mapping using ArcGIS Desktop

COURSE CONTENT :

UNIT I

Lesson Introduction,Turning geographic information into GIS data What is DBMS? , What is GDB? ,What is Data model & Creating Dataset ,Geo-referencing ,Types of Geo-referencing

UNIT II

Methods for obtaining GIS data2 , Accessing GIS data , Considerations for choosing GIS data , Evaluating GIS data

UNIT III

Integrate and organize GIS data , Create a folder connection Add a basemap layer , Add oil and gas wells to the map , Add oyster harvesting areas to the map , Search for data , Identify location of downloaded data , Export a layer's data to the geodatabase

UNIT IV

Explore maps, services, and data on ArcGIS Online , Search ArcGIS Online for web content , Search ArcGIS Online for desktop content , Use a web mapping application template

UNIT V

Create and update features , Use an editing map to visualize edits , Add a new point feature , Add a new line feature , Delete a feature , Create a new polygon ,Copy and paste features , Merge features

REFERENCE BOOKS:

- Getting to Know ArcGIS Pro by Michael Law (Author), Amy Collin

19. STADD PRO

Course Code :VACCE05   **Total Duration : 36Hrs**

COURSE OBJECTIVE :

STAAD is the abbreviation for Structural Analysis and Design. STAAD.Pro is one of the popular software that is used for analysing & designing structures like – buildings, towers, bridges, industrial, transportation and utility structures.

COURSE CONTENT :

UNIT I
- Simple beam with UDL & a Point Load
- Simple beam with Triangular loads
- Simple beam with Trapezoidal loads

UNIT II
- Simple beam with moments & linearly varying loads
- Continues Beam with various loads and supports
- Portal frame

UNIT III
- Portal frame with 5 load combinations- Analysis
- Multistory / Multi bay 2D Frame- Analysis & design
- Multistory Frame with load combinations- Analysis & design

UNIT IV
- Wind load analysis- Introduction to IS875
- G+10 Structure – Wind load analysis

UNIT V
- Earth Quake Analysis - Seismic Coefficient method - IS 1893- a discussion
- G+10 Structure – Eq load analysis

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REFERENCE BOOKS:
- Staad Pro V8i for Beginners:by TS Sharma

20. AUTODESK INVENTOR

Course Code :VACME01   **Total Duration : 30Hrs**

COURSE OBJECTIVE :
This course will cover principles of 3D parametric part design, assembly design and creating production-ready part, assembly drawings and analysis using Autodesk Inventor. After completing this course students will be able to Create multiple designs using several of tools., Understand how to assembly parts and use work plane on X,Y, Z axis.

Chapter 1: Getting Started
Autodesk Inventor User Interface, Designing Parametric Parts , Using Project Files for Part Design , Creating 2D & Basic Sketches , Geometric Constraints

Chapter 2: Intermediate Sketching
 Editing Parametric Parts ,Creating Work Features , Modify ,Creating Basic Swept Shapes , Creating Chamfers and Fillets , Creating Holes and Threads , Patterning and Mirroring Features

Chapter 3: Assembly
Creating Thin-Walled Parts , Designing Assemblies , Using Project Files for Assembly Design , Constraining Components , Basic Part Design in an Assembly , Identifying Parts in an Assembly

Chapter 4: Drawing Creation Environment
 Creating Chamfers and Fillets , Base and Projected Views , Section Views , Detail Views , Managing Views , Automated Dimensioning Techniques , Manual Dimensioning Techniques , Annotating Holes and Threads , Creating Centrelines, Symbols and Leaders , Creating Tables ,

Chapter 5: Analysis
Stress Analysis Overview , Dynamic Simulation Overview , Preparing and Running a Simulation ,Viewing Results ,Analyzing Assemblies Performing , Convergence Performing a Model Analysis , Preparing and Running a Simulation , Viewing Results , Analyzing Assemblies ,

References:
• Autodesk Inventor Professional 2021, by Prof. Sham Tickoo
• Learning Autodesk Inventor 2021 Paperback by Randy Shih

21. SOLID WORKS

Course Code :VACME02   **Total Duration : 32Hrs**

COURSE OBJECTIVE :
This course takes students through an introduction to SOLIDWORKS. Students will then move into the essentials of creating parts, assemblies and drawing. This course covers the basics of part design, editing and reusing geometry with patterns and symmetry .

UNIT I
Introduction to SOLIDWORKS
Starting SOLIDWORKS, Building Your First Part,. Create a Part Drawing, Create an Assembly, Create an Assembly Drawing

UNIT II
SOLIDWORKS Essentials - Basic Part Modeling
Creating Your Part with Design Intent, Remove Material, Fillets, and Holes, Creating Drawings

UNIT III
SOLIDWORKS Essentials - Assembly Modeling
Getting Started, Adding More Components and Mates, Working with Assemblies,

UNIT IV
SOLIDWORKS Essentials - Basic Drawings
Intro to Drawings, Types of Drawing Views, Dealing with Part Configurations, Dimensions, Annotations

UNIT IV
SOLIDWORKS Essentials - Designing Molded & Casted Parts
Introduction to Tapered and Drafted Geometries, Designing a Molded Production-ready Part, Designing a Part for Injection Molding,

References:
• Engineering Design with SOLIDWORKS 2021: A Step-by-Step
 Project Based Approach Utilizing 3D Solid Modeling by
  David C. Planchard
• The Complete Guide to Mold Making with SOLIDWORKS
2021 Basic through Advanced Techniques

22. CNC EXTURN

Course Code :VACME03   **Total Duration : 30Hrs**

COURSE OBJECTIVE :

The course is designed in such a way that the students can program and operate any Advanced CNC Turning Center, Vertical Machining Center with ATC and fourth axis. The students are given basic knowledge of TPM, and preventive maintenance. The students shall be able to perform self-inspection of the components made by them.

UNIT: I

• Introduction and basics of CNC Machines

• Fundamental and advanced programming of CNC Lathes and Machining centres

UNIT II

• Tooling for CNC machines

• CAM Software based CNC programming

UNIT III

• Installation and commissioning of CNC machines

• Control elements and feedback devices

• Electric drives and servomotors

UNIT IV

• Study on CNC machine — mechanical elements

• Maintenance of Pneumatic and hydraulic elements

• Maintenance and troubleshooting of CNC machines.

References:

• Basics of CNC Programming by Yadav, Om Prakash, Ram, Mangey, Negi, Pawan ,River Publishers

• Suh Suk-Hwan, Kang Seong-Kyoon, Chung Dae-Hyuk, Stroud Ian., Theory and Design of CNC Systems, 2008, Springer-Verlag London Limited

23. ANSYS

Course Code :VACME04   **Total Duration : 36Hrs**

COURSE OBJECTIVE :
ANSYS training course aims to explain the basics of ANSYS, Finite Element Modeling (FEM), and Finite Element Analysis (FEA). The curve of learning will elevate from various stages, which includes pre-processor, solution, and post-processor.

UNIT I: Introduction of Ansys
Intro to modelling, GUI of ANSYS, Material Handling & Definition (Customized Material settings), Intro to modelling, Overview on meshing, 1D meshing using ANSYS, Solving Beam problems,

UNIT II: Structural Analysis (Static & Transient)
Structural Analysis (Static & Transient), Theory of Materials, Different Analysis and Basic equations & Laws, Complete Simulation Analysis on 3D Bodies, Stress, Strain, Error, Factor of Safety and Deformation

UNIT III: Thermal Analysis (Static & Transient)
Thermal Analysis (Static & Transient), Thermodynamics Theories and Fourier Laws, Conduction, Convection, Radiation, Thermal and Mixed boundary Examples

UNIT III : Model Analysis
Model Analysis, Coupled Structure, Joints, Springs, Assembly Structure

UNIT IV : Meshing Theories (2D & 3D)
Theories of Meshing and types,Element Types (cont.)-properties, meshing,2D & 3D meshing ,Advanced meshing and Techniques ,Modelling Using Axisymmetric ,Element Types-classification, properties ,Finalizing FE model for Analysis ,Creating Quality Mesh

UNIT V: Computational Fluid Dynamics CFD Analysis (2D & 3D)
Theory of Computational Fluid Dynamics ,CFD Post Analysis, Fluent Analysis

References:
• Finite Element Simulations with ANSYS Workbench 2022 By Huei-Huang
• Finite Element Modeling and Simulation with ANSYS
Second Edition by Xiaolin Chen (Author), Yijun Liu

24. IOT & ROBOTICS

Course Code :VACEC01   **Total Duration: 40Hrs**

COURSE OBJECTIVE:
To provide an introduction to Robotics and Automation including robot classification, design and selection, analysis and applications in industry. The Internet of Things (IOT) describes the network of physical objects —"things"—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet

COURSE CONTENT:

UNIT I
Introduction to Robotics, Introduction to Robotics, Uses of Robots, Robot Control

UNIT II
Hardware Study and Implementation, Sensor Interfacing, Motor Interfacing, Interfacing of Electronic and Robotic Components

UNIT III
Design of Multiple Robots, Line Followers, Obstacle Avoiders, Computer Controlled Robots

UNIT IV
Introduction to Internet of Things, Applications of IoT over Robotics, Marketing, Governance, Manufacturing, IoT Standards in Industry, Security Concerns in IoT, IoT Hardware Requirements, Analysis of Arduino Uno, Raspberry Pi,

UNIT V
Role of Cloud Computing in IoT, Tools, API and Platform for integration of IoT devices with ClouD,IoT cloud platform and integration with Gateway, Web services and APIs

REFERENCE BOOKS:
- Internet of Robotic Things (IoRT) ByYashonidhi Srivastava, Sahil Virk, Souvik Ganguli, Suman Lata Tripath

25. PLC – SCADA & MATLAB

Course Code :VACEC02   **Total Duration: 32Hrs**

COURSE OBJECTIVE:

The main objectives of the program are:

To understand the generic architecture and constituent components of a Programmable Logic Controller. To apply knowledge gained about PLCs and SCADA systems to real-life industrial applications. To develop a software program using modern engineering tools and technique for PLC and SCADA. To provide students an understanding of the expectations of industry.

Chapter 1:

Concept of Automation, Need & history of automation, Basics of PLC Introduction to PLC, pin diagrams, Block diagram of PLC, Detailed information of PLC

Chapter 2:

Internet of Things (IOT), Programming by using Allen Bradly PLC & Micro Logix, RS Logix software.

Troubleshooting & fault diagnostics of PLC

Chapter 3:

SCADA wonder ware InTouch, creating new SCADA applications, creating database of tags, creating & editing graphic display with automation.

Chapter 4:

The MATLAB user interface ,Working with MATLAB data types,Creating matrices and arrays ,Operators and control statements ,Using scripts and functions ,Data import and export ,Using the graphical features

REFERENCE BOOKS:

- PLC & SCADA SYSTEMS by Francis G.L
- Duane Hansel man, Bruce Little Field "Mastering MATLAB 7" Pearson Education India

26. Drone Technology

Course Code :VACEC03   **Total Duration: 30Hrs**

COURSE OBJECTIVE:

The main objective of the Drone Technology course was established in line with industry requirements. The general objective is assimilation of theoretical and practical knowledge required to design, build, program and use of the drones under safety conditions and according with the legislation in force.

Chapter 1: Introduction to Drone Technology

• Drone Concept

• Vocabulary Terminology

• History of drone

Chapter 2: Basic Drawing and Modify Tools

• Using General Drawing Tools

• Editing Elements

• Working with Basic Modify Tools

Chapter 3: Drone design and fabrication

• Classifications of the UAV

• Overview of the main drone parts

• Technical characteristics of the parts Function of the component

Chapter 4: Drone flying and operation

• Concept of operation for drone Flight modes

• Operate a small drone in a controlled environment

• Drone controls

• Flight Operations

• management tool

Chapter 5: Drone accessories

• Sensors

• On board storage capacity

• Removable storage devices Linked mobile devices and applications

REFERENCE BOOKS:

Drone Technology in Architecture, Engineering and Construction by Daniel Tal, AslaJon Altschuld, Rla

27. Embedded System

Course Code :VACEC04   **Total Duration: 35Hrs**

COURSE OBJECTIVE:

This program is designed to prepare student for a career as an Embedded Systems professional. In this course, the fundamentals of embedded system hardware and firmware design will be explored. Issues such as embedded processor selection, hardware/firmware partitioning, circuit design, circuit layout, circuit debugging, development tools, firmware architecture, firmware design, and firmware debugging will be discussed.

Chapter 1: IBasic Electronics and PCB Software Overview

Number Systems,IBoolean Algebra,About Basic Electronic Components,Data sheets, power supplies, voltage regulators. Thermal considerations, heat sinks, parts kits.,Introduction to Embedded Systems Laboratory and equipment.,Logic probes, voltmeters and oscilloscopes; Debugging using logic analyzers, state and timing information.,

Chapter 2: Embedded C Programming

C Basic data types,Programming constructs,Functions in C,Data Structures,Advanced topics,Overview of the C standard library,Embedded System Oriented Topics

Chapter 3: Microcontroller Architectures

• Classifications of the UAV

• Overview of the main drone parts

• Technical characteristics of the parts Function of the component

Chapter 4: Drone flying and operation

Embedded systems descriptions, definitions, and vocabulary.

Embedded system design considerations and requirements.

Processor selection and tradeoffs.

Chapter 5: Overview of RTOS

pSOS system overview,pSOS real time kernel concepts,pNA network manager concepts,Input output system,Exploring pRISM environment

REFERENCE BOOKS:

Programming embedded systems in C and C++

Book by Michael Barr