

LIVE Online

Offline

Hybrid



MICRO, SMALL & MEDIUM ENTERPRISES

सूक्ष्म, लघु एवं मध्यम उद्यम

ACADEMY OF SKILL DEVELOPMENT



- INDUSTRIAL TRAINING
- INTERNSHIP



<For>
<Students>
<and>
<Faculties>

**SAME
CERTIFICATES**

**FOR
OFFLINE/LIVE ONLINE**

CHOOSE YOU OWN MODE

**MOST POPULAR
(LIVE ONLINE)**



Evaluated by the AICTE NEAT-CELL
(<https://neat.aicte-india.org/>)





Duration (Weeks)

2/3/4/6/8/12

Type of Program	Student	Faculty
Industrial Training	✓	✓
Internship	✓	✓
Industrial Training + Internship	✓	✓
FDP		✓

For Students

- Industrial Training
- Internship
- Dual Program (Industrial Training + Internship)

Accepted by all
Colleges/Universities

For Faculties

- Industrial Training
- Internship
- Dual Program (Industrial Training + Internship)

For Promotion & Career
Advancement

Apply from website
(<https://asd.org.in/application-form.php>)

- Industrial Training
- Internship

Process

You will receive the Confirmation/Offer Letter
within 96 Hours

You will receive the WhatsApp Group
joining link based on the start month

You will under go the Industrial Training, complete
the Internship Project and prepare the Report

Certificate Generation



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COMPUTECH
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IT - ITes SSC
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Duration (Hours)

60/90/120

Type of Program	Student
Industrial Training	✓
Internship	✓
Industrial Training + Internship	✓

For Students

- Industrial Training
- Internship
- Dual Program (Industrial Training + Internship)

Accepted by all
Colleges/Universities

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Certificate Generation



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Program USP CERTIFICATION

QR<->WEBSITE 2-WAY
AUTHENTICATED CERTIFICATES



UPON

1

Industrial Training/Internship Offer/Confirmation Letter

COMPLETION

2

Industrial Training Certificate

THE

3

Internship Certificate

FOLLOWING

4

Project Certificate

CERTIFICATES

5

Completion Certificate with Grade

WILL BE

6

Attendance Certificate

ISSUED

7

Industry Partner Certificate

Certificates are identical for all modes, as the programs are conducted in hybrid mode. There is no mention of "ONLINE" on the certificates.



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MATLAB AND ITS APPLICATIONS (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to MATLAB	Overview of MATLAB Interface; MATLAB Environment (Command Window, Editor, Workspace, Path); Basic Syntax and Commands; Variables and Data Types; Arrays and Matrices; File Operations (Saving, Loading, Managing Scripts)
2	Basic Programming Constructs	Scripts and Functions; Conditional Statements (if, switch-case); Loops (for, while); Input and Output Handling; Error Handling and Debugging
3	Data Visualization	Plotting 2D Graphs: Line, Bar, Scatter Plots, Subplots and Annotations; 3D Plotting: Surface, Mesh, Contour Plots; Customizing Plots (Labels, Titles, Legends, Grid); Animation and Real-Time Plotting
4	Mathematical Foundations	Linear Algebra Operations; Solving Linear & Nonlinear Equations; Calculus: Differentiation, Integration; Numerical Methods: Root Finding, Interpolation, Curve Fitting
5	Signal Processing Basics	FFT, Filtering, Convolution; Sampling and Reconstruction; Laplace Transform for Circuit Analysis; Frequency Domain Analysis
6	Circuit & Power System Analysis	Solving Linear Circuits; Load Flow Analysis; Harmonics Analysis; Control Systems: Transfer Functions and State-Space Models; Bode, Nyquist, and Root Locus Plots; PID Controller Design
7	Mechanical Engineering Applications	Rigid Body Simulation; Vibration Analysis; Basics of FEA Using MATLAB; Heat Transfer Simulation; Flow Analysis
8	Robotics & Mechatronics	Kinematics and Dynamics of Robotic Arms; Path Planning and Trajectory Generation; Feedback Control Design; Model Predictive Control (MPC)
9	Simulink Introduction	Basics of Block Diagrams; Electrical and Mechanical System Modeling; Simscape for Multi-domain Systems; Building and Simulating Dynamic Systems
10	Optimization Techniques	Linear and Nonlinear Optimization; Genetic Algorithms and Heuristic Methods; Constraint-Based Optimization; Engineering Design Optimization
11	Machine Learning with MATLAB	Regression and Classification; Neural Networks and Deep Learning Basics; Pattern Recognition; Training and Testing ML Models
12	Image Processing with MATLAB	Image Import, Display & Enhancement; Filtering and Edge Detection; Morphological Operations; Image Segmentation and Object Detection
13	Real-World Applications & Case Studies	Case Studies in Electronics, Electrical, and Mechanical Engineering; MATLAB-Based System Design; Real-Time Data Analysis; Simulation and Modeling Challenges
14	Project Work and Documentation	Capstone project on a domain-specific application; Project Report Writing; Presentation and Demonstration; Peer Review and Faculty Feedback

SOLIDWORKS (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to SolidWorks Interface	Software layout, Tools Overview, Template Settings, Units and Document Properties
2	2D Sketching Fundamentals	Sketch entities, Relations, Smart Dimensions, Constraints, Sketch Tools
3	3D Features & Part Modeling	Extrude, Revolve, Sweep, Loft, Fillet, Shell, Draft, Rib
4	Design Intent & Parametric Modeling	Design changes, Equations, Configurations, Design Tables
5	Working with Complex Sketches	Splines, Projected Curves, Sketch Blocks, Construction Geometry
6	Assembly Modeling Basics	Mates, Assembly Hierarchies, Interference Detection, SmartMates
7	Advanced Assembly Techniques	Sub-assemblies, Motion Study, Exploded Views, Assembly Patterns
8	Drafting & Technical Drawings	Orthographic Views, Section Views, Auxiliary Views, BOM, GD&T
9	Sheet Metal Design	Flange, Bend, Flatten, Form Tools, Sheet Metal Features, K-Factor
10	Surface Modeling	Surface creation, Trimming, Knitting, Thickening, Filled Surface
11	Weldments and Frame Structures	Structural Members, Weld Beads, Cut Lists, Gussets, End Caps
12	Simulation & Stress Analysis	Static Simulation, Meshing, Boundary Conditions, Safety Factor Analysis
13	Capstone Project – Mechanical Design	Design and simulate a complete mechanical component or system; detailed engineering drawings
14	Capstone Project – Documentation & Presentation	Final Report, Engineering Drawings, Team Presentation, Faculty Evaluation

DATA SCIENCE, AI, MACHINE LEARNING USING PYTHON (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to Python & Data Science	Introduction to Python & Data Science; Python for Data Science; Data Visualization in Python; Data Analysis Using SQL; Math for Machine Learning
2	NumPy – Arrays & Operations	NumPy Basics: Arrays and Multidimensional; Attributes and Functions; Indexing and Slicing; Nditer Function and Broadcasting; Array Manipulation and Arithmetic Functions
3	Pandas – Data Analysis	Getting Started with Pandas; Reading Excel & CSV files; DataFrames and basic operations; Data Exploration and Descriptive Statistics; Handling Missing Values; Aggregating data
4	Data Collection & Extraction	Data Collection and Data Extraction; Generate data frame from database; Extract data from JSON; Working with AWS cloud data; Use of Data Lakes in AWS cloud
5	Data Visualization	Understanding Data Visualization; Matplotlib library (Bar, Line, Scatter, Bubble Charts); Exploring Two-dimensional data; Visualizing contour lines; Generating PNG/PDF outputs
6	Regression Techniques	Scikit-Learn overview; Exploratory Data Analysis (EDA); Linear and Multiple Regression; Robust, Regularized and Polynomial Regression; Evaluate Regression Model Performance; Cross Validation
7	Classification Techniques	Logistic Regression; K-Nearest Neighbor; SGD and Confusion Matrix; Precision, Recall, F1 Score; ROC Curve; Precision-Recall Tradeoff
8	Support Vector Machines (SVM)	SVM Concepts; Linear SVM Classification; Polynomial Kernel; Radial Basis Function (RBF); Support Vector Regression
9	Decision Trees	Introduction to Decision Trees; Training and Visualizing; Visualizing Decision Boundary; Tree Regression, Regularization, and Overfitting; Gini Impurity vs Entropy
10	Ensemble Learning Methods	Ensemble Learning Introduction; Bagging; Random Forests and Extra-Trees; AdaBoost; Gradient Boosting Machine; XGBoost
11	Dimensionality Reduction	Dimensionality Reduction Concept; PCA Introduction; Kernel PCA; LDA vs PCA; t-SNE and UMAP for visualization
12	Unsupervised Learning	Unsupervised Learning Techniques; Clustering and K-Means; Limits of K-Means; Using Clustering for Image Segmentation; DBSCAN
13	Natural Language Processing (NLP)	Natural Language Processing; Lexical Processing; Syntactic Processing; Semantic Processing; Sentiment Analysis; Market Basket Analysis
14	Project Work and Documentation	Capstone project on a real-world data science problem; Data cleaning, modeling, evaluation; Project report and documentation; Presentation and faculty evaluation

PYTHON AND ITS APPLICATIONS (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to Python	History of Python; Using Python Interpreter; The Interpreter and its Environment; Using Python as a Calculator; First Step towards Programming
2	String Handling & Control Flow	Assigning Values to Variables; Multiple Assignment; Standard Data Types; Python Strings; Data Type Conversion; If/else, Elif; Iterative statements (for, while)
3	Functions & Python Data Structures	Defining and Calling a Function; Default Attribute Function; Introduction to List; Work on Tuples; Sets; Dictionary
4	Modules, Packages & Comprehensions	Locating and Creating Modules; Creating and Using Packages; List Comprehension; Set Comprehension; Dictionary Comprehension
5	Files I/O	Printing to the Screen; Reading Keyboard Input; The input Function; Opening and Closing Files; The open Function; Reading and Writing Files; The write() and read() Methods
6	Introduction to OOP	Introduction to OOP; Class and Objects; Class Diagram; Constructor; Need for Encapsulation; Private Attributes; Getting and Setter Methods
7	OOP – Inheritance & Abstract Classes	Reference Variable; Pass by Reference; Self; Static Attributes and Methods; Need for Inheritance; Overriding; Super and Types; Need for Abstract; Abstract Methods
8	Exception Handling & Advanced Python	Introduction to Exception Handling; Raise; Custom Exception; Decorators; Generators; Context Managers; Lambda Functions
9	NumPy & Data Science	Arrays; Array indexing; Datatypes; Array math; Slicing and numeric functions; Feature of NumPy in Data Science; Multidimensional operations
10	Pandas	How To Create a Pandas DataFrame; Select Index or Column; Add an Index, Row, or Column; Delete Indices, Rows, or Columns; Rename Columns or Indices; Data Processing Using Pandas for Data Science
11	Data Visualisation – Matplotlib	Principles of Information Visualisation; Basic Charting (line chart, Bar chart, Pie chart) using Matplotlib; Graph customization, Annotation, and formatting
12	Data Visualisation – Advanced	Using Plotly & Seaborn to generate images; Image processing with Python; Interactive charts; Dashboard creation basics
13	Database Integration & APIs	Working with SQLite using Python; CRUD operations with Python; Introduction to REST APIs; Consuming APIs with requests library; JSON handling
14	Project Work and Documentation	Capstone project on a real-world Python application; Data analysis, visualization, or automation; Project report and documentation; Presentation and faculty evaluation

FULL STACK DEVELOPMENT USING MERN STACK (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to Node.js & Async JavaScript	Introduction to NODE.JS; Asynchronous JavaScript Concept; Setting up a Node.js Environment; Run your first NODE.JS Application; Working in REPL Node JS Console
2	File System, Streaming & Building Servers	File System Module; Reading Directories & Files; Readable & Writable Streams; Creating HTTP servers; Handling GET, POST, PUT, and DELETE requests; HTTP Streaming; Working with Pipes
3	APIs, NPM & Events	What is NPM; Installing Packages Locally and Globally; Adding dependency in package.json; The EventEmitter API; CommonJS Modules; npm Packages (nodemon, etc.)
4	Introduction to ExpressJS & Middleware	Express framework setup; Routes, rendering, layouts, URL building; Configuration; Views; Middlewares
5	MongoDB – Setup & Basic Operations	Installation of MongoDB; Introduction to NoSQL; Collections and Documents; MongoDB CRUD using MongoDB shell; Connecting MongoDB with Express
6	Mongoose & Advanced MongoDB	Store data with Mongoose; Defining Schemas and Models; Querying with Mongoose; MongoDB CRUD using Express; Advanced Querying and Aggregation
7	Authentication with Passport & JWT	Stateful vs. Stateless Authentication; OAuth2; Passport.js; JWT – JSON Web Tokens; Securing routes with middleware
8	Advanced Node.js Topics	Node.js API design; Error Handling; Debugging; Testing with Mocha/Jest; Performance optimization
9	Introduction to ReactJS	Introduction to React; Downloading and Installing ReactJS; Understanding Virtual DOM; JSX syntax; First React Application
10	React Components, State & Props	Rendering data in ReactJS; Applying CSS class and HTML content; Component lifecycle and state; Creating multiple and reusable components; Understanding state of React
11	Events, Forms & Routing in React	Working with properties and events; Accessing Child properties; Working with Forms in ReactJS; React Router; Working with Links & Creating Nested Routes
12	React HTTP Requests & Redux	Introducing Fetch; Rendering Remote Data in Components; Introduction to Redux; Actions, Reducers and Store; Connecting React with Redux
13	Advanced React Topics & Tooling	Tooling Support; Converting JSX to JS; Inline Styles; Two-Way Data Binding; Animation using CSS Transition; React Hooks: useState, useEffect, useContext
14	Project Work and Documentation	Capstone project: Building a complete MERN stack application; Frontend and Backend integration; API development; Testing and Deployment; Final documentation and presentation

INTERNET OF THINGS (IoT) (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to IoT	Introduces IoT architecture, devices, protocols, and industrial applications; Covers basic IoT ecosystem and real-world industrial use cases
2	Arduino Microcontroller Basics	Arduino architecture, pin configuration, IDE setup, basic programming, GPIO handling, and serial communication
3	Sensor Integration	Integrates IR, PIR, Ultrasonic, LDR, DHT11, and Gas sensors with Arduino, enabling data collection and analysis
4	Actuator Control	Focuses on controlling DC motors, servo motors, and relays using Arduino to build interactive IoT applications
5	Display Interfacing	Demonstrates the interfacing of 16×2 LCD and OLED displays to visualize real-time sensor data
6	Introduction to NodeMCU & ESP8266	Covers NodeMCU architecture, pin configuration, and ESP8266 IDE setup, preparing for IoT communication over Wi-Fi
7	Communication Protocols	Introduces the HTTP protocol, Wi-Fi configuration, and demonstrates making HTTP requests (GET/POST) using NodeMCU
8	Cloud Integration Basics	Explores cloud platforms like Blynk and ThingSpeak, guiding learners on cloud setup, device integration, and remote monitoring
9	Data Handling in Cloud	Covers data transmission, visualization, and remote device control using cloud APIs; practical experience with cloud-based automation
10	IoT Security Fundamentals	Introduces security protocols, encryption techniques, and methods for securing IoT devices from cyber threats
11	MQTT Protocol for IoT	Provides a deep dive into the MQTT protocol, covering broker-client communication, topic management, and real-world applications
12	IoT with Python & APIs	Explains API interaction, data handling with Python, and automating device control using Python-based IoT solutions
13	Advanced IoT Applications	Explores predictive maintenance, smart home automation, and environmental monitoring applications using IoT
14	Project Work & Documentation	Guides learners to develop a complete IoT solution, integrating hardware, cloud, and communication protocols with proper documentation

INDUSTRIAL AUTOMATION (PLC AND SCADA) (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to PLCs	Definition and history of PLCs; PLC architecture; Interfacing devices; Types and selection of PLCs
2	PLC Control Systems & Hardware	Understanding PLC control & actuation; OLD Diagrams; Switches, Relays, Contactors, Timers, Sensors (Theory with Assignments)
3	Basic PLC Programming in SIMATIC Manager	OB1 Creation; NO/NC contacts, SPDT; Latching, Memory Bits; Comparators, Counters, Timers
4	Introduction to TIA Portal	What is TIA Portal; Installation & Interface walkthrough; Hardware and device configuration
5	TIA Portal – Programming Fundamentals	Tags and Data Blocks; Basic Ladder Logic instructions; Creating basic logic with NO, NC contacts and coils
6	SCADA Systems Overview	Introduction to SCADA; Types of SCADA software; How SCADA integrates in automation; Creating user projects
7	SCADA and PLC Communication	Interfacing PLC with PC (SCADA screen); Data exchange and synchronization; Real-time control overview
8	Tag Management and Object Handling in SCADA	Direct Tagging; C-Action operations; Object hiding, flashing, digital/analog display setup
9	Analog Control in SCADA	SCADA analog operations; Analog signal simulation; Creating analog signal window and displaying data
10	Motor Control Using SCADA	Motor start/stop control; Forward/reverse operations; Sequence motor control; Push button and toggle switch implementation
11	Sensor and Valve Control Systems	Inductive sensor value display; Valve control logic; Output device control using SCADA; Building all types of switches
12	Real-Time Monitoring and Alarm Systems	Monitoring process control via SCADA; Online data tracking; Trends and alarms setup
13	Hands-On Mini Projects in SCADA	Practical implementations: Railway gate signal; Tank water level; Traffic signal control; Multi-load sequence control
14	Capstone Project & Documentation	Design and implement a full automation project using PLC & SCADA; Testing, documentation, and final presentation

DIGITAL MARKETING (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to Digital Marketing	Overview of Digital Marketing; Traditional vs. Digital Marketing; Key Digital Marketing Channels; Setting SMART Marketing Goals; Introduction to Marketing Funnel
2	Website Planning & WordPress	Importance of a Website; Domain, Hosting & CMS; Introduction to WordPress; Building a Basic Website; On-Page SEO Basics
3	Search Engine Optimization (SEO) – Basics	How Search Engines Work; Keyword Research & Analysis; On-Page SEO: Title Tags, Meta Descriptions, H1-H6; Technical SEO Basics; URL Structure & Internal Linking
4	Advanced SEO Strategies	Off-Page SEO & Link Building; Local SEO & Google My Business; Mobile SEO; SEO Audit Tools (SEMrush, Ahrefs, Moz); Measuring SEO Performance
5	Search Engine Marketing (SEM) & Google Ads	Introduction to Pay-Per-Click (PPC); Google Ads Account Setup; Search Campaigns, Display Campaigns; Bidding Strategies; Quality Score & Ad Rank; Conversion Tracking
6	Social Media Marketing (SMM)	Overview of Social Media Platforms; Creating a Social Media Strategy; Content Calendar; Facebook & Instagram Marketing; LinkedIn Marketing; Twitter/X Marketing
7	Content Marketing	Content Marketing Strategy; Types of Content (Blogs, Infographics, Videos, Podcasts); Content Creation Tools (Canva, Grammarly); Content Distribution; Measuring Content Effectiveness
8	Email Marketing	Email Marketing Fundamentals; Building an Email List; Email Campaign Types (Newsletter, Drip, Promotional); Email Copywriting; A/B Testing; Email Analytics
9	Social Media Advertising	Facebook Ads Manager; Audience Targeting & Custom Audiences; Instagram Advertising; YouTube Advertising; Retargeting Campaigns; Ad Creatives & Copywriting
10	Video Marketing & YouTube	Importance of Video Marketing; YouTube Channel Setup & Optimization; Video SEO; YouTube Ads; Creating Engaging Video Content; Live Streaming Basics
11	Web Analytics & Performance Tracking	Google Analytics 4 Setup; Understanding Traffic Sources; Conversion Tracking; KPIs & Metrics Dashboard; UTM Parameters; Data-Driven Decision Making
12	Affiliate & Influencer Marketing	Introduction to Affiliate Marketing; Affiliate Networks; Influencer Marketing Strategy; Identifying and Partnering with Influencers; Measuring Influencer Campaign ROI
13	Digital Marketing Strategy & Campaign Planning	Integrated Digital Marketing Campaign Planning; Budget Allocation; A/B Testing Campaigns; Case Studies & Real-World Examples; Industry Tools & Automation
14	Project Work and Documentation	Capstone: End-to-end digital marketing campaign for a product/service; Creating a full digital marketing plan; Analytics report and ROI analysis; Presentation and faculty evaluation

DATA ANALYTICS AND VISUALISATION USING ADVANCED EXCEL (PROJECT-BASED)

#	Module Title	Topics / Description
1	Data Organization & Filters	Data Filters: AutoFilter and Advanced Filters; Sorting and Customize Sorting; Subtotals; Data Grouping and Ungrouping; Introduction to Excel Tables
2	Data Validation & Data Tables	Cell Level Validations; Specifying a valid range of values for a cell; Specifying a list of valid values for a cell; Custom validations based on formulas; Using data tables for data analysis
3	PivotTables – Fundamentals	Mastering PivotTables; Using External Data Sources; Multiple Consolidation Ranges; Customizing PivotTable Layout; PivotTable Advanced Options
4	PivotCharts & Advanced Charting	Pivot Charts; Creating Dynamic Charts; Chart Types: Bar, Line, Scatter, Bubble, Waterfall; Sparklines; Chart Formatting and Customization
5	Workbook Collaboration & Protection	Workbook Sharing; Tracking Changes; Merging Workbooks; Workbook and Sheet Protection; Online Collaboration; Scheduling Meetings and Web Discussions
6	What-If Analysis	Goal Seek; Scenario Manager; Creating and Editing Scenarios; Merging Scenarios; Data Tables for Sensitivity Analysis
7	Auditing, Add-ins & Customization	Auditing: Tracing Precedents and Dependents; Tracing Errors; Managing Add-ins; Customizing Toolbars and Menus; Customizing Views and Settings; Creating Custom Lists
8	Conditional Formatting & Styles	Conditional Formatting of Cells; Creating, Managing, and Merging Styles; Cell Formatting Techniques; Data Bars, Color Scales, Icon Sets
9	Financial & Date/Time Functions	Financial Functions: PMT, PV, FV, IRR, NPV, RATE; Date and Time Functions: NOW, TODAY, DATEDIF, WORKDAY, NETWORKDAYS; Array Formulas
10	Statistical & Lookup Functions	Statistical Functions: AVERAGE, STDEV, COUNTIF, SUMIF, SUMIFS, AVERAGEIFS; Lookup and Reference Functions: VLOOKUP, HLOOKUP, INDEX, MATCH, XLOOKUP
11	Database & Text Functions	Database Functions: DSUM, DAVERAGE, DCOUNT; Text Manipulation Functions: LEFT, RIGHT, MID, TRIM, CONCATENATE, TEXTJOIN, SUBSTITUTE; Flash Fill
12	Logical & Information Functions	Logical Functions: IF, IFS, AND, OR, NOT, IFERROR; Worksheet and Cell Information Functions: ISBLANK, ISNUMBER, ISTEXT, CELL, INFO; Nested Functions
13	Power Query & Introduction to Macros	Introduction to Power Query; Getting & Transforming Data; Data Cleaning with Power Query; Introduction to VBA Macros; Recording and Running Macros; Basic VBA scripting
14	Project Work and Documentation	Capstone project: Real-world data analysis using Excel; Creating dashboards with PivotCharts and Slicers; Automated reports using formulas and macros; Final report and presentation

POWER BI (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to Business Intelligence & Power BI	Overview of BI concepts; Importance of data-driven decisions; Introduction to Power BI ecosystem (Desktop, Service, Mobile); Use cases
2	Getting Started with Power BI Desktop	Installation & interface; Navigating Power BI Desktop; Connecting to data sources (Excel, CSV, Database); Data loading basics
3	Data Preparation with Power Query	Data cleaning; Removing duplicates; Handling missing values; Data transformation; Merge & append queries
4	Data Modeling Fundamentals	Relationships; Star schema vs snowflake schema; Creating data models; Cardinality and cross-filter direction
5	Introduction to DAX	What is DAX; Calculated columns vs measures; Basic DAX functions (SUM, COUNT, IF, CALCULATE)
6	Data Visualization Basics	Creating charts (bar, line, pie, table); Formatting visuals; Slicers and filters; Report layout design
7	Advanced Visualizations	Drill-down & drill-through; Tooltips; Conditional formatting; Custom visuals from marketplace
8	Dashboard Design Principles	UI/UX best practices; Color themes; Storytelling with data; Creating interactive dashboards
9	Intermediate DAX	Time intelligence functions; Aggregations; Logical functions; Ranking and filtering techniques
10	Sales Dashboard Project (Mini Project)	Build a dynamic sales dashboard; KPI cards; Region-wise analysis; Performance tracking
11	Power BI Service & Publishing	Publishing reports; Workspaces; Sharing dashboards; Data refresh and scheduling
12	Real-Time & Advanced Features	Introduction to real-time dashboards; Gateways; Row-level security (RLS); Data alerts
13	HR Analytics Project (Mini Project)	Employee data analysis; Attrition insights; KPI visualization; Interactive HR dashboard
14	Final Capstone Project & Deployment	End-to-end dashboard project; Business problem solving; Report publishing & sharing; Presentation & portfolio building

STAAD.PRO (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to STAAD.PRO	Why we learn STAAD.PRO; Overview of STAAD.PRO interface; Applications in structural engineering; Introduction to FEM concepts
2	Creating Models – Space, Beam & Plate	Design Add space, Add beam, Add plate; Creating model; Applying many types of support; Use rotation and pan
3	Material Properties & Section Assignment	Use of concrete in design; Use of steel in design; Calculation of thickness in design; Assigning material properties to members
4	Load Assignment	Assigning the dead load; Assigning the live load; Assigning load combinations; Use of nodal load, member load, floor load, temperature, and plate load
5	Design Analysis & Error Resolution	Analysis of the design; Resolve any error in the design; Viewing the analysis output; Understanding displacement, shear and moment diagrams
6	Use of International Codes	Uses of Indian codes; Use of bridge codes; Overview of other international codes (ACI, Eurocode); Selecting appropriate design codes
7	Concrete Design Parameters	Concrete design using STAAD.PRO; Parameters selection; Using various types of commands; Reinforcement calculation and output
8	Steel Design	Steel design fundamentals using STAAD.PRO; Member selection and code checks; Steel design output interpretation; Connection design overview
9	Structural Wizard & Advanced Modeling	Generate model using Structural Wizard; Use rotation and spin; Modeling frames, trusses, and plate structures; Grid generation
10	Reports & Output Files	Generate the report of the full design; Customizing report output; Post-processing tutorial; Viewing output files and result interpretation
11	STAAD.PRO Editor	Working with STAAD editor; Changing load values and directions; Command-level editing for efficiency; Batch analysis from editor
12	Foundation Design	Isolated footing design; Combined and strap footing; Mat foundation design; Foundation design parameters and output
13	Project Selection & Industry Practice	Project selection by individual or group; Applying real-world loading scenarios; Structural drawings from STAAD output; Industry best practices
14	Project Work and Documentation	Capstone project on a selected structural system; Full analysis and design; Project report writing; Presentation and faculty evaluation

DEEP LEARNING WITH TENSORFLOW & KERAS (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to Deep Learning	What is AI, ML, and Deep Learning; Real-world applications; Overview of Neural Networks; Course roadmap
2	Python & Math Basics for DL	Python essentials (NumPy, Pandas); Linear Algebra basics; Vectors, matrices, basic statistics for DL
3	Introduction to TensorFlow & Keras	Installation & setup; TensorFlow architecture; Keras API basics; Building first simple model
4	Understanding Neural Networks	Perceptron; Activation functions (ReLU, Sigmoid, Softmax); Loss functions; Forward & Backpropagation concepts
5	Data Preprocessing & Visualization	Data cleaning; Handling missing values; Feature scaling; Train-test split; Data visualization using Matplotlib & Seaborn
6	Building First ANN Model	Creating ANN using Keras Sequential API; Model compilation; Training & evaluation
7	Model Optimization Techniques	Overfitting vs Underfitting; Regularization (L1/L2); Dropout; Early stopping; Hyperparameter tuning basics
8	Classification Project (Mini Project)	Build a classification model (e.g., customer churn prediction or digit classification); Evaluation metrics (accuracy, precision, recall)
9	Convolutional Neural Networks (CNN)	Image processing basics; CNN architecture (Conv, Pooling); Image augmentation; Use of Keras CNN layers
10	Image Classification Project	Build image classifier (e.g., cat vs dog / handwritten digits); Dataset handling; Model evaluation
11	Recurrent Neural Networks (RNN)	Sequential data; RNN basics; LSTM & GRU concepts; Time series introduction
12	NLP with Deep Learning	Text preprocessing; Tokenization; Word embeddings; Sentiment analysis using Keras
13	NLP Project (Mini Project)	Build sentiment analysis model (movie reviews or tweets); Performance evaluation
14	Final Capstone Project & Deployment	End-to-end project (image/text/structured data); Model saving/loading; Basic deployment (Flask/Streamlit); Project presentation

AUTOCAD 2D AND 3D [MECHANICAL ENGINEERING] (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to AutoCAD & Mechanical Drafting	AutoCAD Interface, Workspaces, Navigation, Essential Tools, Mechanical Drafting Standards
2	Basic 2D Drawing & Editing Tools	Lines, Circles, Arcs, Polylines, Trim, Extend, Fillet, Offset, Mirror, Array
3	Precision Drawing & Object Snap	Grid & Snap, Ortho & Polar Tracking, Object Snaps (Osnap), Dynamic Input, Coordinate Systems
4	Layers, Line Types & Text Annotations	Creating & Managing Layers, Line Weights, Hatching, Mechanical Symbols, Text & Multiline Text
5	Dimensioning & Tolerancing for Mechanical Drawings	Linear & Angular Dimensions, GD&T, Dimension Styles
6	Blocks, Attributes & External References	Creating & Using Blocks, Attributes for Mechanical Parts, Inserting & Managing Xrefs
7	Templates, Title Blocks & Printing	Customizing Title Blocks, Creating Drawing Templates, Plotting & Printing (CTB & STB files)
8	Introduction to AutoCAD 3D & Modeling Basics	3D Workspaces, 3D Coordinate Systems (UCS), Viewports & Navigation, Solid vs. Surface Modeling
9	3D Solid & Surface Modeling for Mechanical Parts	Creating 3D Primitives, Extrude, Revolve, Loft, Sweep, Presspull, Editing Solids & Surfaces
10	Advanced 3D Operations & Assembly Modeling	Boolean Operations (Union, Subtract, Intersect), Fillet & Chamfer in 3D, Assembling Mechanical Parts
11	Mechanical Part Design & Section Views	Creating Mechanical Components, Generating Section Views, Detail Views & Exploded Views
12	Rendering & Visualization of Mechanical Models	Applying Materials, Lighting, Cameras, Rendering Settings, Exporting 3D Models
13	AutoCAD Customization & Automation for ME	Creating Custom Tool Palettes, Macros, Introduction to AutoLISP & Script Files
14	Final Project – Mechanical Design & Documentation	Full Mechanical Assembly Drawing (2D & 3D), Dimensioning & Annotations, Final Review & Printing

AUTOCAD 2D AND 3D [CIVIL ENGINEERING] (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to AutoCAD & 2D Drafting Basics	Overview of AutoCAD in civil applications; Interface walkthrough (Ribbon, command line, toolbars); Basic drawing commands: Line, polyline, rectangle, circle, arc; Units, scale, and limits setup
2	Creating Your First Floor Plan	Hands-on: Drawing a basic floor layout using lines and rectangles; Using grid snaps and object snaps; Coordinate entry and drawing precision
3	Advanced 2D Drafting Techniques	Working with layers and line types; Hatching and gradient fills; Annotations: text, leaders, and dimensioning; Creating and inserting blocks
4	Structural & Site 2D Drafting	Drafting site plans: plot boundaries, roads; Structural drawings: beams, columns, footings; Hands-on: Drafting a complete site layout with utility lines
5	Detailing and Section Views in 2D	Creating section lines and details; Using layer states and filters; Adding title blocks and annotation styles
6	Introduction to 3D in AutoCAD	Understanding 3D workspace and UCS; Basic 3D commands: extrude, revolve, sweep, loft; View controls: pan, orbit, isometric
7	Modeling Basic Civil Elements in 3D	Hands-on modeling: extruded slab, foundation pad; Creating elevation views from 3D models; 3D object modification techniques
8	Advanced 3D Modeling Tools	Solid editing tools: union, subtract, intersect; Surface modeling for terrain/contours; Fillets, chamfers, shell commands
9	Applying Materials & Rendering	Applying textures and realistic materials; Lighting and camera setup; Rendering images for presentations
10	3D Applications in Civil Projects	Modeling columns, beams, and trusses; Bridge modeling basics; Terrain modeling using contours or point cloud
11	Creating Walkthroughs & Visualization	Walkthrough animation setup; Creating flythrough for building interiors or site plans; Using sections for cutaways
12	Plotting and Drawing Documentation	Page setup, viewports, and layouts; CTB/STB plot styles; Exporting: PDF, DXF, DWF; Scales and sheet sets for civil drawings
13	Capstone Projects & Case Studies	Project 1: 2D + 3D Residential Building; Project 2: Road & drainage layout; Project 3: Bridge structure modeling; Project 4: Terrain modeling
14	Final Project Submission & Documentation	Finalize project sheets; Organize documentation; Oral presentation or walkthrough demo; Instructor evaluation & feedback

ANSYS (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to ANSYS	Introduction to ANSYS and its advantages; Overview of ANSYS Workbench interface; Applications of ANSYS across industries; Introduction to FEA concepts
2	Static Structural Analysis – Basics	Fundamentals of static structural analysis; Meshing strategies and element types; Defining boundary conditions and loads; Post-processing and result interpretation
3	Static Structural – Beams & Springs	Different types of beam analysis (cantilever, simply supported, fixed); Helical spring analysis; Leaf spring analysis; Stress and deformation results
4	Steady-State Thermal Analysis	Fundamentals of thermal analysis; Heat sink analysis; Piston thermal analysis; Applying convection, conduction and heat flux boundary conditions
5	Explicit Dynamics Analysis	Explicit dynamics analysis and its applications; Impact analysis based on velocity; Gravity-driven impact analysis; High-speed transient simulation
6	Modal & Harmonic Analysis	Natural frequency extraction; Mode shapes visualization; Harmonic response analysis; Vibration analysis and frequency response
7	Fluid Flow (CFX) – Internal Flow	CFX setup and physics; Internal water flow analysis of a pipe; Heat transfer through a pipe; Pressure drop and velocity profile analysis
8	Fluid Flow (CFX) – External Flow	External airflow analysis over cross-section area of an object; Aerodynamic drag and lift; Turbulence modeling; Post-processing with CFD-Post
9	Fluid Flow (Fluent) – Internal Flow	Fluent setup and physics; Internal water flow analysis of a pipe (cross-section area); Mesh generation for internal flows; Convergence criteria
10	Fluid Flow (Fluent) – External & Complex Flow	External water flow analysis of any object; External airflow analysis of a car body; Airfoil analysis (cross-section area); Lift and drag coefficient computation
11	Fatigue & Optimization Analysis	Introduction to fatigue analysis; S-N curve and fatigue life calculation; Topology optimization; Design optimization using ANSYS tools
12	Buckling & Nonlinear Analysis	Linear and nonlinear buckling analysis; Geometric nonlinearity; Material nonlinearity; Contact analysis between components
13	Multiphysics Coupling & Advanced Simulations	Fluid-structure interaction (FSI); Thermal-structural coupling; Electromagnetic analysis basics; Advanced post-processing and report generation
14	Project Work and Documentation	Capstone project on a selected engineering problem; Simulation setup, analysis, and result interpretation; Project report writing; Presentation and evaluation

ELECTRICAL SYSTEM DESIGN WITH CAD (2D AND 3D) (PROJECT-BASED)

#	Module Title	Topics / Description
1	Basics of AutoCAD & Coordinate Systems	Introduction to AutoCAD for Electrical Engineers; Cartesian Co-Ordinate System; Absolute, Relative, and Polar Coordinate Systems
2	2D Drawing Commands	Line, Circle, Polygon, Ellipse, Text, Point; Rectangle, Polyline, Arc; Drawing basic electrical layouts
3	Modify Commands	Copy, Move, Mirror, Array, Offset; Trim, Extend, Fillet, Chamfer; Explode, Join and other modify tools
4	Introduction to Electrical CAD & Project Manager	Introduction to project manager; Working with projects; Adding a drawing; Introduction to AutoCAD Electrical workspace
5	Single-Phase Circuit Design	Introduction of electrical circuit; Inserting electrical equipment in OLD/SLD; Designing single-phase diagram; Inserting components and wires
6	Three-Phase Circuit Design	3-phase diagram with control & power circuit; Designing control circuits; Designing power circuits; Motor starter circuit design
7	PLC Module Design in CAD	Inserting PLC modules; Designing ladder logic using CAD; PLC I/O assignment in drawings; PLC wiring diagrams
8	Component Tagging & Wire Numbering	Component tagging; Wire numbering and labelling; Terminal numbering; Cable tagging
9	Panel Layout Design	Panel layout design fundamentals; Placing components in panel; DIN rail and cabinet sizing; Panel schematic vs. panel layout
10	Schematic & Panel Reports	Generate a schematic report; Generate a panel report; BOM (Bill of Materials) generation; Error checking and report customization
11	3D Electrical Modeling Basics	Introduction to 3D AutoCAD for Electrical; Modeling cable trays and conduits; 3D routing of cables; Clash detection in 3D
12	Electrical Standards & Documentation	IEC and IS electrical standards; Drawing revision management; Title blocks and drawing templates; Electrical documentation best practices
13	Industry Applications & Case Studies	Industrial plant wiring design; Motor control center (MCC) design; Distribution board design; Case study: End-to-end electrical design project
14	Project Work and Documentation	Capstone project: Complete electrical system design (schematic + panel layout + reports); Final documentation; Presentation and faculty evaluation

CNC PROGRAMMING (PROJECT-BASED)

#	Module Title	Topics / Description
1	Overview of NC & CNC Machining Systems	Overview of NC & CNC Machining System; Fundamental Aspect of CNC Machine Control; Major Units & Components of CNC Lathe and its function; Major Units & Components of CNC Milling and its Function
2	Feedback Systems & Axis Identification	Feedback system used in CNC Lathe and CNC Milling Machine; Axis Identification in CNC Machine; Dimensioning System; Types of Interpolation (Linear, Circular, Helical)
3	Tools & Equipment for CNC Operations	Tools and Equipment used in CNC Lathe; Tool and Equipment used in CNC Milling; Tool holders and inserts; Tool life and tool wear
4	Fundamentals of Part Programming	Fundamentals of Part Programming; Word address format; Program structure; Tool compensation concepts; Coordinate systems (Absolute vs. Incremental)
5	CNC Lathe – Specification & Reference Points	Specification of CNC Lathe; Reference points to be considered for programming; Different operations on CNC Lathe; Tool Offset setup
6	CNC Lathe – Codes & Fixed Cycles	Different G-codes and M-codes used for Programming in CNC Lathe; Fixed cycles: G71, G72, G73, G74, G75, G76; Threading cycles; Turning and facing cycles
7	CNC Lathe – Programming Practice	Programming practice for CNC Lathe; Step turning; Contour turning; Threading; Grooving; Practical training on CNC Lathe (simulation and machine)
8	CNC Milling – Specification & Reference Points	Specification of CNC Milling Machine; Reference points to be considered for programming; Different operations on CNC Milling; Tool Offset and length compensation
9	CNC Milling – Codes & Fixed Cycles	Different G-codes and M-codes used for Programming in CNC Milling; Drilling cycles: G81-G89; Canned cycles; Coordinate system rotation; Scaling and mirroring
10	CNC Milling – Programming Practice	Programming Practice for CNC Milling; Pocket milling; Contour milling; Hole patterns; Practical Training on CNC Milling (simulation and machine)
11	Subprogram & Parametric Programming	What is a subprogram; Calling subprograms; Parametric programming / custom macro; Applications of parametric programming
12	Advanced CNC Programming Techniques	High-speed machining strategies; Multi-axis machining introduction; CNC machine maintenance overview; DNC (Direct Numerical Control) communication
13	CAM Software Introduction	Introduction to CAM software (Mastercam/NX/Fusion 360); Generating NC code from CAD model; Simulation in CAM; Post-processing and DNC transfer
14	Project Work and Documentation	Capstone project: Programming and simulating a complex part on CNC Lathe and Milling; Project report; Presentation and evaluation

FULL STACK DEVELOPMENT USING PYTHON AND DJANGO (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to Python	History of Python; Using Python Interpreter; The Interpreter and its Environment; Using Python as a Calculator; First Step towards Programming
2	Basic Syntax & Variables	Basic Syntax; Python Identifiers and Keywords; Python Comments; Command Line Arguments; Parsing Command-Line Arguments
3	Data Types & Data Structures	Variable Types; Assigning Values; Standard Data Types; Python Numbers and Strings; Introduction to List, Tuples, Sets, Dictionary; List Comprehension
4	Conditional Statements & Looping	Conditional and Iterative statements; If Statements; Looping Techniques; For and While Statements; The range function; BREAK Statement
5	Operators & Functions	Types of Operators; Arithmetic, Comparison, Assignment, Logical, Identity Operators; Python Operators Precedence; Defining a Function; Calling a Function; Global vs. Local variables; Creating Modules
6	Files I/O & OOP	Files I/O: Printing to Screen, Reading Keyboard Input, The input Function, Opening and Closing Files, Reading and Writing Files; OOP: Classes, Objects, Encapsulation, Inheritance
7	Introduction to Django	What is Django; Django and Python; Django's take on MVC: Model, View, and Template; DRY Programming; How to get and install Django
8	Django Core – MVT, Templates & Static Files	Getting started with Django; Important Core Files; Templates; Adding static files; Models and Databases; Admin Interface; MVT – In details
9	Forms, Validation & Template Inheritance	Django Forms; Validation; Relative URL; Template Inheritance; Crispy Forms
10	Advanced Django – Authentication	Django's in-built User authentication; Registration; Login; Logout; Password Reset; User Profile
11	Generic Views & CRUD Implementation	Generic Views (ListView, DetailView, CreateView, UpdateView, DeleteView); CRUD Implementation; Class-based views vs. function-based views
12	Django REST Framework	Introduction to Django REST Framework (DRF); Serializers; API Views and ViewSets; Authentication and Permissions in DRF; Token Authentication; Testing APIs
13	Deployment & Performance Optimization	Deploying Django on cloud (Heroku/AWS/PythonAnywhere); Static and media file configuration for production; Database optimization and caching; Security best practices in Django
14	Project Work and Documentation	Capstone project: Building a full-stack web application using Python and Django; Frontend integration; REST API and user authentication; Testing, deployment, and documentation; Presentation and evaluation

PROFESSIONAL C (PROJECT-BASED)

#	Module Title	Topics / Description
1	Programming Logic and Technique	Introduction to Programming language; What is Procedural Programming Language; Algorithm and Flow Chart; Introduction to C; What is Compiler and Interpreter
2	C Language Preliminaries	Data types (Primary, Secondary, User Defined); What is variable and constant; Identifiers and Keyword; Declarations and expressions; Different C compilers (gcc/tcc)
3	Input Output and Pre-Processor Statements	Pre-processor Directives; getchar, putchar, scanf, printf; gets, puts; Header File and #include; Different types of preprocessor directives
4	Storage Classes in C	What is storage class; Different types of storage Classes (Auto, static, register, extern); Different features of a variable (memory, default initial value, scope, lifetime)
5	Operators and Control Statements	Different types of operators (arithmetic, logical, relational, etc.); If, else, else-if with examples; Conditional operator (?:); Switch case with example; Use of Break, Continue
6	Loops	What is iteration; Different types of loops; For, while, do-while with examples; Nesting of loops; Pattern printing using nested for loop
7	Arrays and Strings	What is array; Different types of array (1D and 2D); Examples of 1D array and 2D array (matrix addition); Introduction to character array and string
8	Functions	What is a function; Declarations, definitions, and calling of a function; Arguments and parameters; Recursive function; Passing array to a function; String library function
9	Pointers	Definitions of pointer; Declaring and accessing a pointer; Passing pointer to a function; Operations on a pointer, pointer arithmetic; Pointer and array
10	Structures and Unions	What is a structure; Processing and accessing structure variable; Array of structure; Union; typedef; Pointer to structure
11	File Handling in C	File handling in C; Text file and binary file; File creation and opening; Reading and writing to a file; File copy; File seek operations
12	Dynamic Memory Allocation	Introduction to dynamic memory allocation; malloc(), calloc(), realloc(), free(); Memory leaks and best practices; Applications of dynamic memory
13	C99, C11, C17 Specification Additions	C99: Variable-length arrays, designated initializers, inline functions; C11: Generic selections, atomic types, threads; C17: Bug fixes and clarifications; Modern C best practices
14	Project Work and Documentation	Capstone project: Building a C application (system utility, data structure implementation, or simulation); Testing and debugging; Project report and presentation

PROFESSIONAL C++ (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to C++	Introduction to C++; Procedural vs. Object-Oriented Programming; Benefits of OOPs; Different OOPs Features; Basic Components of C++; Compiling and Executing C++ program
2	Fundamentals of C++	Tokens, Keywords, Identifiers, and Constants; Data Types, Type Compatibility, and Variables; Operators in C++; Operator precedence; Control Statement; Iteration and Loops
3	Functions in C++	Type of Function, Function Prototyping; Call by Reference and Call by Value; Scope and Visibility of Variables in Functions; Inline Function, Friend Function
4	Variadic Functions in C++	What is Variadic Function; Use of Variadic Function; Types of Variadic Function; A C++ Program to implement a variadic function
5	Basic Concepts in OOPs	Objects and Classes; Encapsulation; Abstraction; This pointer; Polymorphism; Inheritance; Dynamic Binding; Message Passing
6	Objects and Classes	Access Specifier; Specifying a Class and Creating an Object; Defining Member Function; A C++ program with Class
7	Constructors and Destructors	Default Constructor, Parameterized Constructor, Copy Constructor, Dynamic Constructor; Constructor Overloading; How to define a Destructor
8	Inheritance	Introductions and Benefits; Access Specifiers; Base and Derived Class; Types of Inheritance; Function Overriding
9	Polymorphism	What is Polymorphism; Run-time and Compile-time Polymorphism; Function Overloading; Operator Overloading; Virtual Function
10	Files and Exception Handling	Classes for File Stream Operations; Opening and Closing a File; File Modes, File Pointers; Input-Output Operations; Updating a File; Types of Error and Exceptions; Try-Catch-Throw mechanism
11	Templates	Template Class; Template Function; Implementation of Templates using C++; Generic programming with templates
12	Standard Template Library (STL)	Introduction to STL; Containers: vector, list, deque, set, map; Iterators; Algorithms: sort, find, count; Function objects and lambda with STL
13	Advanced C++ Features	Smart Pointers (unique_ptr, shared_ptr, weak_ptr); Move Semantics and Rvalue References; Lambda Expressions; C++11/14/17 Feature Highlights; Multithreading basics in C++
14	Project Work and Documentation	Capstone project: Building a complete C++ application; Applying OOP, STL, and file handling; Testing and debugging; Project report and presentation

JAVA AND ITS APPLICATIONS (PROJECT-BASED)

#	Module Title	Topics / Description
1	OOP Concepts & Introduction to Java	Object-Oriented Programming Core Concepts; Introduction to Java; Primary components: Class, Interface, Enum, Annotation; Writing, compiling, and running a Java program; JVM, JRE, JDK; Eclipse/IntelliJ IDE
2	Class, Object & Constructors	Object properties and operations; What is a class; Private fields, accessor, and mutator methods; Method overloading; The 'this' keyword; What is a constructor; Constructor overloading & chaining
3	Static Members, Advanced Class Concepts & Packages	Static variable and Static method; Static and non-static field initializers; Private constructors and singleton class; Nested classes (Static, Member inner, Local inner, Anonymous); Package concept; Compiling with classpath; Creating JAR files
4	Inheritance, Abstract Classes & Interfaces	Java inheritance mechanism; Upcasting, downcasting, instanceof operator; Method overriding and runtime polymorphism; Abstract method and class; Interfaces and multiple inheritance; Default implementation in interface; Functional interfaces and lambda expressions
5	Exception Handling	Why we need exception handling; try, catch, and finally; Stack unwinding; Checked and unchecked exceptions; Exception chaining; Custom exceptions; Catching multiple exceptions; Try with resources
6	Multithreading & Concurrency	Concept of processes and threads; Multithreading by extending Thread class and Runnable interface; Life cycle of a thread; Thread synchronization: monitor, synchronized blocks and methods; Interthread communication; Deadlock, starvation, and livelock; Executors and Lock objects
7	Generics & Collections Framework	Why use Generics; Generic Types, Raw Types, Generic Methods; Bounded Type parameters; Introduction to Java collection framework; Set, List, Queue, Deque, Map, SortedSet, SortedMap; Algorithms: Sorting, Shuffling, Searching
8	Basic I/O & Annotations	Concept of Input and Output in Java; Byte Streams and Character Streams; Buffered Streams; Scanning and Formatting; File I/O (Nio.2); Annotation Basics; Declaring Annotation Types; Predefined Annotation Types
9	SQL & Database Fundamentals	Data Definition Language (DDL); Data Retrieval Language (DQL); Data Manipulation Language (DML); Transaction Control Language (TCL); Database Security (DCL); DDL Commands: Create, Alter, Rename, Truncate, Drop; DML: Insert, Update, Delete; DQL: SELECT with WHERE, Operators
10	JDBC – Database Connectivity	Introduction to JDBC; JDBC architecture; java.sql Package; Connection, Statement, ResultSet; Prepared Statement; Callable Statement; Scrollable and Updatable ResultSet; Batch Updates; Simple Transaction Management; Four Levels of JDBC drivers
11	Java Swing & Desktop Applications	Introduction to Java Swing; Swing Controls and Components; Event Handling in Swing; Designing GUI with NetBeans; Building a simple desktop application
12	Java Web Basics (Servlets & JSP)	Introduction to Web Applications; Servlet lifecycle; HTTP methods with Servlets; Introduction to JSP; JSP Directives, Scripting elements; Session Management in Web Applications
13	Java Design Patterns & Best Practices	Introduction to Design Patterns; Creational Patterns (Singleton, Factory, Builder); Structural Patterns (Adapter, Decorator); Behavioral Patterns (Observer, Strategy); Code quality and best practices
14	Project Work and Documentation	Capstone project: Building a complete Java application (Desktop or Web); Database integration via JDBC; GUI or web front-end; Testing and documentation; Final presentation

FULL STACK DEVELOPMENT WITH JAVA [SPRING BOOT] (PROJECT-BASED)

#	Module Title	Topics / Description
1	Spring Overview & Java Configuration	What is the Spring Framework; The DI Container; Spring Framework History and EcoSystem; Java configuration and the Spring application context; @Configuration and @Bean annotations; @Import; Defining bean scopes
2	Advanced Java Configuration & Annotations	External properties & Property sources; Environment abstraction; Using bean profiles; Spring Expression Language (SpEL); Component scanning; Autowiring using @Autowired; Lifecycle annotations: @PostConstruct and @PreDestroy; Stereotypes and meta-annotations
3	Spring Container & AOP	The Spring Bean Lifecycle; BeanFactoryPostProcessor and BeanPostProcessor; Spring Bean Proxies; What problems does AOP solve; Defining pointcut expressions; Implementing various types of advice
4	Testing Spring Applications	Spring and Test-Driven Development; Spring 5 integration testing with JUnit 5; Application context caching and @DirtiesContext; Profile selection with @ActiveProfiles; Easy test data setup with @Sql
5	JDBC & Spring Data Access	How Spring integrates with existing data access technologies; Spring's JdbcTemplate; DataAccessException hierarchy; Transaction overview; Transaction management with Spring; Transaction propagation and rollback rules
6	Spring Boot Introduction & Auto-Configuration	Introduction to Spring Boot Features; Value Proposition of Spring Boot; Creating a simple Boot application using Spring Initializer; Dependency management using Spring Boot starters; How auto-configuration works; Configuration properties; CommandLineRunner
7	Spring Data JPA & ORM	Quick introduction to ORM with JPA; Benefits of using Spring with JPA; JPA configuration in Spring; Configuring Spring JPA using Spring Boot; Spring Data JPA dynamic repositories
8	Web Applications with Spring Boot	Introduction to Spring MVC and request processing; Controller method signatures; Using @Controller, @RestController and @GetMapping; Configuring Spring MVC with Spring Boot; Spring Boot packaging options (JAR or WAR)
9	RESTful Applications with Spring Boot	Introduction to the REST architectural style; Controlling HTTP response codes with @ResponseStatus; Implementing REST with @RequestMapping, @RequestBody and @ResponseBody; HttpMessageConverters and automatic content negotiation
10	Spring Boot Testing	Spring Boot testing overview; Integration testing using @SpringBootTest; Web slice testing with MockMvc framework; Slices to test different layers of the application
11	Spring Security	What problems does Spring Security solve; Configuring authentication; Implementing authorization by intercepting URLs; Authorization at the Java method level; Understanding the Spring Security filter chain; Spring security testing
12	Actuators, Metrics & Health Indicators	Exposing Spring Boot Actuator endpoints; Custom Metrics; Health Indicators; Creating custom Health Indicators; External monitoring systems
13	Microservices & Advanced Topics	Introduction to Microservices architecture; Spring Cloud overview; Service discovery with Eureka; API Gateway with Spring Cloud Gateway; Feign clients and inter-service communication
14	Project Work and Documentation	Capstone project: Building a full-stack enterprise application with Spring Boot; REST API backend with Spring Data JPA; Frontend integration; Security, testing, and deployment; Documentation and presentation

CLOUD COMPUTING WITH AMAZON WEB SERVICES (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to Cloud Computing & AWS	Introduction to Cloud Computing; Different cloud service providers; Cloud computing application and future scope; Cloud computing models: IaaS, PaaS, SaaS; AWS Global Infrastructure
2	EC2 – Compute in the Cloud	Working with different instances (Windows, Linux); Putty configuration; EC2 volume, image; Snapshot; Instance types, pricing and key pairs
3	S3 & CloudWatch	Introduction to S3; S3 versioning; S3 Security and Bucket Policies; AWS CloudWatch: Alarms, Metrics, Dashboards; SNS, SMS, Billing alerts; Cron expressions and ARN
4	IAM, Cognito & CloudFront	IAM: User, Role, Policy, Group, MFA; Cognito for user authentication; CloudFront CDN; Route 53 DNS; VPC fundamentals
5	Lambda & Serverless Computing	AWS Lambda functions; Event-driven architecture; Triggers and integrations; Lambda layers; Serverless architecture patterns
6	Load Balancing & Auto Scaling	Elastic Load Balancer (ELB); Application Load Balancer (ALB); Auto Scaling Groups; Scaling policies; Health checks
7	Relational Database Service (RDS)	Introduction to RDS; Supported databases (MySQL, PostgreSQL, Aurora); RDS instances and backups; Multi-AZ deployments; Read replicas
8	DynamoDB & NoSQL	Introduction to DynamoDB; Tables, Items, Attributes; Primary Keys and Indexes; CRUD operations; DynamoDB Streams
9	AWS IoT & Machine Learning Tools	AWS IoT Core; Device management and shadow; Introduction to AWS ML services: SageMaker, Rekognition, Comprehend; Using pre-trained ML models on AWS
10	AWS DevOps & CI/CD	Introduction to DevOps on AWS; AWS CodeCommit, CodeBuild, CodeDeploy, CodePipeline; Infrastructure as Code with CloudFormation; Introduction to Docker on AWS (ECS)
11	VPC, Networking & Security	VPC design and subnets; Security Groups and NACLs; VPN and Direct Connect; AWS Shield and WAF; AWS Inspector and GuardDuty
12	Cost Optimization & Governance	AWS pricing model; Cost Explorer and Budgets; Reserved Instances and Savings Plans; AWS Trusted Advisor; Cloud governance best practices
13	Deploying a Cloud-Based Application	Hosting a static website on S3 + CloudFront; Deploying a web application on EC2 + RDS; Using Elastic Beanstalk for deployment; Monitoring with CloudWatch
14	Project Work and Documentation	Capstone project: Designing and deploying a cloud architecture on AWS; Architecture diagram, cost estimation, and security plan; Project report and presentation

REVIT (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to Revit Architecture & BIM	Introduction to Autodesk Revit Architecture and User Interface; BIM and Autodesk Revit; Overview of the Interface; Starting Projects; Viewing Commands
2	Basic Sketching & Modify Tools	Using General Sketching Tools; Editing Elements; Working with Basic Modify Tools; Working with Additional Modify Tools; Modifying Walls
3	Walls, Room Elements & Grids	Adding Room Elements; Setting up Levels and Grids; Creating Structural Grid Lines; Exterior and Interior Walls; Wall Assembly and Customization
4	Doors, Windows & Curtain Walls	Inserting Doors and Windows; Loading Door and Window Types from the Library; Creating Additional Door and Window Sizes; Creating Curtain Walls; Adding Curtain Grids; Working with Curtain Wall Panels; Attaching Mullions to Curtain Grids
5	Views – Elevations, Sections & Callouts	Setting the View Display; Duplicating Views; Adding Callout; Creating Elevations and Sections; Camera Views and 3D Navigation
6	Components & Floors	Adding and Modifying Components; Modelling Floors; Creating Shaft Openings; Creating Sloped Floors
7	Ceilings & Roofs	Modelling Ceilings; Adding Ceiling Fixtures; Creating Ceiling Soffits; Modelling Roofs; Creating Roofs by Footprint; Building Roofs by Extrusion
8	Stairs, Railings & Ramps	Creating Component Stairs; Modifying Component Stairs; Working with Railings; Building Ramps; Stair and railing customization
9	Construction Documents & Sheet Setup	Setting Up Sheets; Placing and Modifying Views on Sheets; Printing Sheets; Title blocks and border setup; Sheet list creation
10	Annotating Construction Documents	Working with Dimensions; Working With Text; Adding Detail Lines and Symbols; Creating Legends; Keynotes and tags
11	Tags, Schedules & BIM Data	Adding Tags; Working with Schedules; Creating Room and Area Schedules; BOM and material takeoffs; Exporting schedules to Excel
12	Creating Details & Family Editor	Setting Up Detail Views; Adding Detail Components; Annotating Details; Introduction to the Revit Family Editor; Modifying and creating custom families
13	Rendering & Collaboration	Applying materials to building elements; Lighting setup for rendering; Rendering views and walkthroughs; Exporting models (DWG, IFC, Navisworks); Collaboration using Revit Cloud Worksharing
14	Project Work and Documentation	Capstone project: Complete BIM model of a building (architectural + structural elements); Construction documentation set; Schedules and quantity takeoffs; Presentation and faculty evaluation

CYBER SECURITY AND ETHICAL HACKING (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to Ethical Hacking	What is Cyber Security; What is Hacking; What is Ethical Hacking; Types of Hackers; Hacking Concepts; Ethical Hacking Concepts; Penetration Testing Concepts
2	Lab Setup & Linux Fundamentals	Concept of Virtualization; VirtualBox Installation; Kali Linux .iso Installation; Introduction to Kali Linux; Linux File Structure; Basic Linux Commands
3	Networking & Website Fundamentals	IP Address & Classes; MAC Address; Network Devices; Network Topology; Type of Networks; OSI/TCP Model; HTML, CSS, JavaScript Basics; Components of URL; GET & POST Method
4	Footprinting & Reconnaissance	Footprinting Concepts; Website Footprinting; Network Footprinting; Competitive Intelligence; Footprinting Tools; Footprinting Penetration Testing
5	Scanning Networks	Concept of Network Scanning; Scanning Tools; Scanning Techniques; Scanning Penetration Testing; Nmap; Nessus
6	System Hacking – Linux & Windows	Linux Hacking Concepts; Scanning The Machine; Exploiting Different Protocols and Ports; Windows Hacking Concepts; Scanning Windows Device; Exploiting Windows Vulnerability; Creating Windows Virus; Remote Connection Listener
7	Android & Google Hacking	Android Hacking Concepts; Scanning Android Device; Creating Android Virus; Getting Remote Sessions; Google Dorks; Google Exploit; DB Shodan; Virustotal
8	Social Engineering & Phishing	Social Engineering Concepts; Social Engineering Techniques; Phishing Concepts and Techniques; Creating phishing pages; Email spoofing
9	Burp Suite	Burp Suite introduction; Site Map; Proxy; Intruder; Repeater; Sequencer; Decoder; Comparer; Logger
10	Web Application Pentesting	Web Applications Concepts; Web Applications Threats; Hacking Methodology; Web Application Hacking Tools; OWASP Top 10
11	SQL Injection & Data Tampering	SQL Injection Concepts; SQL Injection Tools; Dumping Database; Types of Data Tampering; Data Tampering Live Demonstration; CSRF attacks
12	XSS & Advanced Web Attacks	Type of XSS; XSS Concepts; XSS Live Demonstration; File Upload Vulnerabilities; Remote Code Execution; SSRF and XXE attacks
13	Wi-Fi Hacking & Wireless Security	WIFI Hacking Concepts; WIFI Hacking Methodology; WIFI Hacking Tools; Cracking WIFI Password; WPA2 attacks; Wireless network security best practices
14	Project Work & Documentation	Capstone penetration testing project on a target lab environment; Vulnerability assessment and report writing; Remediation recommendations; Final presentation and evaluation

MOBILE APPLICATION DEVELOPMENT USING FLUTTER (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to Flutter & Mobile Apps	Introduction of Mobile Apps; Discussion on different technologies and frameworks; Introduction to Flutter; Flutter Definition; Flutter Architecture; Introduction to Dart
2	Installation & Setup	Installation of IDE(s), tools, packages; Flutter SDK; Setting up of a device; Enabling web support
3	Dart Programming Language	What is Dart; How to write code in Dart; OOP concepts in details; Implementation using an online editor
4	Flutter Project Structure	Different ways of creating a Flutter project; Understanding the file structure of a project; Writing Flutter code using Dart; Running into targeted device
5	Introduction to Widgets	Introduction to widgets; Use of different widgets and their implementation; Explanation of Widget Tree
6	Stateful & Stateless Widgets	Types of Widgets; Use of stateful widgets and lifecycle; Use of stateless widgets; Implementation
7	Layouts & Event Handling	Different layouts and their use; Designing the screen with different layouts; Use of different designing tools/libraries; Handling events and functions
8	Customized Widgets & Theming	Creation of customized widgets; Different states and widgets connection; Styling and theming; Use of external package and upgrading the project
9	Navigation & Routing	Screens and routing; Different routing techniques; Different navigation widgets; Linking with tabs, menus, and options
10	Data Listing & Collections	Data Listing; Multiline text/input in the view and its management; Understanding List, Grid, Stack and implementation
11	Data & Backend Integration	Different Storage forms and usage; Adding external dependency for suitable storage; Local storage with SharedPreferences and SQLite; Relevant Coding
12	Images & Media	Images and media handling; Camera and Gallery usage; Handling multimedia support; Creation of supported Apps
13	Packages, Plugins & API Integration	Discussion on essential packages and plugins; Implementing platform-specific changes; REST API integration using http package; JSON parsing
14	Project Development and Documentation	Capstone project: Building a complete cross-platform Flutter application; API integration, state management, and navigation; Report preparation; Presentation and evaluation

FULL STACK WEB DEVELOPMENT USING PHP AND MYSQL (PROJECT-BASED)

#	Module Title	Topics / Description
1	HTML 5 & CSS 3 Fundamentals	Introduction to HTML 5 & CSS 3; HTML Tags and semantic elements; Basic understanding of CSS; Responsive design basics; Lab Session
2	Introduction to PHP 8	Introduction to PHP 8 and new features; Configure PHP 8 (XAMPP/WAMP); Use Form Handling; Variables, Expressions, and Operators; Conditional and flow control statements; Functions and Arrays; Lab Session
3	Form Handling & Data Security	Understanding GET, POST & REQUEST methods; Handling Form events; Sanitize and validate form data; Encryption techniques; Protecting from SQL / URL injections; Lab Session
4	MySQL Database	Introduction to database management (RDBMS); Preparing SQL Query statements; Database connectivity with PHP; DML Operations using MySQLi; MySQL Joins, Between, IN, LIMIT operators; Lab Session
5	State Management	Use cookies for state management; Perform session management; Session variables and expiry; Flash messages; Lab Session
6	File Uploading & Management	File upload & download in server; View and delete the uploaded file; File validation and security; Working with directories; Lab Session
7	JavaScript, jQuery & AJAX	Basic understanding of JavaScript; Understanding of DOM; Event Handling; Data Validation; Introduction to jQuery; Implement Ajax using PHP; Lab Session
8	Introduction to Laravel & MVC	What is MVC; Introduction to Laravel; Laravel Installation in Windows/Linux; Artisan CLI; Directory structure
9	Laravel – Routing & Controllers	Laravel Routing basics; Named routes; Route groups; Creating Controllers; Resource Controllers; Middleware
10	Laravel – Blade Templates & Views	Introduction to Blade templating engine; Template inheritance and layouts; Blade directives; Passing data to views; Including sub-views
11	Laravel – Eloquent ORM	Introduction to Eloquent ORM; Defining Models; CRUD operations with Eloquent; Relationships: One-to-One, One-to-Many, Many-to-Many; Eager Loading
12	Laravel – Authentication & Authorization	Laravel built-in authentication (Breeze/Jetstream); Login, Register, Password Reset; Roles and Permissions; Policy and Gates; Middleware for authorization
13	RESTful API Development with Laravel	Designing RESTful APIs; API Routes and Controllers; Resource API Controllers; API Authentication with Sanctum; JSON responses and error handling; API testing with Postman
14	Project Work and Documentation	Capstone project: Building a complete web application using PHP, MySQL, and Laravel; Frontend with HTML5, CSS3, JavaScript; Backend with Laravel; Database design and integration; Testing, deployment, and documentation

GENERATIVE AI AND PROMPT ENGINEERING - PYTHON BASED APPROACH (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to Generative AI	Understanding generative artificial intelligence; Applications of generative models in various domains; Types of generative models: autoregressive models, VAEs, GANs, etc.
2	Foundations of Prompt Engineering	The role of prompts in guiding generative models; Introduction to prompt engineering and its significance; Basic principles of prompt formulation and design
3	Language Models & GPT	Overview of language models for text generation; Introduction to OpenAI's GPT series; Understanding prompt-based generation with GPT models; ChatGPT and Claude API usage
4	Advanced Prompt Engineering Techniques	Advanced prompt design strategies; Zero-shot, One-shot, and Few-shot prompting; Chain-of-thought prompting; Handling biases and improving fairness; Fine-tuning strategies for specific tasks
5	Image Generation Models	Introduction to Diffusion Models; DALL-E, Stable Diffusion, Midjourney; Prompt engineering for image generation; Negative prompts and sampling parameters; ControlNet and image-to-image generation
6	Code Generation & AI-Assisted Programming	GitHub Copilot and AI coding assistants; Prompt engineering for code generation; Debugging with AI; Test generation; Code explanation and documentation
7	Evaluation Metrics & Performance Analysis	Metrics for evaluating generative AI models; Benchmark datasets and evaluation techniques; BLEU, ROUGE, and perplexity scores; Analyzing model performance and identifying areas for improvement
8	Fine-Tuning & Transfer Learning	Introduction to fine-tuning language models; Parameter-efficient fine-tuning (LoRA, PEFT); Building custom AI models on domain data; Evaluation of fine-tuned models
9	Deploying Generative AI Models	Deployment considerations for generative AI models; Infrastructure requirements and model serving; Scalability and performance optimization; API development for AI services
10	Ethical AI, Bias & Responsible AI	Analyzing ethical implications and biases in generative AI applications; Responsible AI principles; Regulatory landscape (EU AI Act); Preventing misuse: deepfakes and misinformation
11	AI for Business Applications	AI use cases in marketing, healthcare, education, and finance; Using AI tools for productivity (Notion AI, Jasper, etc.); ROI of AI adoption; Building AI-powered workflows
12	Building AI-Powered Applications	Integrating LLMs into applications using APIs; LangChain framework fundamentals; Building a RAG (Retrieval-Augmented Generation) system; Vector databases and embeddings
13	Multimodal AI & Future Trends	Introduction to multimodal models (text + image + audio); GPT-4o and other multimodal LLMs; Agentic AI and autonomous systems; Future of Generative AI
14	Project Work and Documentation	Capstone project: Building a Generative AI-powered application (chatbot, content generator, or image generator); Prompt library development; Project report and documentation; Presentation and evaluation

GENERATIVE AI & PROMPT ENGINEERING - NO-CODE / LOW-CODE (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to Generative AI	What is Generative AI; AI vs ML vs DL; Real-world applications (text, image, audio, video); Overview of popular tools
2	Understanding Large Language Models (LLMs)	How LLMs work (conceptual); Tokens, context, parameters; Examples like ChatGPT, Gemini; Use cases
3	Prompt Engineering Fundamentals	What is a prompt; Types of prompts; Role-based prompting; Zero-shot & few-shot prompting
4	Advanced Prompting Techniques	Chain-of-thought prompting; Instruction tuning; Output formatting; Prompt refinement strategies
5	AI Tools for Text Generation	Using tools like ChatGPT for content writing, emails, reports; Summarization; Paraphrasing; Translation
6	AI for Image Generation	Tools like DALL·E, Midjourney (conceptual); Prompting for images; Styles, variations, editing
7	No-Code AI Tools & Platforms	Overview of tools like Notion AI, Canva AI, Zapier AI; Workflow automation without coding
8	AI for Data & Analytics	Using AI for data insights; Excel/Sheets AI features; Generating reports and dashboards with AI
9	Mini Project 1 – Content Automation	Build automated content system (blog/social media/email) using AI tools
10	AI for Business Productivity	Resume building; Presentation creation; Meeting summaries; Chatbots for business use
11	Mini Project 2 – AI Chatbot (No-Code)	Create chatbot using no-code tools (e.g., ChatGPT + form/tools); Basic conversational flow
12	Ethics, Limitations & Responsible AI	Bias, hallucination, privacy; Best practices; Responsible usage guidelines
13	Prompt Engineering for Different Domains	Marketing, education, coding, analytics use cases; Custom prompt templates
14	Final Capstone Project & Portfolio	End-to-end project using AI tools; Real-world use case; Documentation; Portfolio creation & presentation

VLSI AND FPGA DESIGN COURSE USING VHDL / VERILOG (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to VLSI & Digital Design Basics	Evolution of VLSI and Moore's Law; Overview of VLSI technologies: ASIC vs. FPGA; Applications in IoT, AI, communication systems; Introduction to EDA tools; Number systems, logic gates, truth tables; Boolean algebra; Combinational and Sequential circuits
2	Introduction to VHDL for Digital Design	History and purpose of HDL: VHDL vs Verilog; Basic structure of VHDL: Entity, Architecture, Library; VHDL syntax, identifiers, and data types; Operators, signal assignments, control flow: IF, CASE, LOOP; Concurrent vs. sequential statements
3	VHDL Programming & Simulation	VHDL Coding Styles: Behavioral, Dataflow, and Structural modeling; Writing testbenches for simulation; Synthesis and simulation process overview; Simulation Using ModelSim: Compiling, simulating, and debugging VHDL code; Waveform analysis
4	CMOS-Based Design Concepts	CMOS based NAND, NOR, XOR, XNOR Universal Gate Design; CMOS based Latch, Flip-flop, Register design; CMOS inverter and logic gate sizing; Pass transistor logic
5	IC Fabrication Journey	Semiconductor materials and ingot formation (Czochralski Process); Wafer slicing, lapping, and polishing; Oxidation and formation of SiO ₂ layers; Photolithography; Etching and doping; Deposition techniques: PVD, CVD; Metallization; Wafer testing, dicing, and packaging
6	Vivado Design Flow & Project Management	Introduction to Xilinx Vivado IDE; Creating VHDL-based projects; IP Catalog usage and constraint files; RTL analysis and hierarchy view; Synthesis, Implementation, Bitstream Generation
7	Introduction to FPGA & Spartan7 Series	FPGA architecture: logic blocks, I/O, and interconnects; Overview of Xilinx Spartan7 FPGA features and resources; Exploring development board features and peripheral interfaces
8	Programming & Testing on Spartan7 FPGA	Design constraints and I/O pin assignment; Timing analysis, place and route, and bitstream generation; Bitstream upload and verification on the Spartan7 board
9	ALU Design & Digital Circuits	Coding, simulating, synthesizing, and implementing a basic ALU; Testing ALU functionality on FPGA; Designing and implementing a digital encoder/decoder/counter with 7-segment display interface; Verification of timing constraints
10	Advanced Digital System Design	Digital Timer, Clock Divider, FSM-based design; 4-digit up/down counters and BCD interfacing; Multiplexed display driving; Button interfacing and debouncing
11	Memory & Peripheral Interfacing	UART communication basics; Displaying serial data from FPGA; Overview of I2C/SPI protocols; Implementing a simple SPI or I2C master on FPGA
12	Introduction to Verilog HDL	History and basics of Verilog; Module declaration and port types; Verilog data types and operators; Behavioral and structural modeling in Verilog; Testbench writing in Verilog
13	System-Level Design & IP Integration	System-level design considerations; Using pre-built IP cores in Vivado; AXI protocol basics; Integrating IP in block design; Introduction to Zynq SoC (ARM + FPGA)
14	Final Project Assessment and Documentation	Capstone project: Design, simulate, implement, and test a complete digital system on FPGA; Project Demo and Discussion; Student presentations of FPGA project designs and results; Challenges and solutions documentation

WEB DESIGNING USING HTML 5, CSS3, JAVASCRIPT, BOOTSTRAP (PROJECT-BASED)

#	Module Title	Topics / Description
1	Introduction to the Web & Internet	Brief History of Internet; What is World Wide Web; Why create a web site; Web Standards; How browsers work; Introduction to web development tools
2	HTML Fundamentals & Document Structure	Introduction to HTML; What is HTML; HTML Documents; Basic structure of an HTML document; Creating an HTML document; Mark up Tags; Heading-Paragraphs; Line Breaks; HTML Tags
3	HTML Elements – Text, Lists & Tables	Introduction to elements of HTML; Working with Text; Working with Lists (ordered, unordered, definition); Working with Tables; Table attributes and styling
4	HTML Frames, Forms, Hyperlinks, Images & Multimedia	Working with Hyperlinks; Images and Multimedia; Working with Frames (iframes); Working with Forms and controls; HTML5 semantic elements (header, footer, article, section, nav)
5	CSS Fundamentals & Styling	Concept of CSS; Creating Style Sheet; CSS Properties; CSS Styling (Background, Text Format, Controlling Fonts); Working with block elements; Working with Lists and Tables; CSS Id and Class
6	CSS Box Model & Layout	Box Model (Border, Padding, Margin properties); CSS Advanced (Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar); CSS Color; Creating page Layout and Site Designs
7	CSS3 Advanced – Flexbox & Animations	CSS Flexbox layout; CSS Grid layout; CSS Transitions and Animations; CSS3 features: border-radius, box-shadow, gradients; Responsive design using media queries
8	Introduction to JavaScript	Java Script Language Basics; JavaScript Objects, Scope; JavaScript Events; Strings, Numbers, Math; Arrays, Boolean; Comparisons, Conditions, Switch, Loops; Type Conversion; RegExp; JavaScript Functions
9	JavaScript DOM & Form Validation	JavaScript HTML DOM; Selecting and manipulating DOM elements; Event handling; Form validation; JavaScript Errors and Debugging; JavaScript ES6 features (let, const, arrow functions, template literals)
10	Introduction to jQuery	jQuery Syntax; jQuery Selectors; jQuery Events; jQuery Effects; jQuery HTML manipulation; jQuery Traversing; jQuery AJAX; jQuery Misc
11	Bootstrap Basics & Grid System	Bootstrap introduction; Bootstrap Grids; Grid system and responsive breakpoints; Creating responsive layouts; Bootstrap CSS utilities; Bootstrap Themes
12	Bootstrap Components	Navigation bars; Buttons; Forms; Modals; Alerts; Cards; Carousel; Accordion; Bootstrap JS components
13	Advanced Bootstrap & Responsive Design	Bootstrap Spacing, Colors, Typography; Flexbox utilities; Customizing Bootstrap with Sass; Bootstrap themes; Integrating Bootstrap with JavaScript plugins; Building a complete responsive website
14	Project Work and Documentation	Capstone project: Building a complete multi-page responsive website; HTML structure, CSS styling, JavaScript interactivity, Bootstrap components; Final design review; Presentation and faculty evaluation