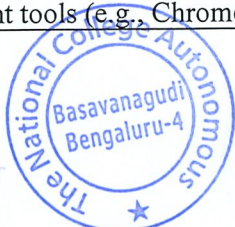


Add on course 2022-23		
Building Dynamic Websites with HTML, CSS and Beyond		
Duration: 48 Hours	Department of Computer Science	Course code: CS-VSD
<p>Objectives and Course Outcomes: This course provides a comprehensive introduction to building dynamic websites using HTML, CSS, JavaScript, and backend technologies. Students will learn how to create interactive web applications that dynamically generate content, handle user inputs, interact with databases, and communicate with servers.</p>		
<p>Course Objectives:</p> <ul style="list-style-type: none"> • Understand the principles of dynamic web development • Learn how to use HTML, CSS, and JavaScript to create interactive webpages • Explore frontend frameworks and libraries for building responsive and interactive user interfaces • Gain proficiency in server-side programming using backend technologies • Learn how to work with databases to store and retrieve data dynamically • Develop skills in building RESTful APIs for client-server communication • Gain hands-on experience by completing practical projects 		
Module 1: Introduction to Dynamic Web Development		08 Hours
<ul style="list-style-type: none"> • Overview of dynamic web development • Introduction to HTML5 and CSS3 • Basic JavaScript concepts: variables, data types, operators, control structures 		
Module 2: Frontend Development with JavaScript		10 Hours
<ul style="list-style-type: none"> • DOM manipulation and event handling • Introduction to JavaScript frameworks/libraries (e.g., jQuery) • Responsive web design and CSS frameworks (e.g., Bootstrap) 		
Module 3: Introduction to Backend Technologies		10 Hours
<ul style="list-style-type: none"> • Overview of backend development • Introduction to server-side scripting languages (e.g., Node.js, Python) • Setting up a local development environment 		
Module 4: Working with Databases		10 Hours
<ul style="list-style-type: none"> • Introduction to databases (e.g., MySQL, MongoDB) • CRUD operations (Create, Read, Update, Delete) using backend languages • Database connectivity and querying 		
Module 5: Building RESTful APIs		10 Hours
<ul style="list-style-type: none"> • Introduction to REST architecture • Creating RESTful APIs using frameworks like Express.js (Node.js) or Flask (Python) <p>Consuming APIs from frontend using JavaScript</p>		
<p>SUGGESTED READING:</p> <ul style="list-style-type: none"> • Textbooks, online tutorials, documentation • Code editors (e.g., Visual Studio Code, Sublime Text) • Web development tools (e.g., Chrome Developer Tools) 		



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Add on Course 2022-23		
GRAPHIC DESIGN FOR NON-DESIGNERS		
Duration: 30 Hours	Department of Computer Science	Course code: CS-VSD
<p>Course Description: This course is designed for individuals with no prior experience in graphic design who want to learn the basics of creating visually appealing graphics for personal or professional use. Participants will explore fundamental design principles, learn how to use graphic design software, and develop practical skills for designing various types of visual content.</p> <p>Course Objectives:</p> <ul style="list-style-type: none"> • Understand fundamental design principles and terminology • Learn how to use graphic design software effectively • Develop skills in creating basic graphics and layouts • Gain confidence in designing visual content for different purposes 		
Module 1: Introduction to Graphic Design and Graphic Design Software		06 Hours
<p>Graphic Design</p> <ul style="list-style-type: none"> • Overview of graphic design principles and terminology • Understanding the role of graphic design in communication • Introduction to basic design elements: line, shape, color, typography <p>Graphic Design Software</p> <ul style="list-style-type: none"> • Overview of graphic design software options (e.g., Canva, Adobe Spark) • Navigating the interface and basic tools • Hands-on exercises to create simple graphics 		
Module 2: Typography Basics		06 Hours
<ul style="list-style-type: none"> • Understanding the importance of typography in design • Introduction to font selection and pairing • Hands-on exercises to create text-based graphics 		
Module 3: Layout and Composition		08 Hours
<ul style="list-style-type: none"> • Principles of layout and composition in graphic design • Creating balanced and visually appealing layouts • Hands-on exercises to design posters or social media graphics 		
Module 4: Design		08 Hours
<p>Colour Theory</p> <ul style="list-style-type: none"> • Introduction to colour theory and its application in design • Understanding colour schemes and combinations • Hands-on exercises to create colour-themed graphics <p>Putting It All Together</p> <ul style="list-style-type: none"> • Review of key concepts covered in the course • Final project: Designing a visual campaign or series of graphics. 		
<p>SUGGESTED READING:</p> <ul style="list-style-type: none"> • Graphic design software (e.g., Canva, Adobe Spark) • Design tutorials and resources available online • Reference materials on graphic design principles and techniques 		



ADD ON COURSE 2022-23		
LAYOUT AND PUBLISHING MASTERY		
Duration: 48 Hours	Department of Computer Science	Course code: CS-LPM
<p>Course Description: This course provides comprehensive training in layout design and publishing techniques for print and digital media. Students will learn the principles of typography, layout composition, colour theory, and graphic design software skills necessary to create professional-quality publications. Through hands-on projects and real-world examples, students will develop the knowledge and skills required to produce visually appealing and effective print and digital publications.</p>		
<p>Course Objectives:</p> <ol style="list-style-type: none"> 1. Understand the principles of layout design and typography. 2. Develop proficiency in using graphic design software for layout and publishing. 3. Learn techniques for creating visually engaging and cohesive layouts. 4. Explore various publishing formats, including print and digital media. 		
Module 1:		8 Hours
<p>Introduction to Layout Design: Principles of layout composition, Understanding visual hierarchy, Introduction to graphic design software (e.g., Adobe InDesign) Typography Fundamentals: Anatomy of type, Typeface selection and pairing, Typographic hierarchy and emphasis Colour Theory and Application: Colour models and terminology, Colour psychology and symbolism, Creating colour schemes for layouts</p>		
Module 2:		8 Hours
<p>Grid Systems and Layout Structures: Grid theory and design principles, applying grids to layout compositions, Designing multi-page layouts Image Integration and Graphic Elements: Image selection and editing, using graphic elements (icons, illustrations) in layouts, Incorporating text and image interaction</p>		
Module 3:		8 Hours
<p>Print Publishing Workflow: Prepress preparation and file optimization, Understanding print specifications and requirements, Proofing and quality control in print production Digital Publishing Techniques: Designing for web and mobile platforms, Interactive elements and multimedia integration, Exporting layouts for digital distribution</p>		
Module 4:		8 Hours
<p>Branding and Identity Design: Creating brand guidelines, Consistency in branding across publications, Case studies in effective branding Publication Design for Different Formats: Editorial design for magazines and newspapers, Book layout and typesetting, Designing brochures and promotional materials Packaging Design: Principles of packaging design, Structural considerations and die-lines, Label and package graphics</p>		
<p>Textbook:</p> <ol style="list-style-type: none"> 1. "The Non-Designer's Design Book" by Robin Williams 2. "Layout Essentials: 100 Design Principles for Using Grids" by Beth Tondreau 		



DISTRIBUTED SYSTEMS AND VIRTUALIZATION

Duration: 30 Hours

Course code: CS-DSV

Course Description:

This course introduces fundamental concepts, principles, and techniques in distributed systems and virtualization. Students will learn about the design, implementation, and management of distributed systems and virtualized environments, including cloud computing platforms.

Course Objectives:

1. Understand the principles and challenges of distributed systems.
2. Learn about various distributed system architectures and models.
3. Explore virtualization technologies and their applications.
4. Gain hands-on experience with virtualization platforms and tools.
5. Analyse real-world distributed systems and virtualization case studies.

Module 1:

7 Hours

Introduction to Distributed Systems: Definition and characteristics of distributed systems, Challenges and issues in distributed computing.

Distributed System Architectures: Client-server architecture, Peer-to-peer architecture, Hybrid architectures.

Module 2:

7 Hours

Communication in Distributed Systems: Remote procedure calls (RPC), Message-oriented middleware (MOM), Distributed object middleware (e.g., CORBA).

Distributed System Models: Synchronous vs. asynchronous models, Event-driven and data-driven models.

Module 3:

8 Hours

Distributed File Systems: Concepts and design principles, Case studies: NFS, AFS, Google File System (GFS).

Distributed Coordination and Consensus: Distributed transactions and consensus algorithms (e.g., Paxos, Raft).

Virtualization Overview: Introduction to virtualization, Types of virtualizations: hardware, software, and network virtualization.

Module 4:

8 Hours

Virtualization Technologies: Hypervisors (Type 1 and Type 2), Containerization (e.g., Docker), Virtual machine management (e.g., VMware, KVM).

Cloud Computing: Introduction to cloud computing, Cloud service models (IaaS, PaaS, SaaS), and Cloud deployment models (public, private, hybrid).

Virtualization Management and Orchestration: Virtual infrastructure management and orchestration tools (e.g., Kubernetes, OpenStack).

Textbook:

- "Distributed Systems: Principles and Paradigms" by Andrew S. Tanenbaum and Maarten Van Steen
- "Virtualization Essentials" by Matthew Portnoy



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SCALABLE IT SOLUTIONS IN THE CLOUD

Duration: 30 Hours

Course code: CS-ITC

Course Description:

This course explores scalable IT solutions leveraging cloud computing technologies. Students will learn about designing, implementing, and managing scalable applications and services in cloud environments. Emphasis will be placed on understanding scalability challenges and employing cloud-native tools and techniques to address them.

Course Objectives:

1. Understand the concepts and principles of scalability in the context of cloud computing.
2. Learn about different types of scalabilities (horizontal, vertical, etc.) and their application in cloud environments.
3. Explore cloud-native technologies for building scalable applications and services.
4. Gain hands-on experience with cloud platform services and tools for scalability.
5. Analyse case studies of scalable IT solutions deployed in the cloud.

Module 1:

7 Hours

Introduction to Scalability and Cloud Computing: Definition of scalability, Characteristics of scalable IT solutions, Overview of cloud computing and its benefits for scalability.
Types of Scalabilities: Horizontal scalability (scaling out), Vertical scalability (scaling up), and Elastic scalability.

Module 2:

7 Hours

Designing Scalable Architectures: Principles of scalable design, Scalability patterns (e.g., load balancing, caching), Microservices architecture.
Scalable Storage Solutions: Distributed file systems, NoSQL databases (e.g., Cassandra, MongoDB), and Object storage services (e.g., Amazon S3, Azure Blob Storage).

Module 3:

8 Hours

Scalable Compute Resources: Virtual machines vs. containers, Container orchestration (e.g., Kubernetes), Serverless computing (e.g., AWS Lambda, Azure Functions).
Scalable Networking Infrastructure: Content Delivery Networks (CDNs), Scalable network architectures (e.g., VPCs, virtual networks), Global load balancing.

Module 4:

8 Hours

Monitoring and Autoscaling: Monitoring tools and metrics for scalability, Autoscaling policies, and triggers, Autoscaling in practice (e.g., AWS Auto Scaling, Azure Autoscale).
Resilience and Fault Tolerance: Designing for failure in distributed systems, High availability architectures, Disaster recovery strategies in the cloud.

Textbook:

- "Cloud Native Architectures: Design high-availability and cost-effective applications for the cloud" by Tom Laszewski and Kamal Arora
- "Scalability Rules: Principles for Scaling Web Sites" by Martin L. Abbott and Michael T. Fisher



DATA SCIENCE PREDICTIVE ANALYTICS SPECIALIZATION

Duration: 48 Hours

Course code: CS-SIS

Course Description:

This specialization focuses on predictive analytics techniques and their application in data science. Students will learn to analyse data, build predictive models, and use them to make data-driven decisions across various domains. Emphasis will be placed on hands-on projects and real-world applications.

Course Objectives:

1. Understand the principles and methodologies of predictive analytics.
2. Learn to preprocess data for predictive modelling.
3. Explore various predictive modelling techniques, including regression, classification, and clustering.
4. Gain practical experience in building and evaluating predictive models using real-world datasets.
5. Apply predictive analytics techniques to solve business problems and make data-driven decisions.

Module 1:

12 Hours

Introduction to Predictive Analytics: Introduction to predictive analytics, Data pre-processing techniques, Exploratory data analysis (EDA), and Introduction to regression analysis.

Module 2:

12 Hours

Regression Analysis: Linear regression, Polynomial regression, Multiple regression, Model evaluation and validation techniques.

Classification and Clustering: Introduction to classification and clustering, Logistic regression, Decision trees and random forests, K-means clustering.

Module 3:

12 Hours

Advanced Predictive Modelling: Ensemble methods (e.g., bagging, boosting), Support Vector Machines (SVM), Neural networks for predictive analytics, Time series forecasting.

Module 4:

12 Hours

Applied Predictive Analytics: Case studies and real-world applications of predictive analytics, Hands-on projects using industry-standard tools (e.g., scikit-learn, TensorFlow, Keras), Ethical considerations in predictive analytics, Final project: Design and implement a predictive analytics solution for a real-world problem.

Textbooks and Resources:

- "Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die" by Eric Siegel
- "Introduction to Statistical Learning" by Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani
- Online tutorials, documentation, and case studies from industry leaders (e.g., Kaggle, Towards Data Science)



CRAFTING EFFECTIVE WEBSITES

Duration: 48 Hours

Course code: CS-WEB

Course Description:

This course introduces students to the principles and techniques of designing and building effective websites. Students will learn the fundamentals of web design, user experience (UX) principles, and best practices for creating websites that engage and delight users.

Course Objectives:

1. Understand the principles of effective website design and user experience.
2. Learn to plan, design, and prototype websites using industry-standard tools.
3. Develop proficiency in HTML, CSS, and other web development technologies.
4. Gain hands-on experience in building responsive and accessible websites.
5. Analyse and critique existing websites to understand design choices and user interactions

Module 1:

12 Hours

Introduction to Website Design: Importance of effective website design, Overview of web design process and methodologies.

Understanding Users and User Experience (UX): Principles of user-centered design, conducting user research and usability testing, Creating user personas and user journeys.

Module 2:

12 Hours

Planning and Wire Framing: Defining project goals and objectives, Information architecture and site mapping, Wire framing tools and techniques.

Visual Design for the Web: Typography, colour theory, layout principles, Visual hierarchy, and branding considerations, Designing for mobile-first and responsive layouts.

Module 3:

12 Hours

HTML and CSS Fundamentals: Basics of HTML markup and semantic structure, Introduction to CSS styling and layout techniques, Implementing CSS frameworks for rapid development.

Building Responsive Websites: Principles of responsive web design, Media queries and breakpoints, Testing and debugging across multiple devices and browsers.

Module 4:

12 Hours

Introduction to Web Development Tools: Text editors and Integrated Development Environments (IDEs), Version control with Git and GitHub, and Browser developer tools for debugging and optimization.

Website Optimization and Performance: Techniques for optimizing images and media, Minification and compression of HTML, CSS, and JavaScript, Web performance metrics, and tools for analysis.

Textbooks and Resources:

- "Don't Make Me Think" by Steve Krug
- "HTML and CSS: Design and Build Websites" by Jon Duckett
- Online tutorials and documentation for web design and development tools (e.g., Adobe XD, Figma, Visual Studio Code)



Data-Driven Insights: Unveiling the Power of Business Intelligence

Duration: 48 Hours

Course code: CS-DDI

Course Description:

This course provides a comprehensive overview of business intelligence principles and practices, focusing on harnessing the power of data to drive strategic decision-making and enhance business performance. Participants will gain a deep understanding of various analytical techniques, tools, and methodologies used in modern business environments to extract actionable insights from data.

Course Objectives:

1. Understand the fundamental concepts of business intelligence and its importance in contemporary business settings.
2. Explore different types of data and sources, including structured and unstructured data, and their relevance to business analytics.
3. Learn various data analysis techniques, such as descriptive, diagnostic, predictive, and prescriptive analytics.
4. Gain proficiency in using popular business intelligence tools and software platforms for data visualization and analysis.

Module 1:

12 Hours

Introduction to Business Intelligence, Definition, and Significance, Evolution of business intelligence, Role in decision-making processes.
Understanding Data: Types of data: structured vs. unstructured, Data sources and collection methods, Data quality and governance.

Module 2:

12 Hours

Data Analysis Techniques: Descriptive analytics: summarizing and interpreting data, Diagnostic analytics: identifying patterns and correlations, Predictive analytics: forecasting future trends, Prescriptive analytics: recommending actions for optimization.
Business Intelligence Tools and Technologies: Overview of popular BI tools (e.g., Tableau, Power BI, Qlik), Hands-on exercises with selected BI software platforms, and Data visualization best practices.

Module 3:

12 Hours

Data Interpretation and Communication: Interpreting analytical results, Effective storytelling with data, Communicating insights to diverse stakeholders.
Applications of Business Intelligence: Case studies across various industries (e.g., retail, finance, healthcare), Practical examples of BI implementation and impact.

Module 4:

12 Hours

Ethical Considerations in Business Analytics: Privacy and security issues, Data governance and compliance, Ethical implications of data-driven decision-making.

Recommended Textbooks:

- "Business Intelligence Guidebook: From Data Integration to Analytics" by Rick Sherman
- "Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking" by Foster Provost and Tom Fawcett



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