PEOPLE'S INFORMATION TECHNOLOGY PROGRAMME (PITP)

PHASE II - BATCH I

(22-SEP-2025 TO 14-NOV-2025) | (MONDAY TO FRIDAY)

LESSON PLAN

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1. Web Development

Course Overview

This course is designed to equip participants with the essential skills required to become competent web developers. Beginning with the foundations of the internet, HTML, and CSS, the course gradually progresses towards JavaScript fundamentals, DOM manipulation, responsive design, PHP programming, and database integration. By the end of the program, learners will not only understand how to build functional and responsive websites but will also gain the confidence to integrate server-side features and database-driven functionalities.

The training also includes soft skills and freelancing modules to prepare learners for real-world opportunities, helping them effectively communicate with clients, build strong professional profiles, and explore freelancing platforms. Practical, hands-on activities and deliverables are incorporated throughout to ensure participants apply their knowledge in real time, leading up to the development of a complete portfolio project.

Course Structure

Week	Days	Topics
Week 1	**Day 1**	Overview of the Internet, Web, and Browsers
	Day 2	Understanding the Client-Server Model
	Day 3	Introduction to Web Development Tools (IDEs, Browsers, Inspect Tools)
	Day 4	Setting up a Development Environment (VS Code)
	Day 5	Structure of an HTML Document, HTML Tags
	Activities & Deliverables	Build a simple HTML webpage demonstrating the use of basic HTML tags and structure.
Week 2	**Day 1**	Forms and Form Elements (input types, validation)
	Day 2	HTML tags (tables, list)
	Day 3	Introduction to CSS and its Types (inline, internal, external), CSS Selectors, Properties, and Specificity
	Day 4	Box Model and Layout Techniques, Styling Text, Colors, Backgrounds, and Borders
	Day 5	Positioning and Creating Simple Page Layouts
	Activities & Deliverables	Design a styled webpage using forms, tables, lists, and CSS layouts.
Week 3	**Day 1**	Introduction to JavaScript and Its Role in Web Development
	Day 2	Data Types, Variables, and Operators
	Day 3	Conditional Statements and Loops
	Day 4	Functions and Scope

	Day 5	Arrays and Objects
	Activities & Deliverables	Create an interactive webpage where JavaScript handles basic calculations
Week 4	**Day 1**	DOM Tree and Element Selection (getElementById, querySelector)
	Day 2	Event Handling and Listeners
	Day 3	Modifying DOM Elements Dynamically
	Day 4	Form Validation using JavaScript
	Day 5	Midterms
	Activities & Deliverables	Develop a simple form with JavaScript-based validation and dynamic DOM updates.
Week 5	**Day 1**	Concepts of Responsive Web Design
	Day 2	Transitions
	Day 3	Animations
	Day 4	Understand the role of PHP in server-side web development
	Day 5	PHP Syntax and Tags
	Activities & Deliverables	Create a responsive webpage with basic CSS animations and integrate a simple PHP script.
Week 6	**Day 1**	Variables and Data Types
	Day 2	Operators (Arithmetic, Comparison, Logical)
	Day 3	Control Structures (if, else, switch)
	Day 4	Loops (for, while etc)
	Day 5	Write PHP scripts to handle form data and server requests using GET and POST
	Activities & Deliverables	Build a contact form that sends and retrieves data using PHP GET & POST methods.
Week 7	**Day 1**	Introduction to Databases and Data Models
	Day 2	Connect and interact with a database using PHP (MySQL or MongoDB)
	Day 3	Performing CRUD Operations
	Day 4	Data insertion in DB using HTML form
	Day 5	Signup/Login Page
	Activities & Deliverables	Develop a signup/login system connected to a MySQL database performing CRUD operations.
Week 8	**Day 1**	Explore freelancing basics, top marketplaces like Upwork & Fiver
	Day 2	Soft Skills-Effective principles of oral and written communication, Listening skills – listening to the employer and clients, Feedback to the clients, and ethics
	Day 3	Soft Skills-Resume Writing- theory and practice, LinkedIn profile- importance, and account creation
	Day 4	Soft Skills- Employment interviews- theory, discussion, pair interview simulation, group simulation
	Day 5	Finals
	Activities & Deliverables	Prepare a personal portfolio website, optimize it for launch, and present it as part of the final assessment.

Course Outcomes

Upon successful completion of this course, participants will be able to:

- Demonstrate proficiency **in** HTML, CSS, and JavaScript for building interactive, responsive websites.
- Understand and implement client-server communication and dynamic DOM manipulation.
- Apply PHP programming to handle forms, manage server requests, and interact with databases.
- Design and integrate user authentication systems (signup/login) with CRUD operations.
- Build and present a personal portfolio website showcasing their skills and projects.
- Develop essential professional and freelancing skills to pursue career opportunities.

Delivery Framework

- **Teaching Methodology:** Prioritize innovation, creativity, and strategic thinking. Instruction should be a blend of roughly 40% lecture and discussion, complemented by 60% hands-on workshops and lab sessions focused on content development.

- **Assessment & Feedback:** Evaluate not only the quality of creative outputs but also the reasoning and strategic thought process behind each submission. Offer detailed, constructive feedback to guide improvement.

- **Learning Environment:** Build a collaborative classroom culture by encouraging peer review, open dialogue, and active participation in group activities.

- **Digital Monitoring:** Employ the LMS to manage submissions, track strategic documents, gather links to student work (e.g., Canva projects), and conduct quizzes or assessments efficiently.

- **Inclusive Access:** Strive for accessibility by distributing printed slide decks when feasible, using large and clear fonts in development tools, and providing captions or transcripts for all video-based learning resources.

Assessment Strategy

Assignments (25 Marks – 5 × 5)

Practical, hands-on exercises aligned with weekly outcomes.

- **A1 (Week 1):** Build a basic HTML webpage using standard tags and structure.
- **A2 (Week 2):** Design a styled webpage incorporating forms, tables, lists, and CSS layouts.
- **A3 (Week 3):** Create an interactive webpage using JavaScript for basic calculations.
- **A4 (Week 5):** Develop a responsive webpage with CSS animations & integrate a simple PHP script.
- **A5 (Week 6):** Build a contact form using PHP GET & POST methods for data handling.

Quizzes (25 Marks – 5 × 5)

Short MCQ-based assessments on core concepts.

- **Q1 (Week 2):** HTML Structure, Forms, and CSS Basics
- **Q2 (Week 3):** JavaScript Fundamentals (variables, loops, functions)
- **Q3 (Week 4):** DOM Manipulation and Event Handling
- **Q4 (Week 6):** PHP Fundamentals (syntax, control structures, loops)
- **Q5 (Week 7):** Databases, CRUD Operations, and Authentication Systems

Final Project (50 Marks)

A capstone project showcasing end-to-end web development skills.

Timeline: Assigned in Week 7; final submission and presentation in Week 8.
Evaluation Criteria:

- **Design & Architecture (15 pts):** Clear structure, responsive design, and usability.
- **Implementation & Functionality (20 pts):** Working features (forms, PHP integration, database connectivity).
- **Security & Best Practices (10 pts):** Secure coding, validation, and compliance with web standards.
- **Documentation & Presentation (5 pts):** Portfolio website with clear explanations and professional demonstration.

Reference Materials & Tools

- **Development Tools:** Visual Studio Code, Sublime Text, Chrome DevTools, Firefox Developer Edition
- **Core References:** MDN Web Docs, W3Schools, PHP Manual, MySQL Documentation

- **Practice Platforms:** FreeCodeCamp, Codecademy, LeetCode (for JavaScript practice)
- **Additional Support:** Class notes, recorded lectures, sample codes, and project guidelines

Completion & Certification Standards

To successfully earn certification, participants must:

- Maintain at least 90% attendance throughout the course.
- Complete all weekly activities and deliverables as assigned.
- Achieve a minimum of 50% in the midterm assessment.
- Demonstrate professionalism, teamwork, and effective communication during sessions and evaluations.

Program Guidelines

- ✓ Emphasis is placed on strategy and conceptual learning; while the use of real brand accounts is optional, it is encouraged where feasible.
- ✓ All assignments and projects must be submitted within the given deadlines. Delays in submission may impact eligibility for certification.
- ✓ Confidential or sensitive information must never be uploaded to public platforms. When sharing work, anonymized or sample datasets should be used instead.
- ✓ Professional, respectful, and collaborative behavior is expected at all times—whether in class, labs, or online spaces.
- ✓ Acts of plagiarism, duplication, or misrepresentation of work are strictly prohibited.
- ✓ Students are welcome to utilize AI tools to enhance learning and productivity; however, their usage must be transparently cited and cannot replace original project work.
- ✓ University disciplinary rules and regulations must be adhered to; non-compliance may result in formal action.
- ✓ Course-related feedback or concerns should be communicated via the designated channel, where respectful reporting will be addressed promptly.

For Any Assistance

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2. E- Commerce

Course Overview

This course provides a complete hands-on understanding of E-Commerce business models, platforms, and digital store management. Learners will explore how to set up online stores using platforms like WooCommerce and Shopify, configure payments, optimize for SEO, and implement digital marketing strategies. The course also covers customer engagement, analytics, and freelancing opportunities in E-Commerce to prepare learners for both entrepreneurship and professional roles.

Course Structure

Week	Day	Topic
Week 1	**Day 1**	Overview of E-commerce & Business Models (B2B, B2C, C2C)
	Day 2	Benefits & Challenges of E-commerce
	Day 3	E-commerce Platforms Comparison (WooCommerce, Shopify, Magento)
	Day 4	Domain Names & Web Hosting Basics
	Day 5	Key Components of a Successful E-commerce Website
	Tasks & Activities	Research 3 real-world E-commerce stores. Identify their business model (B2B/B2C/C2C), hosting, and domain provider. Present findings in class.
Week 2	**Day 1**	Installing WordPress & WooCommerce
	Day 2	Shopify Dashboard & Settings Overview
	Day 3	Selecting & Customizing Store Themes
	Day 4	Setting Store Information: Currency, Tax & Shipping
	Day 5	Managing Pages, Menus & Store Policies
	Tasks & Activities	Create a demo online store (WooCommerce or Shopify) with proper currency, tax, and shipping settings. Share the store URL with peers.
Week 3	**Day 1**	Adding Simple, Variable & Digital Products
	Day 2	Product Descriptions, Images & Pricing Strategies
	Day 3	Inventory Management & Stock Keeping
	Day 4	Categories, Tags & Customer Purchase Journey
	Day 5	Order Management: Viewing, Fulfilling, Cancelling Orders
	Tasks & Activities	Add 5 sample products with descriptions, images, pricing & categories. Simulate a customer order and process it.
Week 4	**Day 1**	Introduction to Online Payment Methods
	Day 2	Setting up PayPal & Stripe (International)
	Day 3	Setting up JazzCash & Easypaisa (Local)
	Day 4	Payment Gateway Sandbox Testing
	Day 5	Mid Term Exam

	Tasks & Activities	Integrate one payment gateway in sandbox mode and process a test payment on your demo store.
Week 5	**Day 1**	Basics of SEO for E-commerce Sites
	Day 2	Keyword Research & On-page Optimization
	Day 3	SEO-friendly Product Titles & Descriptions
	Day 4	Social Media & Google Ads for E-commerce
	Day 5	Creating Facebook & Instagram Ads + Budgeting Campaigns
	Tasks & Activities	Optimize 3 product pages for SEO + create 1 sample ad campaign. Present SEO improvements & ad designs.
Week 6	**Day 1**	Understanding Customer Behavior & Loyalty
	Day 2	Discount Coupons & Promotional Offers
	Day 3	Email Marketing Platforms (Mailchimp, Klaviyo)
	Day 4	Designing Email Campaigns & Automation
	Day 5	Segmentation, Personalization & Customer Support
	Tasks & Activities	Create a discount coupon + design an email campaign in Mailchimp. Send the email to test accounts & analyze engagement.
Week 7	**Day 1**	Introduction to Web Analytics (Google Analytics, Reports)
	Day 2	Tracking Traffic, Conversions & Sales Funnel
	Day 3	Identifying High-performing Products & Pages
	Day 4	A/B Testing, Speed & Mobile Optimization
	Day 5	Cart Abandonment & Recovery Strategies + Final Project
	Tasks & Activities	Launch a fully functional mini E-commerce store with products, payment gateway, SEO, ads, and email campaign.
Week 8	**Day 1**	Explore freelancing basics, top marketplaces like Upwork & Fiver
	Day 2	Effective principles of oral and written communication, Listening skills, ethics
	Day 3	Resume Writing- theory and practice, LinkedIn profile- importance, and account creation
	Day 4	Employment interviews- theory, discussion, pair interview simulation, group simulation
	Day 5	Final Examination
	Tasks & Activities	Submit **project**. Final **presentation** of project and Final Examination

Learning Outcomes

By completing this course, participants will be able to:

- Understand different e-commerce business models (B2B, B2C, C2C) and evaluate real-world examples.
- Set up and customize online stores on Shopify and WooCommerce.
- Add and manage products, inventory, and customer journeys.
- Integrate international and local payment gateways (PayPal, Stripe, JazzCash, Easypaisa).

- Apply SEO strategies and run paid ad campaigns for e-commerce websites.
- Develop customer engagement tactics using email marketing, coupons, and personalization.
- Utilize Google Analytics and A/B testing for performance optimization.
- Build a complete e-commerce store project and prepare for freelancing opportunities.

Delivery Framework

- **Teaching Methodology:** Prioritize innovation, creativity, and strategic thinking. Instruction should be a blend of roughly 40% lecture and discussion, complemented by 60% hands-on workshops and lab sessions focused on content development.

- **Assessment & Feedback:** Evaluate not only the quality of creative outputs but also the reasoning and strategic thought process behind each submission. Offer detailed, constructive feedback to guide improvement.

- **Learning Environment:** Build a collaborative classroom culture by encouraging peer review, open dialogue, and active participation in group activities.

- **Digital Monitoring:** Employ the LMS to manage submissions, track strategic documents, gather links to student work (e.g., Canva projects), and conduct quizzes or assessments efficiently.

- **Inclusive Access:** Strive for accessibility by distributing printed slide decks when feasible, using large and clear fonts in development tools, and providing captions or transcripts for all video-based learning resources.

Assessment Strategy

Assignments (25 Marks – 5 × 5)

Hands-on activities aligned with weekly tasks.

- **A1 (Week 1):** Research 3 real-world e-commerce stores. Identify their model (B2B/B2C/C2C), hosting, and domain provider. Present findings.
- **A2 (Week 2):** Create a demo online store (WooCommerce/Shopify) with correct currency, tax & shipping settings.

- **A3 (Week 3):** Add 5 products with descriptions, images, pricing & categories. Process a simulated order.
- **A4 (Week 5):** Optimize 3 product pages for SEO + create 1 sample ad campaign (Facebook/Instagram). Present improvements.
- **A5 (Week 6):** Create a discount coupon + design an email campaign in Mailchimp/Klaviyo and analyze engagement.

Quizzes (25 Marks – 5 × 5)

Short MCQs/short questions testing theoretical understanding.

- **Q1 (Week 1):** E-commerce Business Models, Platforms, Hosting Basics
- **Q2 (Week 2):** Store Setup, Themes, Currency, Tax & Policies
- **Q3 (Week 3):** Products, Inventory & Order Management
- **Q4 (Week 4):** Online Payment Methods & Gateways (International + Local)
- **Q5 (Week 5):** SEO, Keywords, Ads, & Digital Marketing Basics

Final Project (50 Marks)

Capstone project showcasing end-to-end e-commerce development.

Timeline: Assigned in Week 7, submission & presentation in Week 8.

Deliverables:

- Fully functional mini online store (WooCommerce or Shopify).
- At least 5 optimized products (with SEO titles, descriptions, images).
- Integrated payment gateway (sandbox/local).
- 1 ad campaign + email campaign.
- Analytics setup (Google Analytics or equivalent).

Evaluation Criteria:

- **Store Setup & Functionality (15 pts):** Domain, hosting, design, navigation.
- **Products & Order Flow (10 pts):** Product management, checkout process.
- **Marketing & Customer Engagement (15 pts):** SEO, Ads, Email campaign, coupons.
- **Analytics & Optimization (5 pts):** Tracking conversions, testing improvements.
- **Presentation & Documentation (5 pts):** Professional store presentation, report.

Reference Materials & Tools

Learners will gain hands-on experience with a range of tools and platforms including:

- **E-Commerce Platforms:** Shopify, WooCommerce, Magento (overview)
- **Payment Gateways:** PayPal, Stripe, JazzCash, Easypaisa (sandbox & live)
- **SEO & Analytics Tools:** Google Analytics, Google Search Console, Ahrefs (basics), SEMrush (basics)
- **Email Marketing Tools:** Mailchimp, Klaviyo
- **Advertising Platforms:** Facebook Ads Manager, Google Ads
- **Design & Branding Tools:** Canva, Photoshop (optional), Meta Ads Library
- **Web Hosting Tools:** Domain providers, Hosting dashboards (cPanel, WordPress installations)

Completion & Certification Standards

To successfully earn certification, participants must:

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3. Digital Marketing

Course Overview

This course provides a comprehensive introduction to Digital Marketing, equipping learners with the knowledge and practical skills needed to plan, implement, and evaluate digital strategies. Covering areas such as SEO, SEM, Social Media, Content Marketing, Email Marketing, Affiliate Marketing, Analytics, and Freelancing, the program ensures participants gain hands-on experience with industry-standard tools and platforms. By the end of the course, students will be able to create, manage, and optimize digital marketing campaigns while preparing themselves for career opportunities in freelancing and professional employment.

Course Structure

Week	Days	Topics
Week 1	**Day 1**	• Digital Marketing Definition • What is Digital Marketing? Scope and Career Opportunities • 4 Ps of Digital Marketing • Marketing Funnel • Traditional Marketing vs. Digital Marketing
	Day 2	• Key Components of a Digital Marketing Strategy • Understanding Target Audience, Buyer Personas and Customer Journey • Keyword Analysis & Research
	Day 3	• SWOT Analysis • Competitor Analysis • Overview of Digital Channels (SEO, SEM, Social Media, Email, Content) • Introduction to Tools: Google Workspace, Canva, ChatGPT, Buffer, etc.
	Day 4	• Meta Ads Library • What is Branding? • Branding vs Marketing • Types of Logos
	Day 5	• Chat GPT for content generation, keyword research and content writing. • Prompt Engineering, how to write prompt?
	Activities & Deliverables	Class tasks to find target audience, do competitor research, SWOT analysis and to a Branding for a brand.
Week 2	**Day 1**	• Overview of Platforms: Facebook, Instagram, LinkedIn, Twitter, TikTok • Creating Business Profiles and Pages • Concept of Page vs Account

		• Meta Business Suite • Facebook vs Meta: Difference
	Day 2	• Content Planning and Calendar Creation • How to Make Social Media Strategies
	Day 3	• Paid Advertising on Facebook & Instagram (Meta Ads Manager) • Meta Ads Objectives • Audience Creation • Budget Strategies
	Day 4	• Targeting and Retargeting Strategies • Organic Growth vs. Paid Growth • Social Media Tools: Hootsuite, Buffer
	Day 5	• Social Media Posts Size & Design • Post Designing on Canva
	Activities & Deliverables	Class tasks to Create a content calendar, create meta audience for Ads and to practice for post designing on Canva
Week 3	**Day 1**	• Introduction to Paid Advertising and Google Ads Ecosystem • Creating a Google Ads Account and Campaign Types (Search, Display, Video)
	Day 2	• Understanding Ad Auction, Quality Score, and Bidding • Creating Effective Ads (Headlines, Descriptions, CTAs)
	Day 3	• Keyword Match Types and Negative Keywords • Tracking Conversions and ROI
	Day 4	• Importance of Content in Digital Marketing • Types of Content: Blogs, Videos, Infographics, Reels, Case Studies
	Day 5	• Creating Engaging & SEO-Friendly Content • Content Planning and Scheduling Tools (Trello, Notion, Google Calendar)
	Activities & Deliverables	Create a Demo Basic Google Ads Campaign
Week 4	**Day 1**	• Introduction to Email Marketing Platforms (Mailchimp, Brevo) • Building Email Lists and Designing Campaigns
	Day 2	• Segmentation, Personalization, and Automated Drip Campaigns • Email Marketing KPIs and Best Practices
	Day 3	• Introduction to Influencer Marketing • Identifying the Right Influencers for a Brand
	Day 4	• Outreach, Collaboration, and ROI Measurement • Legal and Ethical Aspects of Influencer Marketing
	Day 5	Mid Term Examination

	Activities & Deliverables	Create a Basic email Template
Week 5	**Day 1**	• Basics of Affiliate Marketing and Key Platforms (Amazon, Daraz, Impact) • Creating and Managing Affiliate Campaigns • Tracking Sales, Commission Models, and Reporting
	Day 2	• Mailchimp Introduction • How to create a email template • Audience on mailchimp
	Day 3	• Setting up the email campaign • Newsletter section on website
	Day 4	• Concept of Website • Domain Names & Web hostings
	Day 5	• Concept of cloud and servers • Wordpress installations and plugins
	Activities & Deliverables	Create and Launch a Simple Affiliate Marketing Email Campaign for a Website
Week 6	**Day 1**	• Importance of Data in Digital Marketing • Setting Up and Understanding Google Analytics • Key Metrics: Traffic Sources, Bounce Rate, Time on Page, Goals
	Day 2	• Google Search Console Setup • Using Google Tag Manager for Conversion Tracking • Setting Up Custom Dashboards and Reports • Using Insights from Analytics to Improve Campaigns • Introduction to UTM Parameters and Campaign Tracking • Measuring ROI and Preparing Performance Reports
	Day 3	• Search Intent • Google EEAT Algorithms • How Search Engine Works • Concept of Crawlers • Crawling in SEO
	Day 4	• ON Page SEO • Alt Tags • HTML Heading form H1 to H6 • Meta Data tags • Internal Linking
	Day 5	• Schema Markup • Permalink • Canonical tags • SSL & Website Security
	Activities & Deliverables	Do Keyword Research and setup Yoast SEO Plugin

Week 7	**Day 1**	• Breadcrumb navigation • Robot.txt • XML sitemap • 404 page optimization • Pagination
	Day 2	• Off page SEO • Back Linking • Guest Posting • Blog Writing
	Day 3	• Technical SEO • Local SEO
	Day 4	• Google Business Profile Setup • Pin your business to map
	Day 5	SEO Auditing and Tools (Google Search Console, Ahrefs, SEMrush Basics)
	Activities & Deliverables	keyword Analysis for blogs, and website content
Week 8	**Day 1**	Explore freelancing basics, top marketplaces like Upwork & Fiver
	Day 2	Effective principles of oral and written communication, Listening skills – listening to the employer and clients, Feedback to the clients, and ethics
	Day 3	Resume Writing- theory and practice, LinkedIn profile- importance, and account creation
	Day 4	Employment interviews- theory, discussion, pair interview simulation, group simulation
	Day 5	Final Examination
	Activities & Deliverables	Softskills training, Final Examination and Presentation

Learning Outcomes

By successfully completing this course, participants will be able to:

- Understand the fundamentals of Digital Marketing, its scope, and its applications in business.
- Conduct competitor analysis, keyword research, and audience targeting.
- Develop effective social media strategies and manage paid campaigns.
- Design, implement, and monitor Google Ads and SEO campaigns.
- Create engaging content and manage email marketing campaigns.
- Apply data analytics to measure and improve digital marketing performance.
- Gain hands-on experience with tools like Google Analytics, Meta Business Suite, Mailchimp, Canva, and WordPress.

- Build professional skills for freelancing, communication, and employment readiness.

Delivery Framework

- **Teaching Methodology:** Prioritize innovation, creativity, and strategic thinking. Instruction should be a blend of roughly 40% lecture and discussion, complemented by 60% hands-on workshops and lab sessions focused on content development.

- **Assessment & Feedback:** Evaluate not only the quality of creative outputs but also the reasoning and strategic thought process behind each submission. Offer detailed, constructive feedback to guide improvement.

- **Learning Environment:** Build a collaborative classroom culture by encouraging peer review, open dialogue, and active participation in group activities.

- **Digital Monitoring:** Employ the LMS to manage submissions, track strategic documents, gather links to student work (e.g., Canva projects), and conduct quizzes or assessments efficiently.

- **Inclusive Access:** Strive for accessibility by distributing printed slide decks when feasible, using large and clear fonts in development tools, and providing captions or transcripts for all video-based learning resources.

Assessment Strategy

Assignments (25 Marks – 5 × 5)

Practical, weekly tasks mapped with deliverables.

- **A1 (Week 1):** Conduct SWOT analysis + competitor research. Identify target audience & create a branding concept for a brand.
- **A2 (Week 2):** Create a content calendar, build a Meta audience for ads, and design sample posts on Canva.
- **A3 (Week 3):** Launch a demo Google Ads campaign with proper keywords, ad copy, and bidding strategy.

- **A4 (Week 5):** Create and launch a simple affiliate marketing email campaign linked to a website.
- **A5 (Week 6):** Perform keyword research & set up Yoast SEO plugin on a WordPress demo site.

Quizzes (25 Marks – 5 × 5)

Short quizzes to check theoretical concepts.

- **Q1 (Week 1):** Fundamentals of Digital Marketing, 4 Ps, Buyer Personas, Marketing Funnel.
- **Q2 (Week 2):** Social Media Strategy, Meta Business Suite, Paid vs Organic Growth.
- **Q3 (Week 3):** Google Ads Ecosystem, Ad Auction, Quality Score, Conversion Tracking.
- **Q4 (Week 4):** Email Marketing Concepts, Influencer Marketing, Legal & Ethical Aspects.
- **Q5 (Week 6):** SEO Basics, Analytics, Google Search Console, Tracking & Reporting.

Final Project (50 Marks)

Capstone assignment integrating all major components of digital marketing.

Timeline: Assigned in Week 7, submitted & presented in Week 8.
Project Brief:

- Develop **a** Digital Marketing Strategy for a brand (real or hypothetical).
- Execute across at least 3 channels (Social Media, SEO, Email, Paid Ads).
- Include branding, competitor analysis, content plan, ad design, and SEO setup.
- Track campaign with Google Analytics/Search Console and prepare performance report.

Evaluation Criteria:

- **Strategy & Research (10 pts):** SWOT, competitor & target audience analysis.
- **Campaign Execution (15 pts):** Social media plan, ads, content, email marketing.
- **SEO & Analytics (10 pts):** On-page optimization, keyword research, tracking setup.
- **Creativity & Tools Usage (10 pts):** Canva designs, ad creatives, Mailchimp setup.
- **Documentation & Presentation (5 pts):** Structured final report & professional pitch.

Reference Materials & Tools

Participants will use a blend of online resources, tutorials, and practical tools including:

- **Google Workspace** (Docs, Sheets, Slides for collaboration)
- **Meta Business Suite** (Facebook & Instagram ads management)
- **Google Ads, Google Analytics, Google Search Console, Google Tag Manager**
- **SEO Tools:** Yoast SEO, Ahrefs, SEMrush (Basics), Ubersuggest
- **Design Tools:** Canva, Photoshop (optional)
- **Email Marketing Platforms:** Mailchimp, Brevo, Klaviyo
- **Web Development Tools:** WordPress, Plugins, Domain & Hosting setup
- **AI Tools:** ChatGPT for content writing, keyword research, and prompt engineering

Completion & Certification Standards

To successfully earn certification, participants must:

- Maintain at least 90% attendance throughout the course.
- Complete all weekly activities and deliverables as assigned.
- Achieve a minimum of 50% in the midterm assessment.
- Demonstrate professionalism, teamwork, and effective communication during sessions and evaluations.

Program Guidelines

- ✓ Emphasis is placed on strategy and conceptual learning; while the use of real brand accounts is optional, it is encouraged where feasible.
- ✓ All assignments and projects must be submitted within the given deadlines. Delays in submission may impact eligibility for certification.
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- ✓ Professional, respectful, and collaborative behavior is expected at all times—whether in class, labs, or online spaces.
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4. Social Media Management

Course Overview

This course provides a comprehensive journey into social media marketing, covering the fundamentals of platforms, branding, content creation, advertising, analytics, community building, automation, monetization, and freelancing. Learners will engage in practical activities each week, gradually building their portfolio and mastering both organic and paid growth strategies. By the end, students will be able to create impactful campaigns, analyze performance, and explore freelancing opportunities.

Course Structure

Week	Day	Topic
Week 1	**Day 1**	Introduction to Social Media & Its Evolution
	Day 2	Overview of Major Platforms: Facebook, Instagram, LinkedIn, X, TikTok, YouTube
	Day 3	Platform-Specific Audiences & Content Formats
	Day 4	Current Trends: Reels, Shorts, Stories, Hashtags
	Day 5	Platform Algorithms, Branding (Personal vs. Business), Target Audiences & Competitor Analysis
	Tasks & Activities	Research 3 competitors on Instagram/Facebook. Identify their target audience, type of content, and engagement level. Prepare a short comparison report.
Week 2	**Day 1**	Basics of Digital Branding (Logo, Colors, Fonts, Brand Voice)
	Day 2	Types of Content: Images, Videos, Carousels, Stories, Live Sessions
	Day 3	Tools for Content Creation (Canva, CapCut, Adobe Express)
	Day 4	Writing Captions & Crafting CTAs
	Day 5	Content Calendars, Scheduling, Storytelling & Feed Aesthetics
	Tasks & Activities	Design a mini content kit (logo, color palette, 3 branded posts). Create one carousel + one story using Canva or CapCut.
Week 3	**Day 1**	Introduction to Paid Advertising
	Day 2	Setting Up Business Accounts & Ad Managers
	Day 3	Types of Ads (Image, Video, Carousel, Story Ads)
	Day 4	Audience Targeting: Interests, Demographics, Custom & Lookalike
	Day 5	Budgeting, Campaign Objectives & Optimization
	Tasks & Activities	Create a mock ad campaign (choose an objective, audience, and format). Prepare ad visuals and write ad copy.
Week 4	**Day 1**	Building & Nurturing Online Communities

	Day 2	Engagement: Comments, Messages, Polls
	Day 3	Managing Feedback & Responding Professionally
	Day 4	Handling Trolls, Negative Comments & Crises
	Day 5	Community Guidelines, Social Listening & Case Studies
	Tasks & Activities	Draft a community engagement plan. Role-play handling a negative comment/troll. Write 3 sample professional responses.
Week 5	**Day 1**	Platform Insights (Meta, LinkedIn, TikTok, YouTube)
	Day 2	Key Metrics: Reach, Impressions, Engagement, CTR
	Day 3	Analyzing Post & Campaign Performance
	Day 4	Identifying High-Performing Content & Replication Strategy
	Day 5	Reports, SMART Goals & Growth Approaches
	Tasks & Activities	Analyze insights of any Instagram/Facebook page. Create a short report with best-performing post, engagement trends, and 2 recommendations for growth.
Week 6	**Day 1**	Scheduling Tools (Meta Business Suite, Buffer, Hootsuite, Later)
	Day 2	Automating Tasks & Publishing
	Day 3	AI Tools for Captions, Hashtags & Content Ideas
	Day 4	Social Media CRM & Comment Management
	Day 5	Collaboration, Workflows & Best Practices
	Tasks & Activities	Use a free scheduling tool to plan 1 week of posts. Generate 5 captions with AI, test hashtags, and prepare a publishing calendar.
Week 7	**Day 1**	Ads, Sponsorships & Collaborations
	Day 2	Affiliate Marketing & Product Endorsements
	Day 3	Creating & Selling Digital Products/Services
	Day 4	Instagram Shops, Marketplace, Paid Communities
	Day 5	Influencer Partnerships + Legal & Financial Considerations
	Tasks & Activities	Create a monetization plan for a chosen niche. Suggest 2 collaboration ideas, 1 product to sell, and 1 influencer to partner with.
Week 8	**Day 36**	Explore freelancing basics, top marketplaces like Upwork & Fiver
	Day 37	Effective principles of oral and written communication, Listening skills, ethics
	Day 38	Resume Writing- theory and practice, LinkedIn profile- importance, and account creation
	Day 39	Employment interviews- theory, discussion, pair interview simulation, group simulation,
	Day 40	Final Examination
	Tasks & Activities	Final **presentation** of project and Final Examination

Course Outcomes

By completing this course, participants will be able to:

- Understand the evolution of social media and its role in digital marketing.
- Create platform-specific content strategies aligned with target audiences.
- Build strong brand identities through effective visuals, tone, and storytelling.
- Plan, design, and optimize paid advertising campaigns across multiple platforms.
- Manage communities professionally, fostering engagement and handling crises.
- Analyze insights to refine strategies and achieve measurable growth.
- Utilize scheduling, automation, and AI-powered tools for efficiency.
- Develop monetization strategies including ads, collaborations, and digital products.
- Prepare for freelancing by creating profiles, resumes, and communication strategies.

Delivery Framework

- **Teaching Methodology:** Prioritize innovation, creativity, and strategic thinking. Instruction should be a blend of roughly 40% lecture and discussion, complemented by 60% hands-on workshops and lab sessions focused on content development.

- **Assessment & Feedback:** Evaluate not only the quality of creative outputs but also the reasoning and strategic thought process behind each submission. Offer detailed, constructive feedback to guide improvement.

- **Learning Environment:** Build a collaborative classroom culture by encouraging peer review, open dialogue, and active participation in group activities.

- **Digital Monitoring:** Employ the LMS to manage submissions, track strategic documents, gather links to student work (e.g., Canva projects), and conduct quizzes or assessments efficiently.

- **Inclusive Access:** Strive for accessibility by distributing printed slide decks when feasible, using large and clear fonts in development tools, and providing captions or transcripts for all video-based learning resources.

Assessment Strategy

Assignments (25 Marks – 5 × 5)

Hands-on tasks aligned with weekly activities.

- **A1 (Week 1):** Competitor analysis report (target audience, content type, engagement).
- **A2 (Week 2):** Create a branded content kit (logo, color palette, 3 posts, 1 carousel & 1 story).
- **A3 (Week 3):** Mock ad campaign with audience targeting, objective, visuals & ad copy.
- **A4 (Week 5):** Insights report for a social media page (best post, engagement trends, growth recommendations).
- **A5 (Week 6):** 1-week post schedule using a tool + AI-generated captions/hashtags calendar.

Quizzes (25 Marks – 5 × 5)

Short assessments for theoretical knowledge.

- **Q1 (Week 1):** Evolution of social media, platforms, algorithms, branding basics.
- **Q2 (Week 2):** Content formats, CTAs, calendars, aesthetics.
- **Q3 (Week 3):** Paid ads types, targeting, budgeting, campaign optimization.
- **Q4 (Week 4):** Online communities, feedback, trolls, professional responses.
- **Q5 (Week 5):** Social media metrics, insights, reports, growth strategies.

Final Project (50 Marks)

Capstone project to integrate strategy, branding, ads, community & insights.

Timeline: Assigned in Week 7, submitted & presented in Week 8.

Project Brief:

- Develop a **complete Social Media Strategy** for a brand/niche.
- Include **branding kit, content calendar, mock ad campaign, community plan & analytics report.**
- Add **monetization approach** (collaborations, products, influencer partnership).

Evaluation Criteria:

- **Branding & Content Kit (10 pts):** Logo, colors, posts, stories.
- **Campaign Execution (15 pts):** Paid ad mockup, captions, visuals, targeting.
- **Community & Engagement (10 pts):** Professional responses, engagement plan.
- **Analytics & Growth (10 pts):** Insights, SMART goals, growth plan.
- **Presentation (5 pts):** Final report & professional delivery.

Reference Materials & Tools

- **Books & Guides:** "Social Media Marketing for Dummies," "One Million Followers by Brendan Kane."
- **Online Resources:** HubSpot Academy, Meta Blueprint, Hootsuite Academy, Google Digital Garage.
- **Tools & Platforms:** Canva, CapCut, Adobe Express, Buffer, Hootsuite, Later, Meta Business Suite, LinkedIn, TikTok, YouTube Studio.
- **AI Assistants:** ChatGPT, Jasper AI, Copy.ai for captions, hashtags, and content ideas.

Completion & Certification Standards

To successfully earn certification, participants must:

- Maintain at least 90% attendance throughout the course.
- Complete all weekly activities and deliverables as assigned.
- Achieve a minimum of 50% in the midterm assessment.
- Demonstrate professionalism, teamwork, and effective communication during sessions and evaluations.

Program Guidelines

- ✓ Emphasis is placed on strategy and conceptual learning; while the use of real brand accounts is optional, it is encouraged where feasible.
- ✓ All assignments and projects must be submitted within the given deadlines. Delays in submission may impact eligibility for certification.
- ✓ Confidential or sensitive information must never be uploaded to public platforms. When sharing work, anonymized or sample datasets should be used instead.
- ✓ Professional, respectful, and collaborative behavior is expected at all times—whether in class, labs, or online spaces.
- ✓ Acts of plagiarism, duplication, or misrepresentation of work are strictly prohibited.
- ✓ Students are welcome to utilize AI tools to enhance learning and productivity; however, their usage must be transparently cited and cannot replace original project work.

- ✓ University disciplinary rules and regulations must be adhered to; non-compliance may result in formal action.
- ✓ Course-related feedback or concerns should be communicated via the designated channel, where respectful reporting will be addressed promptly.

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5. Python Development

Course Overview

This course introduces Python programming from the ground up, beginning with the basics of syntax, data types, and control structures, and gradually progressing towards advanced topics like object-oriented programming, file handling, web scraping, APIs, and data analysis. Learners will also gain exposure to freelancing opportunities and professional communication skills, enabling them to use Python for both technical projects and real-world applications.

Course Structure

Week	Day	Topic
Week 1	**Day 1**	Overview of programming, Python's role, and setting up Python with IDLE and VS Code.
	Day 2	Writing and Executing Python Scripts
	Day 3	Understanding Python Syntax and Code Structure
	Day 4	Introduction to IDEs, Code Editors, and Debugging Tools
	Day 5	Comments and Code Readability Best Practices
	Activities & Deliverables	Practice Problems
Week 2	**Day 1**	Working with Basic Data Types: int, float, string, bool
	Day 2	Type conversion and casting, along with variables and naming conventions.
	Day 3	Arithmetic, Assignment, Comparison, Logical, and Bitwise Operators
	Day 4	Working with Strings: Methods, Formatting, and Slicing
	Day 5	Introduction to Lists, Tuples, Sets, and Dictionaries
	Activities & Deliverables	Practice Problems based on Lists, Tuples and Strings
Week 3	**Day 1**	Conditional Statements (if, elif, else)
	Day 2	Loops: for and while Loops with Range and Iterables
	Day 3	Introduction to Functions: Defining and Calling Functions
	Day 4	Parameters, Arguments, and Return Values
	Day 5	Lambda Functions and Recursion
	Activities & Deliverables	Practice Problems based on Loops and Functions
Week 4	**Day 1**	Introduction to OOP Concepts: Class, Object, Inheritance, Polymorphism
	Day 2	Defining Classes and Creating Objects
	Day 3	Instance vs Class Variables and Methods
	Day 4	Method Overriding and Super Function

	Day 5	Mid Term
	Activities & Deliverables	Practice Problems based on Classes
Week 5	**Day 1**	Reading from and Writing to Text and CSV Files
	Day 2	File Modes and File Pointer Methods
	Day 3	Working with JSON Files
	Day 4	Introduction to Databases and SQL
	Day 5	Executing CRUD Operations using Python
	Activities & Deliverables	Practice Problems based on dealing with CSV files
Week 6	**Day 1**	Introduction to Web Scraping and Ethical Considerations
	Day 2	Using requests and BeautifulSoup Libraries
	Day 3	Extracting Data from Static Web Pages
	Day 4	Introduction to APIs and JSON Format
	Day 5	Making API requests
	Activities & Deliverables	Practice Problems based on Web Scrapping tasks
Week 7	**Day 1**	Making API Requests using requests Module
	Day 2	Parsing and Using API Data
	Day 3	Authentication and security basics for APIs in Python
	Day 4	Data Analysis with Pandas
	Day 5	Data Analysis with Matplotlib
	Activities & Deliverables	Creating Charts and Graphs to Analyze Trends
Week 8	**Day 1**	Explore freelancing basics, top marketplaces like Upwork & Fiver
	Day 2	Effective principles of oral and written communication, Listening skills – listening to the employer and clients, Feedback to the clients, and ethics
	Day 3	Resume Writing- theory and practice, LinkedIn profile- importance and account creation
	Day 4	Employment interviews- theory, discussion, pair interview simulation, group simulation
	Day 5	Final Project Presentation & Wrap-up
	Activities & Deliverables	Final Project Presentation & Wrap-up

Course Outcomes

By the end of this course, learners will be able to:

- Understand Python's role in programming and set up a development environment.
- Write, execute, and debug Python scripts effectively.

- Apply Python's data types, operators, and control structures to solve problems.
- Create and use functions, including lambda and recursive functions.
- Implement object-oriented programming concepts (classes, inheritance, polymorphism).
- Handle files (text, CSV, JSON) and interact with databases using Python.
- Perform web scraping and make API requests for real-world data extraction.
- Analyze and visualize data using Pandas and Matplotlib.
- Develop a portfolio project showcasing Python applications.
- Explore freelancing basics, resume building, LinkedIn profile creation, and interview preparation.

Delivery Framework

- **Teaching Methodology:** Prioritize innovation, creativity, and strategic thinking. Instruction should be a blend of roughly 40% lecture and discussion, complemented by 60% hands-on workshops and lab sessions focused on content development.

- **Assessment & Feedback:** Evaluate not only the quality of creative outputs but also the reasoning and strategic thought process behind each submission. Offer detailed, constructive feedback to guide improvement.

- **Learning Environment:** Build a collaborative classroom culture by encouraging peer review, open dialogue, and active participation in group activities.

- **Digital Monitoring:** Employ the LMS to manage submissions, track strategic documents, gather links to student work (e.g., Canva projects), and conduct quizzes or assessments efficiently.

- **Inclusive Access:** Strive for accessibility by distributing printed slide decks when feasible, using large and clear fonts in development tools, and providing captions or transcripts for all video-based learning resources.

Assessment Strategy

Assignments (25 Marks – 5 × 5)

Weekly coding tasks reinforcing concepts:

- **A1 (Week 1):** Write Python scripts demonstrating syntax, readability, and code structure.
- **A2 (Week 2):** Implement problems using data types, operators, and collections (lists, tuples, dicts).
- **A3 (Week 3):** Solve loop-based problems & implement functions (including recursion).
- **A4 (Week 5):** Perform file handling tasks (read/write text, CSV, JSON).
- **A5 (Week 6):** Build a basic web scraping script using BeautifulSoup and an API request.

Quizzes (25 Marks – 5 × 5)

Concept-check quizzes for theory + code snippets:

- **Q1 (Week 1–2):** Python basics, data types, operators, and collections.
- **Q2 (Week 3):** Conditionals, loops, functions & recursion.
- **Q3 (Week 4):** Object-Oriented Programming concepts (classes, inheritance, polymorphism).
- **Q4 (Week 5–6):** File handling, databases, and web scraping fundamentals.
- **Q5 (Week 7):** APIs, data analysis with Pandas & Matplotlib.

Final Project (50 Marks)

Capstone coding project demonstrating end-to-end Python skills.

Timeline: Assigned in Week 7, due in Week 8.
Project Brief:

- Develop a data-driven Python application combining file handling, APIs, and visualization.
- Example: *A weather or stock tracker app fetching API data, storing in CSV/DB, analyzing trends with Pandas, and visualizing results with Matplotlib.*

Evaluation Criteria:

- **Code Quality & Functionality (20 pts):** Clean, modular, and working code.
- **OOP & Data Handling (10 pts):** Use of classes, files, APIs, and structured data.
- **Analysis & Visualization (10 pts):** Insightful analysis with clear charts/graphs.
- **Documentation & Presentation (10 pts):** Comments, instructions, and professional project demo.

Reference Materials & Tools

- **Books & Guides:** "Python Crash Course" by Eric Matthes, "Automate the Boring Stuff with Python" by Al Sweigart.

- **Online Resources:** W3Schools Python, Real Python tutorials, GeeksforGeeks Python.
- **Development Tools:** Python (IDLE), VS Code, Jupyter Notebook.
- **Libraries & Frameworks:** requests, BeautifulSoup, Pandas, Matplotlib, JSON.
- **Freelancing Platforms:** Upwork, Fiverr, Freelancer, LinkedIn.

Completion & Certification Standards

To successfully earn certification, participants must:

- Maintain at least 90% attendance throughout the course.
- Complete all weekly activities and deliverables as assigned.
- Achieve a minimum of 50% in the midterm assessment.
- Demonstrate professionalism, teamwork, and effective communication during sessions and evaluations.

Program Guidelines

- ✓ Emphasis is placed on strategy and conceptual learning; while the use of real brand accounts is optional, it is encouraged where feasible.
- ✓ All assignments and projects must be submitted within the given deadlines. Delays in submission may impact eligibility for certification.
- ✓ Confidential or sensitive information must never be uploaded to public platforms. When sharing work, anonymized or sample datasets should be used instead.
- ✓ Professional, respectful, and collaborative behavior is expected at all times—whether in class, labs, or online spaces.
- ✓ Acts of plagiarism, duplication, or misrepresentation of work are strictly prohibited.
- ✓ Students are welcome to utilize AI tools to enhance learning and productivity; however, their usage must be transparently cited and cannot replace original project work.
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6. GRAPHIC DESIGNING AND UI/UX DESIGN

Course Overview

This course provides a comprehensive introduction to Graphic Design and UI/UX Design, covering both creative and technical aspects. Learners will explore design principles, industry tools (Photoshop, Illustrator, Figma), typography, color theory, branding, and social media graphics. The program also introduces UI/UX fundamentals, including wireframing, prototyping, and portfolio development, preparing students for both print and digital design careers.

Course Structure

Week	Day	Topic
Week 1	**Day 1**	Introduction to Graphic & UI/UX Design
	Day 2	Overview of Design Disciplines: Print, Digital, UI/UX
	Day 3	Principles of Design: Balance, Contrast, Alignment, Hierarchy
	Day 4	Introduction to Industry Tools: Photoshop, Illustrator, Figma
	Day 5	File Types, Resolution, Design Thinking & Creative Process
	Tasks & Activities	Students discuss the role of designers in groups and share examples of good/bad designs, Collect 3 examples of each design discipline, analyze posters/flyers for design principles.
Week 2	**Day 1**	Photoshop Interface & Workspace Customization
	Day 2	Working with Layers
	Day 3	Masks & Blending Modes
	Day 4	Photo Editing & Retouching
	Day 5	Color Correction & Adjustment Layers
	Tasks & Activities	Submit edited photo with retouching, Create a poster using at least 3 layers and blending modes, Share before/after image color correction.
Week 3	**Day 1**	Background Removal Techniques
	Day 2	Creating Banners
	Day 3	Poster Design
	Day 4	Mockup Creation
	Day 5	Exporting for Web, Print, Social Media
	Tasks & Activities	Submit **banner design** for a product/brand, Submit **event poster design,** Export mockup files for review.
Week 4	**Day 1**	Vector vs Raster Graphics
	Day 2	Working with Shapes & Paths

	Day 3	Using Pen Tool & Anchor Points
	Day 4	Designing Icons & Infographics, Artboards, Symbols, Exporting
	Day 5	Mid Term Examination
	Tasks & Activities	Submit **icon set** (3–5 icons), Complete pen tool tracing exercise, Create a simple infographic with vector graphics.
Week 5	**Day 1**	Importance of Typography, Font Families
	Day 2	Font Pairing, Spacing, Readability
	Day 3	Introduction to Color Theory
	Day 4	Color Schemes & Psychology
	Day 5	Brand Identity: Logos, Business Cards, Letterheads
	Tasks & Activities	Submit **typography poster,** Complete **color wheel & schemes** exercise, Begin **branding kit** with logo + letterhead, Create a sample text poster with paired fonts, Start mini-branding project: logo + stationery.
Week 6	**Day 1**	Logo Design Process (sketching to execution)
	Day 2	Brand Guidelines & Usage Rules
	Day 3	Social Media Graphics: Facebook & Instagram
	Day 4	YouTube & LinkedIn Graphics
	Day 5	Canva for Quick Design Projects
	Tasks & Activities	Submit **logo design,** Submit **social media kit** (post, story, banner, thumbnail), Submit brand guideline sheet.
Week 7	**Day 1**	Flyers & Posters + Brochures & Packaging
	Day 2	Print Considerations: Bleed, CMYK, DPI + Exporting Print Files
	Day 3	Basics of UI Design (Layout, Grids)
	Day 4	UX Fundamentals: User Flow & Wireframing + Prototyping in Figma/Adobe XD
	Day 5	UI Components: Buttons, Menus, Forms + Mini App/Web Layout + Portfolio Development & Final Presentation
	Tasks & Activities	Submit **flyer** + **brochure** in print-ready format, Create a **wireframe for a mobile app, Compile full design portfolio**
Week 8	**Day 1**	Explore freelancing basics, top marketplaces like Upwork & Fiver
	Day 2	Effective principles of oral and written communication, Listening skills, ethics
	Day 3	Resume Writing- theory and practice, LinkedIn profile- importance, and account creation
	Day 4	Employment interviews- theory, discussion, pair interview simulation, group simulation,
	Day 5	Final Examination
	Tasks & Activities	Submit **UI project**. Final **presentation** of project and Final Examination

Course Outcomes

By the end of this course, learners will be able to:

- Understand the foundations of design and its applications across print, digital, and UI/UX.
- Use Photoshop, Illustrator, and Figma for editing, designing, and prototyping.
- Apply design principles (balance, contrast, hierarchy) in real-world projects.
- Create marketing materials such as banners, posters, brochures, and social media kits.
- Develop brand identity elements: logos, typography, color schemes, and guidelines.
- Design UI components, wireframes, and prototypes for apps/websites.
- Export design projects for both print and digital platforms professionally.
- Build a complete design portfolio showcasing branding, print, digital, and UI/UX projects.
- Understand freelancing basics, client communication, and employability skills.

Delivery Framework

- **Teaching Methodology:** Prioritize innovation, creativity, and strategic thinking. Instruction should be a blend of roughly 40% lecture and discussion, complemented by 60% hands-on workshops and lab sessions focused on content development.

- **Assessment & Feedback:** Evaluate not only the quality of creative outputs but also the reasoning and strategic thought process behind each submission. Offer detailed, constructive feedback to guide improvement.

- **Learning Environment:** Build a collaborative classroom culture by encouraging peer review, open dialogue, and active participation in group activities.

- **Digital Monitoring:** Employ the LMS to manage submissions, track strategic documents, gather links to student work (e.g., Canva projects), and conduct quizzes or assessments efficiently.

- **Inclusive Access:** Strive for accessibility by distributing printed slide decks when feasible, using large and clear fonts in development tools, and providing captions or transcripts for all video-based learning resources.

Assessment Strategy

Assignments (25 Marks – 5 × 5)

Weekly design tasks reinforcing tools and principles:

- **A1 (Week 1):** Analyze examples of good/bad designs; create a poster applying balance, contrast, and hierarchy.
- **A2 (Week 2):** Submit a photo retouch project with layers, blending modes, and color correction.
- **A3 (Week 3):** Design a banner + event poster, export in print/web formats.
- **A4 (Week 5):** Typography & color theory project: create a typography poster + color schemes exercise.
- **A5 (Week 6):** Develop a mini social media kit (logo adaptation + Facebook/Instagram post + YouTube thumbnail).

Quizzes (25 Marks – 5 × 5)

Concept-check quizzes for design principles, tools, and workflows:

- **Q1 (Week 1–2):** Basics of design disciplines, principles, Photoshop tools & workspace.
- **Q2 (Week 3):** Layers, masks, blending, photo editing, exporting.
- **Q3 (Week 4):** Vectors, raster graphics, pen tool, infographics, OOP comparison to design systems.
- **Q4 (Week 5–6):** Typography, color theory, branding, logo design, brand guidelines.
- **Q5 (Week 7):** UI/UX fundamentals, wireframes, prototyping, portfolio preparation.

Final Project (50 Marks)

Capstone project demonstrating end-to-end design & branding skills.

Timeline: Assigned in Week 7, due in Week 8.

Project Brief:
Develop a complete brand identity + UI/UX concept for a product/company, including:

- Logo, stationery (business card, letterhead)
- Social media kit (FB/IG posts, YouTube banner)
- Print collateral (flyer/brochure)
- UI/UX prototype (mobile/web wireframe in Figma/Adobe XD)
- Final compiled portfolio presentation

Evaluation Criteria:

- **Creativity & Design Principles (15 pts):** Balance, contrast, typography, and color theory applied effectively.
- **Technical Skills (15 pts):** Mastery of Photoshop, Illustrator, Figma, exporting formats.

- **Branding & Consistency (10 pts):** Cohesive brand identity across print, digital, and UI/UX.
- **Presentation & Portfolio (10 pts):** Professional portfolio showcasing process, mockups, and final outputs.

Reference Materials & Tools

- **Design Principles:** *The Non-Designer's Design Book* by Robin Williams, *Don't Make Me Think* by Steve Krug.
- **Tools:** Adobe Photoshop, Adobe Illustrator, Figma, Canva, Adobe XD.
- **Online Resources:** Behance, Dribbble, Awwwards, Envato Elements.
- **Practice Platforms:** Freepik, Unsplash, Pexels (resources for mockups & stock).
- **Freelancing Platforms:** Upwork, Fiverr, Freelancer, LinkedIn.

Completion & Certification Standards

To successfully earn certification, participants must:

- Maintain at least 90% attendance throughout the course.
- Complete all weekly activities and deliverables as assigned.
- Achieve a minimum of 50% in the midterm assessment.
- Demonstrate professionalism, teamwork, and effective communication during sessions and evaluations.

Program Guidelines

- ✓ Emphasis is placed on strategy and conceptual learning; while the use of real brand accounts is optional, it is encouraged where feasible.
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7. MOBILE APP DEVELOPMENT

Course Overview

This course introduces learners to the fundamentals of mobile application development, covering both Android and iOS ecosystems. Students will explore the history, significance, and job market relevance of mobile apps while learning about development tools, app architecture, design guidelines, UI/UX, and cross-platform frameworks like Flutter and React Native. By the end, participants will gain hands-on experience in building functional apps, integrating APIs, and preparing a final project suitable for showcasing to potential employers or clients.

Course Structure

Week	Day	Topic
Week 1	**Day 1**	Understanding Mobile Application Development and Its Significance
	Day 2	History of Mobile Application development and its evolution
	Day 3	Applications of Mobile Applications in various fields & Ites Job Market
	Day 4	Introduction to Mobile Application Development, Overview of Mobile Application, Why Choose Mobile Application Development
	Day 5	Definitions and Key Concepts
	Activities & Deliverables	Prepare a timeline highlighting the key milestones in the evolution of mobile application development.
Week 2	**Day 1**	Native vs Hybrid vs Cross-Platform Apps
	Day 2	Understanding Mobile App Architecture
	Day 3	Tools and IDEs: Android Studio, Xcode, VS Code
	Day 4	iOS vs. Android
	Day 5	Basics of User Interface (UI) and User Experience (UX)
	Activities & Deliverables	Install any one IDE (Android Studio, Xcode, or VS Code) and create a basic “Hello World” mobile app.
Week 3	**Day 1**	Mobile Design Guidelines for Android & iOS
	Day 2	Designing Wireframes and Prototypes (Figma/Adobe XD)
	Day 3	Responsive Layouts and Device Compatibility
	Day 4	Accessibility and Usability Standards + Design-to-Code Workflow
	Day 5	Setting Up Android Studio and Emulator
	Activities & Deliverables	Design a simple app layout that automatically adjusts to multiple screen sizes and test it on at least two different emulators.
Week 4	**Day 1**	Activity Lifecycle and Intents
	Day 2	Layouts, Views, and UI Components

	Day 3	Event Handling and User Input
	Day 4	Navigation and Fragment Management
	Day 5	Data Storage: Shared Preferences
	Activities & Deliverables	Develop a simple Android app that takes user input from a text field and displays it on the screen when a button is clicked.
Week 5	**Day 1**	SQLite Database Integration
	Day 2	Simple Project 1 – Calculator App & Simple Project 2 – To-Do List App
	Day 3	Introduction to Xcode and Swift Language
	Day 4	Creating Simple iOS Interfaces
	Day 5	Views, Controllers, and Storyboards
	Activities & Deliverables	Develop a basic calculator app for performing arithmetic operations and a to-do list app to add, edit, and delete tasks.
Week 6	**Day 1**	Sample iOS App Development
	Day 2	Introduction to Cross-Platform Frameworks
	Day 3	Setting Up Flutter with Dart / React Native with JS
	Day 4	Creating UI Components and Layouts
	Day 5	State Management and Navigation
	Activities & Deliverables	Develop a basic iOS app using Swift in Xcode that displays a welcome message on the home screen.
Week 7	**Day 1**	Platform Integration (Camera, Location, etc.)
	Day 2	REST APIs and JSON – Understanding & Fetching Data
	Day 3	Displaying Dynamic Data in Apps
	Day 4	Firebase Integration (Realtime DB / Firestore)
	Day 5	Authentication and Session Handling (Firebase Auth)
	Activities & Deliverables	Develop an app that fetches live weather data from a public API in JSON format and displays it on the screen.
Week 8	**Day 1**	Explore freelancing basics, top marketplaces like Upwork & Fiver
	Day 2	Effective principles of oral and written communication, Listening skills – listening to the employer and clients, Feedback to the clients, and ethics
	Day 3	Resume Writing- theory and practice, LinkedIn profile- importance and account creation
	Day 4	Employment interviews- theory, discussion, pair interview simulation & group simulation
	Day 5	Final Project Presentation & Wrap-up
	Activities & Deliverables	Final Project Presentation & Wrap-up

Learning Outcomes

By the end of this course, learners will be able to:

- Understand the evolution, significance, and applications of mobile app development.
- Differentiate between native, hybrid, and cross-platform mobile applications.
- Install and configure IDEs such as Android Studio, Xcode, and VS Code.
- Apply UI/UX principles in designing responsive mobile app interfaces.
- Develop simple apps using Android (Java/Kotlin) and iOS (Swift).
- Utilize cross-platform frameworks like Flutter or React Native for app creation.
- Integrate SQLite databases, Firebase, and APIs for data-driven applications.
- Implement authentication, session handling, and real-time database connections.
- Create a fully functional mobile app project and present it professionally.
- Understand freelancing basics and prepare for mobile app development careers.

Delivery Framework

- **Teaching Methodology:** Prioritize innovation, creativity, and strategic thinking. Instruction should be a blend of roughly 40% lecture and discussion, complemented by 60% hands-on workshops and lab sessions focused on content development.

- **Assessment & Feedback:** Evaluate not only the quality of creative outputs but also the reasoning and strategic thought process behind each submission. Offer detailed, constructive feedback to guide improvement.

- **Learning Environment:** Build a collaborative classroom culture by encouraging peer review, open dialogue, and active participation in group activities.

- **Digital Monitoring:** Employ the LMS to manage submissions, track strategic documents, gather links to student work (e.g., Canva projects), and conduct quizzes or assessments efficiently.

- **Inclusive Access:** Strive for accessibility by distributing printed slide decks when feasible, using large and clear fonts in development tools, and providing captions or transcripts for all video-based learning resources.

Assessment Strategy

Assignments (25 Marks – 5 × 5)

Weekly app development/design tasks reinforcing concepts:

- **A1 (Week 1):** Prepare a timeline highlighting key milestones in mobile application evolution.
- **A2 (Week 2):** Install an IDE (Android Studio / Xcode / VS Code) and build a basic *Hello World* app.
- **A3 (Week 3):** Design a responsive app layout (using Figma/Adobe XD) that adapts to multiple screen sizes, test on emulators.
- **A4 (Week 4–5):** Develop a simple Android app (input → output via button) + implement mini-projects (Calculator & To-Do List).
- **A5 (Week 7):** Build an app fetching live API data (e.g., weather), parsing JSON, and displaying results.

Quizzes (25 Marks – 5 × 5)

Concept-check quizzes for theory + code/application knowledge:

- **Q1 (Week 1–2):** Basics of mobile development, history, native vs hybrid vs cross-platform, IDEs, iOS vs Android.
- **Q2 (Week 3):** UI/UX guidelines, wireframing, responsive layouts, accessibility standards.
- **Q3 (Week 4):** Android fundamentals – activity lifecycle, layouts, views, navigation, data storage.
- **Q4 (Week 5–6):** SQLite, iOS basics (Xcode, Swift, storyboards), cross-platform frameworks (Flutter/React Native).
- **Q5 (Week 7):** APIs, JSON, Firebase integration, authentication & session handling.

Final Project (50 Marks)

Capstone project demonstrating end-to-end mobile development skills.

Timeline: Assigned in Week 7, due in Week 8.

Project Brief:
Develop a **fully functional mobile app** that integrates multiple concepts:

- Responsive UI/UX design

- Database (SQLite or Firebase)
- API integration with JSON data display
- Authentication / session handling
- Cross-platform compatibility (optional bonus)

Example Ideas:

- Personal Finance Tracker with expense logging, database storage & charts
- Weather & News Dashboard app with API integration and Firebase login
- To-Do + Reminder App with push notifications & cross-device sync

Evaluation Criteria:

- **Functionality & Code Quality (20 pts):** Working, bug-free, and modular code.
- **UI/UX Design (10 pts):** User-friendly interface, responsiveness, accessibility.
- **Integration & Features (10 pts):** Proper use of database, APIs, authentication.
- **Presentation & Documentation (10 pts):** Clear explanation, screenshots, demo video, and professional wrap-up.

Reference Materials & Tools

- **Books & Guides:**
    1. *Android Programming for Beginners* by John Horton
    2. *iOS Programming: The Big Nerd Ranch Guide*
    3. *Flutter for Beginners* by Alessandro Biessek
- **Development Tools & IDEs:** Android Studio, Xcode, VS Code, Figma, Adobe XD
- **Frameworks & Libraries:** Flutter with Dart, React Native with JavaScript, Firebase, SQLite
- **Learning Resources:** Android Developer Docs, Apple Developer Docs, Dart.dev, React Native Docs, W3Schools, Stack Overflow
- **Freelancing Platforms:** Upwork, Fiverr, Freelancer, LinkedIn

Completion & Certification Standards

To successfully earn certification, participants must:

- Maintain at least 90% attendance throughout the course.
- Complete all weekly activities and deliverables as assigned.
- Achieve a minimum of 50% in the midterm assessment.

- Demonstrate professionalism, teamwork, and effective communication during sessions and evaluations.

Program Guidelines

- ✓ Emphasis is placed on strategy and conceptual learning; while the use of real brand accounts is optional, it is encouraged where feasible.
- ✓ All assignments and projects must be submitted within the given deadlines. Delays in submission may impact eligibility for certification.
- ✓ Confidential or sensitive information must never be uploaded to public platforms. When sharing work, anonymized or sample datasets should be used instead.
- ✓ Professional, respectful, and collaborative behavior is expected at all times—whether in class, labs, or online spaces.
- ✓ Acts of plagiarism, duplication, or misrepresentation of work are strictly prohibited.
- ✓ Students are welcome to utilize AI tools to enhance learning and productivity; however, their usage must be transparently cited and cannot replace original project work.
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- ✓ Course-related feedback or concerns should be communicated via the designated channel, where respectful reporting will be addressed promptly.

For Any Assistance

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8. DATABASE MANAGEMENT

Course Overview

This course provides a comprehensive introduction to Database Management Systems (DBMS), covering relational and non-relational databases, SQL fundamentals, advanced queries, and database design. Students will gain hands-on experience with database tools such as MySQL and SQL Server, focusing on normalization, stored procedures, triggers, and security practices. The course also introduces concepts of data warehousing, business intelligence, and performance optimization, enabling learners to design, implement, and manage efficient and secure databases for real-world applications.

Course Structure

Week	Day	Topic
Week 1	**Day 1**	Database Concepts & Models
	Day 2	Introduction to Databases and Their Importance
	Day 3	Types of Databases: Relational vs Non-Relational
	Day 4	Overview of DBMS vs RDBMS
	Day 5	Data Models: Hierarchical, Network, Relational, Object-Oriented
	Activities & Deliverables	Lab: Create a report on databases' importance, classify databases, Draw an ER diagram
Week 2	**Day 1**	SQL Fundamentals (CRUD Operations)
	Day 2	Introduction to SQL and Database Tools (MySQL, SQL Server)
	Day 3	Creating Databases and Tables
	Day 4	Inserting, Updating, and Deleting Records (CRUD)
	Day 5	Retrieving Data using SELECT Statements
	Activities & Deliverables	Lab: Install a database tool, Create database and tables, Perform CRUD operations
Week 3	**Day 1**	Relational Database Design & Normalization
	Day 2	Primary Keys, Foreign Keys, and Indexes
	Day 3	Relationships: One-to-One, One-to-Many, Many-to-Many
	Day 4	Designing Efficient Database Schemas
	Day 5	Functional Dependencies and Data Anomalies
	Activities & Deliverables	Lab: Normalize dataset up to 3NF, Create ER diagram, Explain relationships
Week 4	**Day 1**	Advanced SQL Queries & Joins
	Day 2	Aggregate Functions (SUM, AVG, COUNT, MAX, MIN)

	Day 3	Grouping and Filtering with GROUP BY and HAVING, Subqueries: Correlated and Non-Correlated
	Day 4	Inner Joins, Left/Right Joins, Full Joins, Self Joins
	Day 5	**MID TERM**
	Activities & Deliverables	Lab: Write queries using aggregate functions, JOINs, and subqueries
Week 5	**Day 1**	Stored Procedures & Triggers
	Day 2	Introduction to Stored Procedures and Functions
	Day 3	Writing and Executing Stored Procedures with Parameters
	Day 4	Creating and Using Triggers: BEFORE, AFTER Events
	Day 5	Implementing Business Logic at Database Level
	Activities & Deliverables	Lab: Create a stored procedure, Implement a trigger, Submit SQL scripts
Week 6	**Day 1**	Database Security & Performance Optimization
	Day 2	User Roles, Privileges, and Access Controls
	Day 3	Data Backup and Recovery Strategies
	Day 4	Protecting Against SQL Injection and Other Threats
	Day 5	Query Optimization Techniques
	Activities & Deliverables	Lab: Set user roles, Perform backup/restore, Demonstrate SQL injection prevention
Week 7	**Day 1**	Data Warehousing & BI Tools, Distributed Data Stores
	Day 2	OLTPs, ETL Process
	Day 3	Schemas (Star, Snowflake), Fact & Dimension Tables
	Day 4	OLAP & Data Cube, SQL Server Integration Services (SSIS)
	Day 5	SQL Server Analysis Services (SSAS), SQL Server Reporting Services (SSRS)
	Activities & Deliverables	Lab: Design star schema, Create ETL pipeline, Build SSRS report
Week 8	**Day 1**	Explore freelancing basics, top marketplaces like Upwork & Fiver
	Day 2	Effective principles of oral and written communication, Listening skills – listening to the employer and clients, Feedback to the clients, and ethics
	Day 3	Resume Writing- theory and practice, LinkedIn profile- importance, and account creation
	Day 4	Employment interviews- theory, discussion, pair interview simulation, group simulation
	Day 5	**Final Project Presentation & Wrap-up**
	Activities & Deliverables	Final Project Presentation & Wrap-up

Learning Outcomes

By the end of this course, learners will be able to:

- Explain the importance of databases and differentiate between database models.
- Design and implement relational databases using ER diagrams and normalization techniques.
- Apply SQL for CRUD operations, queries, and joins.
- Use stored procedures, triggers, and business logic at the database level.
- Implement security measures, roles, privileges, and optimize queries for performance.
- Perform database backup, recovery, and prevent SQL injection attacks.
- Understand data warehousing concepts, schemas, ETL processes, and BI tools.
- Build practical projects integrating relational databases with advanced SQL features.
- Prepare a final project showcasing complete database design and implementation.
- Explore freelancing opportunities in database management and data solutions.

Delivery Framework

- **Teaching Methodology:** Prioritize innovation, creativity, and strategic thinking. Instruction should be a blend of roughly 40% lecture and discussion, complemented by 60% hands-on workshops and lab sessions focused on content development.

- **Assessment & Feedback:** Evaluate not only the quality of creative outputs but also the reasoning and strategic thought process behind each submission. Offer detailed, constructive feedback to guide improvement.

- **Learning Environment:** Build a collaborative classroom culture by encouraging peer review, open dialogue, and active participation in group activities.

- **Digital Monitoring:** Employ the LMS to manage submissions, track strategic documents, gather links to student work (e.g., Canva projects), and conduct quizzes or assessments efficiently.

- **Inclusive Access:** Strive for accessibility by distributing printed slide decks when feasible, using large and clear fonts in development tools, and providing captions or transcripts for all video-based learning resources.

Assessment Strategy

Assignments (25 Marks – 5 × 5)

Weekly SQL/database design tasks reinforcing concepts:

- **A1 (Week 1):** Write a short report on database importance, classify databases, and draw an ER diagram.
- **A2 (Week 2):** Install a database tool (MySQL/SQL Server), create database & tables, and perform CRUD operations.
- **A3 (Week 3):** Normalize a dataset up to 3NF, design efficient schemas, and explain relationships.
- **A4 (Week 5):** Create stored procedures & triggers, implement simple business logic at DB level.
- **A5 (Week 6–7):** Design a star schema, build ETL pipeline, and prepare a BI/SSRS report.

Quizzes (25 Marks – 5 × 5)

Concept-check quizzes for theory + SQL application:

- **Q1 (Week 1–2):** Database basics, DBMS vs RDBMS, SQL fundamentals, CRUD operations.
- **Q2 (Week 3):** Database design, normalization, keys, relationships, functional dependencies.
- **Q3 (Week 4):** Advanced SQL queries, joins, aggregates, subqueries.
- **Q4 (Week 5–6):** Stored procedures, triggers, security, roles, backup/recovery, optimization.
- **Q5 (Week 7):** Data warehousing, OLTP vs OLAP, schemas, ETL, SSIS/SSAS/SSRS concepts.

Final Project (50 Marks)

Capstone project demonstrating complete database design, implementation, and reporting.

Timeline: Assigned in Week 7, due in Week 8.

Project Brief:
Develop a database-driven system that includes:

- Well-structured ERD & normalized schema
- CRUD operations with stored procedures & triggers
- Security controls, backup & optimization
- Data warehouse schema with ETL pipeline and BI reporting

Example Ideas:

- **Hospital Management System** with patient records, doctors' schedules, and reporting
- **E-commerce Database** with product catalog, orders, customers, and sales analytics
- **School/University Database** with students, courses, results, and dashboards

Evaluation Criteria:

- **Database Design & Schema (15 pts):** ERD, normalization, efficient relationships.
- **Implementation & Queries (15 pts):** CRUD, stored procedures, triggers, SQL accuracy.
- **Security & Optimization (10 pts):** Roles, backup/recovery, performance tuning.
- **Reporting & Presentation (10 pts):** BI/SSRS reports, documentation, professional presentation.

Reference Materials & Tools

- **Books & Resources**
  1. *Database System Concepts* by Silberschatz, Korth & Sudarshan
  2. *Learning SQL* by Alan Beaulieu
  3. *SQL Queries for Mere Mortals* by John L. Viescas
- **Database Tools**
  1. MySQL, SQL Server, PostgreSQL, Oracle Database
- **Other Tools**
  1. SSIS (SQL Server Integration Services)
  2. SSAS (SQL Server Analysis Services)
  3. SSRS (SQL Server Reporting Services)
- **Online Resources**
  1. W3Schools SQL Tutorial
  2. Oracle & MySQL Documentation
  3. SQLBolt, Mode Analytics SQL Tutorials
- **Freelancing Platforms**
  1. Upwork, Fiverr, Freelancer (for database administration & data analysis jobs)

Completion & Certification Standards

To successfully earn certification, participants must:

- Maintain at least 90% attendance throughout the course.
- Complete all weekly activities and deliverables as assigned.

- Achieve a minimum of 50% in the midterm assessment.
- Demonstrate professionalism, teamwork, and effective communication during sessions and evaluations.

Program Guidelines

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9. JAVA DEVELOPMENT

Course Overview

This course introduces learners to the fundamentals of Java programming, starting from basic syntax and object-oriented principles, and gradually advancing to exception handling, multithreading, database integration, unit testing, and software design patterns. Alongside technical training, the course also integrates professional skills such as freelancing, communication, resume building, and interview preparation, enabling participants to become both competent developers and market-ready professionals.

Course Structure

Week	Day	Topic
Week 1	**Day 1**	What is Java? A deep dive into the core components: the JVM (Java Virtual Machine), JRE (Java Runtime Environment), and JDK (Java Development Kit).
	Day 2	Setting Up Your Environment: A practical guide to installing the JDK and configuring a popular IDE like IntelliJ IDEA or Eclipse.
	Day 3	Basic Syntax, Data Types, and Variables: Understanding the fundamental building blocks of a Java program, including primitive data types and variable declaration.
	Day 4	Operators and Expressions: Learning to use arithmetic, relational, logical, and bitwise operators to perform operations.
	Day 5	Control Flow Statements: Mastering if-else, switch, and ternary operators to control the flow of execution in your code.
	Activities & Deliverables	Write and compile a "Hello, World!" program. Deliverable: A working .java file that prints a simple message to the console.
Week 2	**Day 1**	Classes and Objects: The core of Java's OOP paradigm. Understanding how to define a class and instantiate objects from it.
	Day 2	Constructors and Methods: Exploring how constructors initialize objects and how methods define object behavior.
	Day 3	Encapsulation: Learning about access modifiers (public, private, protected) to hide data and protect your objects.
	Day 4	Inheritance and Polymorphism: Understanding how to create a hierarchy of classes and how objects can take on many forms.
	Day 5	super and this Keywords: A closer look at these essential keywords for referring to a parent class and the current object.
	Activities & Deliverables	Create a simple Car class with properties (e.g., color, make) and methods (e.g., startEngine(), accelerate()). Deliverable: A .java file with the Car class and a main method that creates and uses two Car objects.

Week 3	**Day 1**	Abstract Classes and Interfaces: Differentiating between abstract classes and interfaces and learning when to use each for more flexible and maintainable code.
	Day 2	The final Keyword: Understanding the various uses of final with variables, methods, and classes.
	Day 3	Introduction to Java Collections Framework: An overview of the standardized data structures for storing and manipulating groups of objects.
	Day 4	ArrayList and LinkedList: A detailed look at these two list implementations, their differences, and use cases.
	Day 5	HashSet and HashMap: Exploring the Set and Map interfaces and how to use hash-based implementations for efficient data storage.
	Activities & Deliverables	Build a simple program that manages a to-do list using an ArrayList and a contact list using a HashMap. Deliverable: A .java file that demonstrates adding, removing, and retrieving data from both an ArrayList and a HashMap.
Week 4	**Day 1**	Understanding Exceptions: What are exceptions and why is it important to handle them? Learning the try-catch-finally block.
	Day 2	Checked vs. Unchecked Exceptions: Differentiating between the two types of exceptions and how they are handled by the compiler.
	Day 3	File I/O Basics: Introduction to reading from and writing to files using Java's I/O streams.
	Day 4	Reading and Writing Files: Practical examples of using FileInputStream, FileOutputStream, BufferedReader, and BufferedWriter.
	Day 5	Midterm Examination
	Activities & Deliverables	Write a program that reads a list of names from a text file, sorts them alphabetically, and writes the sorted list to a new file. Deliverable: Two .txt files (one for input, one for output) and a .java file that successfully performs the read/sort/write operation.
Week 5	**Day 1**	What is a Thread? Understanding the concept of a thread and how to create one using the Thread class or Runnable interface.
	Day 2	Creating and Managing Threads: Learning how to start, stop, and manage the lifecycle of threads.
	Day 3	Thread Synchronization: Addressing the challenge of multiple threads accessing shared resources simultaneously using synchronized methods and blocks.
	Day 4	volatile and synchronized Keywords: A deeper dive into these keywords for managing visibility and mutual exclusion in concurrent applications.
	Day 5	ExecutorService and Callable: Exploring more advanced concurrency tools for managing thread pools and returning values from a thread's execution.
	Activities & Deliverables	Create a multithreaded application where two threads increment a shared counter, demonstrating the need for synchronization. Deliverable: A .java file that shows a race condition without synchronization and then a corrected version with proper locking.

Week 6	**Day 1**	Introduction to Databases and SQL: A primer on relational databases and the basics of Structured Query Language (SQL).
	Day 2	JDBC (Java Database Connectivity) Architecture: Understanding the architecture and drivers that allow Java applications to connect to databases.
	Day 3	Connecting to a Database: A step-by-step guide to establishing a connection to a MySQL or PostgreSQL database.
	Day 4	Executing SQL Queries: Learning to use JDBC to perform CRUD (Create, Read, Update, Delete) operations.
	Day 5	PreparedStatement and ResultSet: Using PreparedStatement to prevent SQL injection and processing query results with ResultSet.
	Activities & Deliverables	Develop a simple console application that connects to a database, inserts a new user record, and then retrieves and prints all user records. Deliverable: A .java file that demonstrates successful database connectivity and CRUD operations.
Week 7	**Day 1**	Introduction to Unit Testing with JUnit: Learning the importance of unit testing and writing your first test cases with JUnit.
	Day 2	Test Setup and Assertions: Using @Before, @After, and assertion methods to create robust and reliable tests.
	Day 3	Software Design Patterns: An introduction to common design patterns like Singleton, Factory, and Observer, and how to apply them to create more robust and scalable applications.
	Day 4	Introduction to Dependency Management: Understanding the concept of external libraries and how to manage them manually or with a simple tool.
	Day 5	Introduction to Git and Version Control: Learning the fundamentals of Git for collaborative development and version management.
	Activities & Deliverables	Write JUnit tests for the Car class created in Week 2, covering methods like startEngine() and accelerate(). Deliverable: A project that includes the Car class code and a test class with at least three passing unit tests, demonstrating proper project structure.
Week 8	**Day 1**	Explore freelancing basics, top marketplaces like Upwork & Fiver
	Day 2	Effective principles of oral and written communication, Listening skills – listening to the employer and clients, Feedback to the clients, and ethics
	Day 3	Resume Writing- theory and practice, LinkedIn profile- importance, and account creation
	Day 4	Employment interviews- theory, discussion, pair interview simulation, group simulation
	Day 5	Final Project Presentation & Wrap-up
	Activities & Deliverables	Final Project Presentation & Wrap-up

Learning Outcomes

By the end of this course, participants will be able to:

- Write, compile, and execute Java programs with a solid understanding of syntax, operators, and control flow.
- Apply object-oriented programming principles (encapsulation, inheritance, polymorphism) in real-world applications.
- Design efficient programs using abstract classes, interfaces, collections, and data structures.
- Implement robust error handling, file I/O operations, and concurrency in Java.
- Integrate Java applications with databases using JDBC and execute CRUD operations securely.
- Write and maintain unit tests using JUnit for reliable software development.
- Apply design patterns for scalable and maintainable code structures.
- Develop essential professional skills including freelancing, resume writing, communication, and interview preparation.

Delivery Framework

- **Teaching Methodology:** Prioritize innovation, creativity, and strategic thinking. Instruction should be a blend of roughly 40% lecture and discussion, complemented by 60% hands-on workshops and lab sessions focused on content development.

- **Assessment & Feedback:** Evaluate not only the quality of creative outputs but also the reasoning and strategic thought process behind each submission. Offer detailed, constructive feedback to guide improvement.

- **Learning Environment:** Build a collaborative classroom culture by encouraging peer review, open dialogue, and active participation in group activities.

- **Digital Monitoring:** Employ the LMS to manage submissions, track strategic documents, gather links to student work (e.g., Canva projects), and conduct quizzes or assessments efficiently.

- **Inclusive Access:** Strive for accessibility by distributing printed slide decks when feasible, using large and clear fonts in development tools, and providing captions or transcripts for all video-based learning resources.

Assessment Strategy

Assignments (25 Marks – 5 × 5)

Weekly coding tasks reinforcing concepts:

- **A1 (Week 1):** Write basic Java programs covering syntax, variables, operators, and control flow (e.g., calculator app).
- **A2 (Week 2):** Create a class-based program demonstrating OOP fundamentals: constructors, methods, encapsulation, inheritance.
- **A3 (Week 3):** Implement a program using Java Collections (ArrayList, HashMap) to manage structured data.
- **A4 (Week 4–5):** Develop a file-handling & multithreading application (e.g., read/write text data, implement threads with synchronization).
- **A5 (Week 6):** Build a simple database-connected Java application using JDBC (insert, retrieve records).

Quizzes (25 Marks – 5 × 5)

Concept-check quizzes for theory + code snippets:

- **Q1 (Week 1):** JVM, JRE, JDK, syntax, data types, operators, and control flow.
- **Q2 (Week 2):** Classes, objects, methods, inheritance, polymorphism, encapsulation.
- **Q3 (Week 3):** Abstract classes, interfaces, collections (ArrayList, HashMap).
- **Q4 (Week 4–5):** Exception handling, file I/O, multithreading, synchronization.
- **Q5 (Week 6–7):** JDBC basics, SQL operations, unit testing with JUnit, Git fundamentals.

Final Project (50 Marks)

Capstone coding project demonstrating end-to-end Java skills.

Timeline: Assigned in Week 7, due in Week 8.

Project Brief:
Develop a Java-based application integrating OOP, collections, file handling, database connectivity, and testing.

Example: A **Student Management System**:

- Store and retrieve student data using JDBC.
- Use collections for managing in-memory data (ArrayList/HashMap).
- Handle file import/export for reports.
- Include multithreading for background tasks (e.g., auto-save).
- Implement JUnit tests for major functions.

Evaluation Criteria:

- **Code Quality & Functionality (20 pts):** Clean, modular, and working code.
- **OOP & Data Handling (10 pts):** Correct use of classes, inheritance, collections, and JDBC.
- **Concurrency & Exception Handling (10 pts):** Demonstrates proper threading and error management.
- **Documentation & Presentation (10 pts):** Comments, user guide, and professional demo.

Reference Materials & Tools

Participants will leverage the following resources:

- **Software & Tools:** IntelliJ IDEA / Eclipse, JDK, MySQL/PostgreSQL, Git, JUnit.
- **Core References:**
  1. *Head First Java* by Kathy Sierra & Bert Bates.
  2. *Effective Java* by Joshua Bloch.
  3. *Java: The Complete Reference* by Herbert Schildt.
- **Additional Resources:** Online documentation (Oracle Java Docs), coding practice platforms (HackerRank, LeetCode).

Completion & Certification Standards

To successfully earn certification, participants must:

- Maintain at least 90% attendance throughout the course.
- Complete all weekly activities and deliverables as assigned.
- Achieve a minimum of 50% in the midterm assessment.
- Demonstrate professionalism, teamwork, and effective communication during sessions and evaluations.

Program Guidelines

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10. DATA SCIENCE

Course Overview

This course provides a comprehensive introduction to Data Science, covering the entire workflow from data collection and cleaning to analysis, visualization, and machine learning model development. Participants will gain practical experience with Python, Pandas, NumPy, Scikit-Learn, and visualization tools, while also learning to work with cloud platforms and real-world datasets. The course concludes with professional development sessions on freelancing, communication, and career-building skills.

Course Structure

Week	Days	Topics
Week 1	**Day 1**	Introduction to Data Science: Scope, Applications, and Trends
	Day 2	AI & ML Basics, Roles & Responsibilities of a Data Scientist
	Day 3	Data Science Workflow & Project Lifecycle
	Day 4	Tools & Technologies: Jupyter, Python
	Day 5	Pandas, Scikit-Learn
	Activities & Deliverables	Hands-on: Explore datasets using Python Assignment 1: Report on 3 real-world applications of Data Science Quiz 1: Core concepts of data science
Week 2	**Day 1**	Setting up Python Environment (Anaconda, Jupyter)
	Day 2	Python Basics: Variables, Data Types, Operators
	Day 3	Control Structures: if-else, loops, and functions
	Day 4	Data Structures: Lists, Tuples, Dictionaries, Sets
	Day 5	NumPy for numerical operations & Pandas basics
	Activities & Deliverables	Lab: Manipulate datasets using Pandas & NumPy Assignment 2: Analyze a CSV dataset Quiz 2: Python syntax & Pandas operations
Week 3	**Day 1**	Sources of Data: APIs, Web Scraping, Databases, CSV/Excel
	Day 2	Handling Missing Data & Duplicates
	Day 3	Data Cleaning: Outliers, Normalization, Encoding
	Day 4	Feature Engineering & Selection
	Day 5	Scaling & Transformation of Data
	Activities & Deliverables	Lab: Clean and preprocess a dataset Assignment 3: Feature engineering on given data Quiz 3: Data collection & preprocessing concepts
Week 4	**Day 1**	Understanding Data Types & Distributions
	Day 2	Descriptive Statistics and Summary Functions

	Day 3	Identifying Trends, Patterns & Correlations
	Day 4	Pandas Profiling and Seaborn for Insights
	Day 5	**Mid Term Exam**
	Activities & Deliverables	Lab: Perform EDA on a dataset Assignment 4: Create an EDA report with charts Quiz 4: EDA techniques & visualization
Week 5	**Day 1**	Introduction to Machine Learning Concepts
	Day 2	Types of ML: Supervised vs Unsupervised
	Day 3	Building Regression & Classification Models
	Day 4	Model Training, Testing & Validation
	Day 5	Overfitting, Underfitting & Cross-Validation
	Activities & Deliverables	Lab: Train simple regression & classification models Assignment 5: Evaluate model performance Quiz 5: ML basics & model validation
Week 6	**Day 1**	Importance of Data Visualization in Storytelling
	Day 2	Charts & Graphs with Matplotlib
	Day 3	Visualizations with Seaborn
	Day 4	Interactive Dashboards: Intro to Plotly/Power BI
	Day 5	Visualization Best Practices & Presenting Insights
	Activities & Deliverables	Lab: Build visualizations & dashboards Assignment 6: Create a project insights report Quiz 6: Visualization techniques & dashboarding
Week 7	**Day 1**	Big Data Concepts
	Day 2	Structured vs Unstructured Data
	Day 3	Intro to Cloud Platforms: AWS, GCP, Azure
	Day 4	Google Colab & Kaggle for Cloud Analysis
	Day 5	Cloud-Based Tools & Real-World Case Studies
	Activities & Deliverables	Lab: Cloud-based analysis using Colab Assignment 7: Compare cloud platforms & big data tools Quiz 7: Big data & cloud integration concepts
Week 8	**Day 1**	Explore freelancing basics, top marketplaces like Upwork & Fiver
	Day 2	Effective principles of oral and written communication, Listening skills – listening to the employer and clients, Feedback to the clients, and ethics
	Day 3	Resume Writing- theory and practice, LinkedIn profile- importance, and account creation
	Day 4	Employment interviews- theory, discussion, pair interview simulation, group simulation
	Day 5	**Final Exam**

	Activities & Deliverables	**Final Project**: Implement MNIST Classification Model using Kaggle Dataset

Learning Outcomes

By the end of the course, participants will be able to:

- Understand the scope, applications, and project lifecycle of Data Science.
- Write Python programs and use libraries like NumPy and Pandas for data manipulation.
- Collect, clean, preprocess, and transform raw datasets into structured formats.
- Perform Exploratory Data Analysis (EDA) and extract insights using visualization libraries.
- Build and evaluate machine learning models for regression and classification.
- Apply visualization techniques to create dashboards and storytelling reports.
- Work with cloud-based platforms (Google Colab, Kaggle, AWS, GCP, Azure).
- Develop professional skills such as freelancing, resume building, LinkedIn profile optimization, and interview preparation.

Delivery Framework

- **Teaching Methodology:** Prioritize innovation, creativity, and strategic thinking. Instruction should be a blend of roughly 40% lecture and discussion, complemented by 60% hands-on workshops and lab sessions focused on content development.

- **Assessment & Feedback:** Evaluate not only the quality of creative outputs but also the reasoning and strategic thought process behind each submission. Offer detailed, constructive feedback to guide improvement.

- **Learning Environment:** Build a collaborative classroom culture by encouraging peer review, open dialogue, and active participation in group activities.

- **Digital Monitoring:** Employ the LMS to manage submissions, track strategic documents, gather links to student work (e.g., Canva projects), and conduct quizzes or assessments efficiently.

- **Inclusive Access:** Strive for accessibility by distributing printed slide decks when feasible, using large and clear fonts in development tools, and providing captions or transcripts for all video-based learning resources.

Assessment Strategy

Assignments (25 Marks – 5 × 5)

Weekly tasks to reinforce concepts:

- **A1 (Week 1):** Write a short report **on** 3 real-world Data Science applications.
- **A2 (Week 2):** Perform data manipulation on a CSV dataset using NumPy & Pandas.
- **A3 (Week 3):** Apply data cleaning & feature engineering to a raw dataset.
- **A4 (Week 4):** Conduct Exploratory Data Analysis (EDA) and create an insights report with charts.
- **A5 (Week 5):** Train and evaluate regression/classification models, documenting model performance.

Quizzes (25 Marks – 5 × 5)

Short quizzes to test theoretical knowledge + practical concepts:

- **Q1 (Week 1):** Fundamentals of Data Science, workflow, and tools.
- **Q2 (Week 2):** Python basics, data structures, NumPy & Pandas operations.
- **Q3 (Week 3):** Data collection, cleaning, missing values, and preprocessing.
- **Q4 (Week 4):** Descriptive statistics, EDA, visualization methods.
- **Q5 (Week 5):** ML basics, regression, classification, overfitting & validation.

Final Project (50 Marks)

Capstone project demonstrating end-to-end Data Science workflow.

Timeline: Assigned in Week 7, due in Week 8.

Project Brief:
Implement an MNIST Classification Model using Kaggle dataset.

- Preprocess dataset (cleaning, normalization, feature scaling).
- Train supervised ML models (logistic regression / decision tree / neural network).
- Validate models using cross-validation.
- Visualize performance metrics (accuracy, confusion matrix, ROC curve).
- Present insights with a dashboard (Matplotlib/Seaborn/Plotly).

Evaluation Criteria:

- **Data Handling & Preprocessing (15 pts):** Cleaning, feature engineering, transformations.
- **Model Development (15 pts):** Correct ML model training, validation, and tuning.
- **Visualization & Insights (10 pts):** Clear, meaningful visualizations and interpretation.
- **Documentation & Presentation (10 pts):** Professional report, comments, and final demo.

Reference Materials & Tools

- **Core Tools & Libraries:** Python, Jupyter Notebook, Anaconda, NumPy, Pandas, Scikit-Learn, Matplotlib, Seaborn, Plotly, Power BI.
- **Datasets & Platforms:** Kaggle datasets, Google Colab, SQL databases, APIs for data collection.
- **Books & References:**
    1. *Python for Data Analysis* by Wes McKinney.
    2. *Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow* by Aurélien Géron.
    3. *Data Science for Business* by Foster Provost & Tom Fawcett.
- **Additional Resources:** Online documentation, tutorials from Kaggle & DataCamp, cloud documentation (AWS, GCP, Azure).

Completion & Certification Standards

To successfully earn certification, participants must:

- Maintain at least 90% attendance throughout the course.
- Complete all weekly activities and deliverables as assigned.
- Achieve a minimum of 50% in the midterm assessment.
- Demonstrate professionalism, teamwork, and effective communication during sessions and evaluations.

Program Guidelines

- ✓ Emphasis is placed on strategy and conceptual learning; while the use of real brand accounts is optional, it is encouraged where feasible.
- ✓ All assignments and projects must be submitted within the given deadlines. Delays in submission may impact eligibility for certification.
- ✓ Confidential or sensitive information must never be uploaded to public platforms. When sharing work, anonymized or sample datasets should be used instead.

- ✓ Professional, respectful, and collaborative behavior is expected at all times—whether in class, labs, or online spaces.
- ✓ Acts of plagiarism, duplication, or misrepresentation of work are strictly prohibited.
- ✓ Students are welcome to utilize AI tools to enhance learning and productivity; however, their usage must be transparently cited and cannot replace original project work.
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11. CYBER SECURITY AND ETHICAL HACKING

Course Overview

This course introduces learners to the dynamic field of Cyber Security and Ethical Hacking. Participants will explore cyber threats, attack vectors, and defense mechanisms while gaining hands-on exposure to industry-standard tools like Kali Linux, Metasploit, and Nmap. The curriculum balances theoretical foundations with real-world case studies, practical labs, and professional development, ensuring participants are ready for technical roles in cybersecurity or freelancing opportunities.

Course Structure

Week	Days	Topics
Week 1	**Day 1**	Cyber Security Landscape & Threat Types
	Day 2	Principles of Ethical Hacking & Legal Frameworks
	Day 3	Types of Hackers: White Hat, Black Hat, Grey Hat
	Day 4	Cyber Attack Vectors & Real-World Case Studies
	Day 5	Phases of Ethical Hacking & Intro to Security Tools
	Activities & Deliverables	Lab: Explore attack vectors using Kali Linux Assignment 1: Analyze a real-world cyberattack Quiz 1: Cyber threats & hacker types
Week 2	**Day 1**	Basics of Computer Networks & OSI Model
	Day 2	IP Addressing, Subnetting & Protocols (TCP/IP, UDP)
	Day 3	DNS, DHCP, and Common Network Services
	Day 4	Network Security Concepts: Firewalls, IDS/IPS, VPNs
	Day 5	Wi-Fi Security & Secure Protocols (HTTPS, SSL/TLS, SSH)
	Activities & Deliverables	Lab: Configure firewall & secure Wi-Fi Assignment 2: Document secure network configurations Quiz 2: Networking fundamentals & security protocols
Week 3	**Day 1**	Web Application Architecture & Security Principles
	Day 2	OWASP Top 10 Security Vulnerabilities
	Day 3	Cross-Site Scripting (XSS) & CSRF
	Day 4	SQL Injection Variants & Session Hijacking
	Day 5	Hands-on with DVWA / bWAPP
	Activities & Deliverables	Lab: Exploit DVWA for XSS & SQLi Assignment 3: Document OWASP Top 10 mitigations Quiz 3: OWASP vulnerabilities & SQLi concepts
Week 4	**Day 1**	Types of Malware: Virus, Worms, Trojans, Ransomware
	Day 2	Malware Behavior Analysis Techniques

	Day 3	Static vs Dynamic Malware Analysis Tools
	Day 4	Reverse Engineering Basics (Ghidra, OllyDbg)
	Day 5	**Mid Term Exam**
	Activities & Deliverables	Lab: Analyze malware in a sandbox Assignment 4: Reverse-engineer a binary Quiz 4: Malware types & analysis techniques
Week 5	**Day 1**	Basics of Cryptography: Symmetric vs Asymmetric
	Day 2	Encryption Algorithms: AES, RSA, DES
	Day 3	Hashing Functions: MD5, SHA1, SHA256
	Day 4	Digital Signatures, Certificates & Key Exchange
	Day 5	Best Practices for Data Protection (Transit & Rest)
	Activities & Deliverables	Lab: Implement AES & RSA in Python Assignment 5: Compare symmetric & asymmetric encryption Quiz 5: Cryptography & data security concepts
Week 6	**Day 1**	Penetration Testing Methodologies & Phases
	Day 2	Footprinting, Scanning & Enumeration Techniques
	Day 3	Exploitation & Post-Exploitation Strategies
	Day 4	Social Engineering Attacks & Countermeasures
	Day 5	Tools Overview: Metasploit, Nmap, Nessus, Nikto, OpenVAS
	Activities & Deliverables	Lab: Perform a simulated penetration test Assignment 6: Document pen-test phases Quiz 6: Pen-testing methodologies & tools
Week 7	**Day 1**	IT Security Policies & Procedures
	Day 2	Conducting Security Audits & Risk Assessments
	Day 3	Compliance Standards: ISO 27001, GDPR, PCI-DSS
	Day 4	Logging, Monitoring & Incident Response Planning
	Day 5	Cybersecurity Career Roadmap & Certifications
	Activities & Deliverables	Lab: Simulate a risk assessment Assignment 7: Prepare a compliance audit report Quiz 7: Security auditing & compliance standards
Week 8	**Day 1**	Explore freelancing basics, top marketplaces like Upwork & Fiver
	Day 2	Effective principles of oral and written communication, Listening skills – listening to the employer and clients, Feedback to the clients, and ethics
	Day 3	Resume Writing- theory and practice, LinkedIn profile- importance, and account creation
	Day 4	Employment interviews- theory, discussion, pair interview simulation, group simulation
	Day 5	**Final Exam**
	Activities & Deliverables	**Final Project**: End-to-end penetration testing simulation

Learning Outcomes

By the end of this course, participants will be able to:

- Understand the evolving cyber threat landscape and ethical hacking frameworks.
- Explain key networking concepts, protocols, and their security implications.
- Identify, exploit, and mitigate common web application vulnerabilities (OWASP Top 10).
- Analyze and reverse-engineer malware using static and dynamic techniques.
- Apply cryptographic principles, encryption, and hashing methods for data protection.
- Conduct penetration testing through reconnaissance, exploitation, and reporting phases.
- Design and implement IT security policies, audits, and compliance assessments.
- Develop professional skills for freelancing, resume building, and cybersecurity certifications.

Delivery Framework

- **Teaching Methodology:** Prioritize innovation, creativity, and strategic thinking. Instruction should be a blend of roughly 40% lecture and discussion, complemented by 60% hands-on workshops and lab sessions focused on content development.

- **Assessment & Feedback:** Evaluate not only the quality of creative outputs but also the reasoning and strategic thought process behind each submission. Offer detailed, constructive feedback to guide improvement.

- **Learning Environment:** Build a collaborative classroom culture by encouraging peer review, open dialogue, and active participation in group activities.

- **Digital Monitoring:** Employ the LMS to manage submissions, track strategic documents, gather links to student work (e.g., Canva projects), and conduct quizzes or assessments efficiently.

- **Inclusive Access:** Strive for accessibility by distributing printed slide decks when feasible, using large and clear fonts in development tools, and providing captions or transcripts for all video-based learning resources.

Assessment Strategy

Assignments (25 Marks – 5 × 5)

Weekly assignments to ensure applied understanding:

- **A1 (Week 1):** Analyze a real-world cyberattack (cause, impact, prevention).
- **A2 (Week 2):** Document secure network configurations (firewall + Wi-Fi security).
- **A3 (Week 3):** Create a mitigation report for OWASP Top 10 vulnerabilities.
- **A4 (Week 4):** Reverse-engineer a binary sample (basic analysis only).
- **A5 (Week 5):** Compare symmetric vs. asymmetric encryption in a short technical paper.

Quizzes (25 Marks – 5 × 5)

Short conceptual + practical quizzes:

- **Q1 (Week 1):** Cyber threats, hacker categories, and ethical hacking principles.
- **Q2 (Week 2):** Networking fundamentals, TCP/IP, secure protocols.
- **Q3 (Week 3):** OWASP Top 10 vulnerabilities, SQLi, and XSS concepts.
- **Q4 (Week 4):** Malware types, analysis approaches, reverse engineering basics.
- **Q5 (Week 5):** Cryptography, hashing, digital signatures, and encryption best practices.

Final Project (50 Marks)

Capstone project to integrate all major skills.

Timeline: Assigned in Week 6, presented in Week 8.

Project Brief:
Perform an **end-to-end penetration testing simulation** on a controlled environment.

- Conduct reconnaissance, scanning, enumeration, and exploitation.
- Demonstrate at least one OWASP vulnerability exploit (DVWA / test app).
- Implement cryptography for data protection.
- Document security policies, compliance checks, and incident response.
- Prepare a comprehensive pen-test report.

Evaluation Criteria:

- **Reconnaissance & Exploitation (15 pts):** Proper use of tools (Nmap, Metasploit, etc.).

- **Vulnerability Mitigation (10 pts):** Suggested fixes and countermeasures.
- **Cryptography Application (10 pts):** Demonstrated use of AES/RSA/Hashing.
- **Reporting & Presentation (15 pts):** Structured documentation, clarity, and professionalism.

Reference Materials & Tools

- **Core Tools & Platforms:** Kali Linux, DVWA, bWAPP, Nmap, Metasploit, Nessus, Nikto, OpenVAS, Wireshark, Ghidra, OllyDbg.
- **Languages & Libraries:** Python for cryptography & scripting.
- **Books & References:**
    1. *The Web Application Hacker's Handbook* by Dafydd Stuttard & Marcus Pinto.
    2. *Practical Malware Analysis* by Michael Sikorski & Andrew Honig.
    3. *Hacking: The Art of Exploitation* by Jon Erickson.
    4. *Applied Cryptography* by Bruce Schneier.
- **Standards & Frameworks:** OWASP Top 10, ISO 27001, GDPR, PCI-DSS.
- **Additional Resources:** Cybersecurity blogs, exploit databases, MITRE ATT&CK framework.

Completion & Certification Standards

To successfully earn certification, participants must:

- Maintain at least 90% attendance throughout the course.
- Complete all weekly activities and deliverables as assigned.
- Achieve a minimum of 50% in the midterm assessment.
- Demonstrate professionalism, teamwork, and effective communication during sessions and evaluations.

Program Guidelines

- ✓ Emphasis is placed on strategy and conceptual learning; while the use of real brand accounts is optional, it is encouraged where feasible.
- ✓ All assignments and projects must be submitted within the given deadlines. Delays in submission may impact eligibility for certification.
- ✓ Confidential or sensitive information must never be uploaded to public platforms. When sharing work, anonymized or sample datasets should be used instead.
- ✓ Professional, respectful, and collaborative behavior is expected at all times—whether in class, labs, or online spaces.
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12. CLOUD COMPUTING

Course Overview

This course provides a comprehensive introduction to Cloud Computing concepts, architectures, and hands-on practices. Participants will gain an in-depth understanding of virtualization, service models (IaaS, PaaS, SaaS), deployment models, and leading cloud platforms such as AWS and OpenStack. The course also emphasizes security, compliance, scalability, and freelancing skills, enabling learners to confidently apply cloud solutions in professional and real-world contexts.

Course Structure

Weeks	Days	Topics
Week 1	**Day 1**	Overview of Cloud Computing and Its Evolution
	Day 2	Benefits and Challenges of Cloud Adoption
	Day 3	Virtual Machines vs Containers
	Day 4	Introduction to Hypervisors and Virtualization Technologies
	Day 5	Cloud Deployment Models: Public, Private, Hybrid, Community
	Activities & Deliverables	Report: Explore Real-World Use Cases of Cloud Solutions, Public and Private Cloud Solutions
Week 2	**Day 1**	Understanding IaaS, PaaS, SaaS with Examples
	Day 2	Comparing Traditional IT vs Cloud Models
	Day 3	Use Cases and Selection Criteria for Service Models
	Day 4	Key Vendors and Offerings in Each Model
	Day 5	Service-Level Agreements (SLAs) and Pricing Models
	Activities & Deliverables	Lab: Explore the Service-Level Agreements (SLAs) of AWS and Perform Estimation using AWS Pricing Models
Week 3	**Day 1**	Introduction to Amazon Web Services (AWS)
	Day 2	Creating and Managing Accounts and Resources
	Day 3	AWS Global Infrastructure, Zone, Region, POP
	Day 4	Common Services: Compute (EC2, VM), Storage (S3, Blob), Networking
	Day 5	Cloud Console Navigation and CLI Basics
	Activities & Deliverables	Lab: AWS Cloud Console Navigation and CLI Basics
Week 4	**Day 1**	OpenStack Introduction, OpenStack landscape
	Day 2	OpenStack Conceptual Architecture
	Day 3	3-node vs 2-node Architecture of OpenStack
	Day 4	OpenStack case studies
	Day 5	**Mid Term Exam**

	Activities & Deliverables	Lab: Signup on OpenStack Public Cloud Trial and perform basic Cloud Console Navigation
Week 5	**Day 1**	Local Dev Environment: Devstack
	Day 2	Devstack installation
	Day 3	OpenStack services, Compute, Storage, Networking
	Day 4	OpenStack Client tools
	Day 5	OpenStack services Identity, Image services
	Activities & Deliverables	Lab: Deployment of Devstack and access its console for different basic operations.
Week 6	**Day 1**	Types of Cloud Storage: Object, Block
	Day 2	Data Backup, Archiving, and Lifecycle Management
	Day 3	Introduction to Cloud Databases: Trove, RDS
	Day 4	Configuring and Managing Databases in Cloud Platforms
	Day 5	High Availability and Scalability Considerations
	Activities & Deliverables	Lab: Build simple Cloud Storage on OpenStack/AWS
Week 7	**Day 1**	Understanding Cloud Security Shared Responsibility Model
	Day 2	Identity & Access Management (IAM) Basics, Managing Permissions and Security Groups
	Day 3	Data Encryption at Rest and in Transit
	Day 4	Introduction to Compliance Frameworks: GDPR
	Day 5	Tools for Monitoring and Threat Detection
	Activities & Deliverables	Lab: OpenStack Cloud Monitoring using Telemetry (Ceilometer), Alram Services.
Week 8	**Day 1**	Explore freelancing basics, top marketplaces like Upwork & Fiver
	Day 2	Effective principles of oral and written communication, Listening skills – listening to the employer and clients, Feedback to the clients, and ethics
	Day 3	Resume Writing- theory and practice, LinkedIn profile- importance, and account creation
	Day 4	Employment interviews- theory, discussion, pair interview simulation, group simulation
	Day 5	**Final Exam**
	Activities & Deliverables	Final Project: Simple Web Application Deployment on Cloud Platform

Course Outcomes

By the end of this course, learners will be able to:

- Explain the fundamentals and evolution of cloud computing.
- Differentiate between virtual machines and containers, and understand hypervisors.
- Compare and apply deployment models (public, private, hybrid, community).
- Configure and manage AWS resources, services, and cloud consoles.
- Explore and deploy OpenStack environments using Devstack.
- Implement cloud storage and databases with scalability and backup strategies.
- Apply cloud security frameworks, including IAM, encryption, and compliance (e.g., GDPR).
- Develop soft skills for freelancing, including communication, resume writing, and interview preparation.
- Build and deploy a final project on a cloud platform.

Delivery Framework

- **Teaching Methodology:** Prioritize innovation, creativity, and strategic thinking. Instruction should be a blend of roughly 40% lecture and discussion, complemented by 60% hands-on workshops and lab sessions focused on content development.

- **Assessment & Feedback:** Evaluate not only the quality of creative outputs but also the reasoning and strategic thought process behind each submission. Offer detailed, constructive feedback to guide improvement.

- **Learning Environment:** Build a collaborative classroom culture by encouraging peer review, open dialogue, and active participation in group activities.

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Assessment Strategy

Assignments (25 Marks – 5 × 5)

Weekly assignments to ensure continuous application:

- **A1 (Week 1):** Report on real-world use cases of Cloud solutions (Public vs Private Cloud).
- **A2 (Week 2):** Document SLA differences and pricing models of AWS.
- **A3 (Week 3):** Submit a write-up on AWS Global Infrastructure with diagrams of Region/Zone/POP.
- **A4 (Week 5):** Report on Devstack installation steps and OpenStack services overview.
- **A5 (Week 7):** Document Cloud Security Shared Responsibility Model with IAM policy examples.

Quizzes (25 Marks – 5 × 5)

Short tests for conceptual clarity:

- **Q1 (Week 1):** Cloud evolution, deployment models, and virtualization basics.
- **Q2 (Week 2):** Service models (IaaS, PaaS, SaaS), pricing & SLAs.
- **Q3 (Week 3):** AWS services, account setup, CLI navigation.
- **Q4 (Week 4):** OpenStack architecture and use cases.
- **Q5 (Week 6):** Cloud storage, databases, HA, scalability.

Final Project (50 Marks)

Capstone to integrate all core concepts.

Timeline: Assigned in Week 6, presented in Week 8.

Project Brief:
Deploy a **simple web application on a cloud platform** (AWS or OpenStack).

- Provision compute (EC2/VM), configure storage (S3/Block Storage), and networking.
- Setup database service (RDS/Trove) for app backend.
- Implement IAM roles and encryption.
- Demonstrate monitoring via Telemetry/CloudWatch.
- Prepare **deployment + security report** and present live demo.

Evaluation Criteria:

- **Architecture & Deployment (15 pts):** Correct setup of compute, storage, and database.

- **Security & IAM (10 pts):** Proper implementation of access control & encryption.
- **Scalability & Monitoring (10 pts):** Demonstration of HA/scaling strategy & monitoring.
- **Reporting & Presentation (15 pts):** Clear documentation and professional demo.

Reference Materials & Tools

Learners will utilize a combination of digital resources and practical tools, including:

- **Cloud Platforms:** Amazon Web Services (AWS), OpenStack
- **Development Tools:** VS Code, CLI tools, Devstack
- **Reference Books:**
    1. *Cloud Computing: Concepts, Technology & Architecture* by Thomas Erl
    2. *Architecting Cloud Computing Solutions* by Kevin L. Jackson
- **Official Documentation:**
    1. AWS Documentation (https://docs.aws.amazon.com)
    2. OpenStack Documentation (https://docs.openstack.org)

Completion & Certification Standards

To successfully earn certification, participants must:

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