INFORMATION, SCIENCE & TECHNOLOGY DEPARTMENT
GOVERNMENT OF SINDH

MEHRAN UNIVERSITY
OF ENGINEERING AND TECHNOLOGY
JAMSHORO, SINDH, PAKISTAN

COURSE OUTLINES

PEOPLE'S IT PROGRAMME

پيپلز آئي ٽي پروگرام

PITP-MUET

PHASE-II

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Cloud Computing Professional

1. Course Overview

This comprehensive Cloud Computing course provides students with practical skills to design, deploy, and manage applications across major cloud platforms. The curriculum covers fundamental cloud concepts, service models (IaaS, PaaS, SaaS), and hands-on experience with AWS, Azure, and GCP. Students will learn to implement compute services, storage solutions, networking, security, and serverless architectures. Through real-world projects and a capstone deployment, students will gain the expertise needed for cloud administration, architecture, and DevOps roles in modern IT environments.

2. Learning Outcomes

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

- Understand cloud computing fundamentals, deployment models, and service models.
- Set up and manage virtual machines on AWS EC2, Azure VMs, and GCP Compute Engine.
- Implement and configure cloud storage solutions and database services across multiple platforms.
- Design and deploy secure cloud networking architectures with VPCs, security groups, and load balancers.
- Implement identity and access management (IAM) policies and cloud security best practices.
- Develop and deploy serverless functions using AWS Lambda, Azure Functions, and GCP Cloud Functions.
- Set up basic CI/CD pipelines for automated deployment in cloud environments.
- Design, deploy, and manage a complete cloud-based application infrastructure.

Apart from technical knowledge, students will also be able to:

- Improve presentation, communication, and professional writing skills.
- Strengthen soft skills: emotional intelligence, teamwork, and assertive communication.
- Create and set up a freelancing profile on at least one platform (e.g., Fiverr, Upwork, Freelancer), with at least one gig.
- Build or optimize a professional LinkedIn profile, add People's Information Technology Programme – MUET under Education, and connect with professionals, and industry.
- Develop an online portfolio (GitHub, GitLab or personal site) to display projects, assignments, and freelance-ready work.
- Prepare a CV aligned with LinkedIn, highlighting PITP training, skills, and projects.
- Learn to use AI tools for content creation, freelancing, and productivity.

3. Session-wise Breakdown

Day	Topic	Description / Key Activities	Mode of Delivery
Week 1: Cloud Foundations & Virtualization			
1	Course Orientation & Cloud Fundamentals	Introduction to cloud computing, benefits, deployment models	**Lecture & Demo**: Overview of cloud ecosystem and career opportunities.

		(public, private, hybrid, multi-cloud).	
2	Virtualization Technologies	Hypervisors, virtual machines, containers, virtualization vs. containerization.	**Workshop**: Creating local virtual machines using VirtualBox/VMware.
3	Cloud Service Models (IaaS, PaaS, SaaS)	Understanding service models, use cases, and provider comparisons.	**Practical Lab**: Analyzing different service models for various business scenarios.
4	**Mandatory**: Soft & Business Communication (Session 1/3)	***Core Soft Skills for Workplace Success:*** For detailed information, refer to the Soft & Business Communication course manual.	**Lecture & Interactive Workshop**
5	**Project**: Cloud Provider Comparison	**Lab**: Research and present comparison of AWS, Azure, and GCP for different use cases.	**Practical Lab & Mentoring**: Independent research and analysis. A1 Released.
Week 2: Multi-Cloud Setup & Compute Services			
6	AWS Account Setup & EC2 Fundamentals	Creating AWS account, EC2 instance types, launching first VM, security groups.	**Workshop**: Hands-on EC2 instance deployment and configuration.
7	Azure Portal & Virtual Machines	Azure account setup, creating Azure VMs, resource groups, network configuration.	**Practical Lab**: Deploying and connecting to Azure virtual machines.
8	GCP Console & Compute Engine	GCP account setup, Compute Engine instances, custom machine types, firewall rules.	**Lecture & Code-Along**: Deploying VMs across all three platforms. A2 Released.
9	**Mandatory**: Soft & Business Communication (Session 2/3)	***Business Communication Basics: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Writing**
10	**Project**: Multi-Cloud VM Deployment	**Lab**: Deploy identical web servers on AWS EC2, Azure VM, and GCP Compute Engine.	**Practical Lab**: Cross-platform implementation. Q1 (Cloud Fundamentals & Compute) via LMS.
Week 3: Cloud Storage & Databases			
11	AWS Storage Services	S3 buckets, EBS volumes, Glacier storage classes, lifecycle policies.	**Workshop**: Creating and configuring S3 buckets for different use cases.
12	Azure Storage Solutions	Blob storage, Azure Files, Disk Storage, storage tiers and redundancy.	**Practical Lab**: Implementing Azure storage solutions with appropriate configurations.
13	GCP Storage Options	Cloud Storage, Persistent Disks, storage classes, and data transfer services.	**Practical Lab**: Configuring GCP storage with appropriate access controls.
14	**Mandatory**: Soft & Business Communication (Session 3/3)	***Presentation Skills & Public Speaking: For detailed information, refer to the Soft &***	**Lecture, Interactive Workshop & Speaking**

		Business Communication course manual.	
15	**Project**: Static Website Hosting	**Lab**: Host static websites on AWS S3, Azure Blob Storage, and GCP Cloud Storage.	**Practical Lab**: Guided project work. A3 Released.
Week 4: Cloud Networking & Security			
16	AWS Networking (VPC, Subnets)	Virtual Private Cloud, subnets, route tables, internet gateways, NACLs.	**Workshop**: Building a custom VPC with public and private subnets.
17	Azure Networking (VNet, NSGs)	Virtual Network, network security groups, peering, Azure DNS.	**Practical Lab**: Configuring secure network architectures in Azure.
18	GCP Networking (VPC, Firewalls)	VPC networks, firewall rules, cloud router, cloud NAT.	**Workshop**: Implementing network security across all three platforms.
19	**Mandatory**: Intro to Freelancing Platforms	**Freelancing for Cloud Professionals**: Cloud certification paths, consulting opportunities, managed services.	Lecture & Case Study. (M - 3hr session)
20	**Project**: Secure Multi-Tier Architecture	**Lab**: Build a secure web architecture with public frontend and private backend across clouds.	**Practical Lab**: Comprehensive networking implementation. Q2 (Storage & Networking) via LMS.
Week 5: Database Services & Management			
21	AWS Database Services	RDS (MySQL/PostgreSQL), DynamoDB, database migration service.	**Workshop**: Deploying and connecting to RDS and DynamoDB databases.
22	Azure Database Solutions	Azure SQL Database, Cosmos DB, database scaling and management.	**Practical Lab**: Implementing and managing Azure database services.
23	GCP Database offerings	Cloud SQL, Cloud Spanner, Firestore, Bigtable overview and use cases.	**Practical Lab**: Deploying and testing GCP database services. A4 Released.
24	Database Security & Backup	Encryption, authentication, automated backups, and recovery strategies.	**Workshop**: Implementing database security and backup solutions.
25	**Project**: Database-Driven Application	**Lab**: Deploy a web application with cloud databases on all three platforms.	**Practical Lab**: Database integration project. Q3 (Databases & Security) via LMS.
Week 6: Identity Management & Security			
26	AWS IAM & Security	Users, groups, roles, policies, identity federation, security best practices.	**Workshop**: Implementing least privilege access with IAM policies.
27	Azure Active Directory & RBAC	Azure AD, role-based access control, managed identities, conditional access.	**Practical Lab**: Configuring access management in Azure environment.

28	GCP IAM & Security	Cloud IAM, service accounts, organization policies, security commandments.	**Workshop**: Implementing security controls across all three platforms.
29	**Mandatory**: LinkedIn Profile Creation	**The Cloud Professional Profile**: Highlighting cloud certifications, projects, and multi-cloud skills.	Practical Workshop. (M - 3hr session)
30	**Project**: Secure Access Configuration	**Lab**: Implement secure access patterns for different user types and applications.	**Practical Lab**: A5 Released.
Week 7: Serverless & DevOps in Cloud			
31	AWS Serverless Services	Lambda functions, API Gateway, EventBridge, serverless architecture patterns.	**Workshop**: Creating and deploying serverless functions on AWS.
32	Azure Serverless offerings	Azure Functions, Logic Apps, Event Grid, serverless implementation.	**Practical Lab**: Building serverless workflows on Azure.
33	GCP Serverless Solutions	Cloud Functions, Cloud Run, Pub/Sub, serverless deployment options.	**Workshop**: Implementing serverless architectures across platforms.
34	Final Project Kick-off & Ideation	**Students choose final project**: multi-cloud application deployment or cloud migration project.	**Presentation & Workshop**: Project architecture design and planning. Final Project Assigned.
35	Project Work Session #1	**Infrastructure Setup**: Deploying core infrastructure across chosen cloud platforms.	**Mentoring & Practical Lab**: Independent/group work with instructor support. Q4 (Serverless & DevOps) via LMS.
Week 8: Final Project Completion & Review			
36	Project Work Session #2	**Application Deployment**: Deploying application components and configuring services.	**Mentoring & Practical Lab**:
37	Project Work Session #3	**Security & Optimization**: Implementing security controls and performance optimization.	**Mentoring & Practical Lab**:
38	Project Work Session #4	**Testing & Documentation**: Comprehensive testing and creating architecture documentation.	**Mentoring & Practical Lab**:
39	Project Demo & Presentation Day	Students present their cloud architectures, demonstrating multi-platform deployment.	**Evaluation & Presentation**: Live demo and architecture review. Final Project Submission Due.
40	Course Wrap-up, Certification, & Next Steps	Cloud certifications (AWS, Azure, GCP), career paths, advanced cloud specialties.	**Lecture & Open Forum**:

4. Recommended Tools & Software

- **Cloud Platforms**: AWS Free Tier, Azure Free Account, GCP Free Tier
- **CLI Tools**: AWS CLI, Azure CLI, Google Cloud SDK
- **Infrastructure as Code**: Terraform (Introduction)
- **Monitoring**: CloudWatch, Azure Monitor, Cloud Monitoring
- **CI/CD**: GitHub Actions, AWS CodePipeline, Azure DevOps (Introduction)

5. Assessment Strategy

- **Assignments (5 x 5 = 25 Marks)**: Practical cloud implementation projects.
  - **A1 (Week 1)**: Cloud Provider Comparison Analysis
  - **A2 (Week 2)**: Multi-Cloud VM Deployment
  - **A3 (Week 3)**: Static Website Hosting
  - **A4 (Week 5)**: Database-Driven Application
  - **A5 (Week 6)**: Secure Access Configuration
- **Quizzes (5 x 5 = 25 Marks)**: MCQs on cloud concepts, services, and best practices.
  - **Q1 (Week 2)**: Cloud Fundamentals & Compute
  - **Q2 (Week 4)**: Storage & Networking
  - **Q3 (Week 5)**: Databases & Security
  - **Q4 (Week 7)**: Serverless & DevOps
  - **Q5 (Week 8)**: All topics included.
- **Final Project (50 Marks)**: A comprehensive multi-cloud deployment project.
  - **Timeline**: Assigned in Week 7, due end of Week 8.
  - **Evaluation Criteria**:
    - **Architecture Design (15 pts)**: Sound cloud architecture and appropriate service selection.
    - **Implementation & Functionality (20 pts)**: Successful deployment across multiple platforms.
    - **Security & Compliance (10 pts)**: Proper security controls and configuration.
    - **Documentation & Presentation (5 pts)**: Clear architecture diagrams and deployment documentation.

6. Instructor Guidelines

- **Delivery**: Hands-on cloud console navigation. Ratio: 40% lecture/demo, 60% practical lab work.
- **Evaluation**: Focus on working cloud deployments, proper configuration, and cost-effective solutions.
- **Classroom Management**: Monitor student cloud spending, provide budget alerts, use cloud free tiers effectively.
- **LMS Monitoring**: Use the LMS for architecture diagrams, documentation submissions, and quiz administration.
- **Device & Software Readiness:** All required devices and software must be set up by *Week 1, Day 2*. Offline installers should be provided where internet access is limited.
- **Accessibility:** Instructors should provide printed slides when possible, use larger fonts in IDEs, and ensure that video resources include captions or transcripts.

7. Certification Requirements

- Minimum 90% attendance.

- Minimum 50% total score (aggregate of assignments, quizzes, and final project).
- All cloud deployments must be properly documented and submitted via the PITP LMS Portal.

8. Learning Resources

- **Primary**: Instructor-provided cloud setup guides, architecture templates, and best practices.
- **Recommended Readings**: AWS/Azure/GCP documentation, "Cloud Architecture Patterns".
- **Online**: Cloud provider training portals, YouTube cloud tutorials, cloud community blogs.

9. Policy Notes

- Students must monitor their cloud spending and stay within free tier limits.
- All cloud resources must be terminated after projects to avoid unexpected charges.
- Use of personal credit cards for cloud accounts requires careful spending monitoring.
- All assignments and projects must be submitted on time. Late submissions may affect certification eligibility.
- Confidential or sensitive data must not be uploaded to public repositories. Use anonymized or dummy datasets when sharing work publicly.
- Respectful communication and a collaborative attitude are expected at all times—whether in class, labs, or online forums.
- Plagiarism, copying, or misrepresentation of work is strictly prohibited.
- Students are allowed (and encouraged) to use AI tools for learning and productivity, but must cite their use clearly and not rely on them for full project submissions.
- Students are required to follow the disciplinary rules and guidelines of the university; violations may lead to formal action.
- Students may share course-related feedback or concerns through the designated channel; respectful reporting will be addressed promptly.

For Any Assistance:

- **Support Email**: pitp@admin.muet.edu.pk
- **WhatsApp**: +92 329 2065148
- **Website**: https://pitp.muet.edu.pk

Cyber Security and Ethical Hacking Professional

1. Course Overview

This intensive Cyber Security and Ethical Hacking course provides students with both theoretical knowledge and practical skills to defend against and ethically identify modern cyber threats. The curriculum covers networking fundamentals, system security, web application vulnerabilities, wireless security, cryptography, malware analysis, and digital forensics. Through hands-on labs in a controlled environment, students will learn offensive security techniques to understand defensive strategies, preparing them for roles as Security Analysts, Ethical Hackers, and Incident Responders.

2. Learning Outcomes

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

- Conduct ethical reconnaissance and vulnerability assessments using modern tools.
- Identify and exploit common system and web application vulnerabilities (SQLi, XSS, CSRF, etc.).
- Analyze and defend against malware, and perform basic digital forensics.
- Understand and implement cryptographic principles for secure communications.
- Perform wireless security assessments and understand mobile security considerations.
- Execute controlled penetration tests in a lab environment and document findings professionally.
- Understand and respond to security incidents following established frameworks.
- Develop comprehensive security reports and recommend mitigation strategies.

Apart from technical knowledge, students will also be able to:

- Improve presentation, communication, and professional writing skills.
- Strengthen soft skills: emotional intelligence, teamwork, and assertive communication.
- Create and set up a freelancing profile on at least one platform (e.g., Fiverr, Upwork, Freelancer), with at least one gig.
- Build or optimize a professional LinkedIn profile, add People's Information Technology Programme – MUET under Education, and connect with professionals, and industry.
- Develop an online portfolio (GitHub, TryHackMe or personal site) to display projects, assignments, and freelance-ready work.
- Prepare a CV aligned with LinkedIn, highlighting PITP training, skills, and projects.
- Learn to use AI tools for content creation, freelancing, and productivity.

3. Session-wise Breakdown

Day	Topic	Description / Key Activities	Mode of Delivery
Week 1: Foundations of Cybersecurity & Reconnaissance			
1	Course Orientation & The Ethical Hacker's Mindset	Introduction to cybersecurity, ethics, legal considerations, and the cyber kill chain. Lab environment setup (Kali Linux, VirtualBox).	**Lecture & Demo**: Overview of the cybersecurity landscape and lab setup.

2	Networking Fundamentals for Security	TCP/IP stack deep dive, ports, protocols, subnetting. Essential networking commands (ipconfig, ifconfig, netstat).	**Workshop**: Analyzing network traffic and mapping networks.
3	Reconnaissance & Scanning with Nmap	Passive and active reconnaissance. Nmap syntax, host discovery, port scanning, version detection, script scanning.	**Practical Lab**: Performing comprehensive scans on target machines in the lab.
4	**Mandatory**: Soft & Business Communication (Session 1/3)	***Core Soft Skills for Workplace Success: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture & Interactive Workshop**
5	**Project**: OSINT & Network Mapping	**Lab**: Conduct OSINT on a target and perform a full network scan, documenting all findings.	**Practical Lab & Mentoring**: Hands-on reconnaissance. A1 Released.
Week 2: System Fundamentals & Vulnerability Assessment			
6	Linux Command Line for Security	Essential Kali Linux tools, bash scripting for automation, file permissions, process management.	**Workshop**: Using the Linux CLI for security tasks and log analysis.
7	Windows Security Architecture	Windows authentication (NTLM, Kerberos), SAM database, registry, logging (Event Viewer).	**Practical Lab**: Analyzing Windows security settings and event logs.
8	Vulnerability Scanning with Nessus/OpenVAS	Installing and configuring vulnerability scanners. Scanning targets, analyzing results, prioritizing CVSS scores.	**Lecture & Demo**: Running scans and interpreting vulnerabilities. A2 Released.
9	**Mandatory**: Soft & Business Communication (Session 2/3)	***Business Communication Basics: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Writing**
10	**Project**: Full Vulnerability Assessment	**Lab**: Perform a vuln scan on a lab network, write a report prioritizing critical findings.	**Practical Lab**: Comprehensive assessment. Q1 (Networking & Recon) via LMS.
Week 3: System Hacking & Initial Access			
11	Password Attacks & Cracking	Password hashes, rainbow tables. Using John the Ripper, Hashcat. Password policy auditing.	**Workshop**: Cracking password hashes from obtained files.

12	Social Engineering Fundamentals	Phishing techniques, pretexting, baiting. Tools like SET (Social-Engineer Toolkit).	**Lecture & Discussion**: The psychology of social engineering and crafting a phishing email.
13	Metasploit Framework Basics	Metasploit architecture, exploiting vulnerabilities, payloads (reverse shells, Meterpreter).	**Practical Lab**: Exploiting a known vulnerability on a target machine.
14	**Mandatory**: Soft & Business Communication (Session 3/3)	***Presentation Skills & Public Speaking: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Speaking**
15	**Project**: Gaining Initial Foothold	**Lab**: Use a combination of techniques (vuln scan, Metasploit) to gain access to a lab machine.	**Practical Lab**: Guided exploitation. A3 Released.
Week 4: Web Application Security I			
16	Web App Architecture & Burp Suite	HTTP/HTTPS, cookies, sessions. Configuring Burp Suite Proxy, Repeater, Intruder.	**Workshop**: Intercepting and manipulating web traffic with Burp.
17	SQL Injection (SQLi) Fundamentals	Union-based, Error-based, Blind SQLi. Identifying and exploiting SQLi vulnerabilities.	**Practical Lab**: Exploiting SQLi on a deliberately vulnerable web app (e.g., bWAPP).
18	Cross-Site Scripting (XSS)	Reflected, Stored, DOM-based XSS. Crafting payloads, stealing cookies.	**Workshop**: Finding and exploiting XSS vulnerabilities.
19	**Mandatory**: Intro to Freelancing Platforms	**Freelancing in Cybersecurity**: Bug bounty platforms (HackerOne, Bugcrowd), penetration testing as a service.	Lecture & Case Study. (M - 3hr session)
20	**Project**: Web App Pen Test I	**Lab**: Find and exploit SQLi and XSS vulnerabilities in a test application.	**Practical Lab**: Web attack fundamentals. Q2 (System Hacking & Web Intro) via LMS.
Week 5: Web Application Security II & Post-Exploitation			
21	Cross-Site Request Forgery (CSRF) & File Inclusion	Understanding CSRF, crafting exploits. Local and Remote File Inclusion (LFI/RFI).	**Workshop**: Exploiting CSRF and file inclusion vulnerabilities.
22	Post-Exploitation Techniques	Privilege escalation (Linux and Windows), persistence mechanisms, lateral movement.	**Practical Lab**: Escalating privileges on a compromised machine.
23	Authentication & Session Management Flaws	Bypassing authentication, session hijacking, fixation.	**Workshop**: Identifying and exploiting flawed authentication logic. A4 Released.

24	OWASP Top 10 Deep Dive	Review of the top web application security risks and their mitigations.	**Lecture & Case Study**: Analysis of real-world breaches caused by OWASP Top 10 issues.
25	**Project**: Full Web App Assessment	**Lab**: Conduct a complete assessment of a test app, finding multiple vulnerability types.	**Practical Lab**: Comprehensive web app testing. Q3 (Advanced Web Attacks) via LMS.
Week 6: Network Security & Cryptography			
26	Sniffing & MITM Attacks	ARP spoofing, using tools like Wireshark and Ettercap to intercept traffic.	**Workshop**: Performing a man-in-the-middle attack in a lab network.
27	Wireless Security (Wi-Fi)	Wi-Fi encryption (WEP, WPA2, WPA3), cracking WPA2 handshakes with Aircrack-ng.	**Practical Lab**: Auditing and cracking wireless network security (in lab environment).
28	Cryptography for Security	Symmetric vs. asymmetric crypto, hashing, digital signatures, PKI, SSL/TLS.	**Workshop**: Using OpenSSL to create certificates and encrypt data.
29	**Mandatory**: LinkedIn Profile Creation	**The Cybersecurity Professional Profile**: Highlighting skills, certifications (path to CEH, OSCP), and lab work.	Practical Workshop. (M - 3hr session)
30	**Project**: Secure Network Design	**Lab**: Design and propose a secure network architecture to mitigate covered attacks.	**Practical Lab**: A5 Released.
Week 7: Defense & Incident Response			
31	Defense in Depth & Security Controls	Firewalls (iptables), IDS/IPS (Snort), HIDS, segmentation. Layered security strategy.	**Workshop**: Configuring a firewall and analyzing Snort alerts.
32	Digital Forensics Fundamentals	The forensic process, disk imaging, file carving, timeline analysis with Autopsy.	**Practical Lab**: Analyzing a disk image for evidence of an attack.
33	Incident Response Process	IR lifecycle (Preparation, Identification, Containment, Eradication, Recovery, Lessons Learned).	**Workshop**: Table-top exercise for a simulated breach.
34	Final Project Kick-off & Ideation	**Students choose a final pen test project**: full assessment of a test network or web application.	**Presentation & Workshop**: Scoping and rules of engagement for the final test. Final Project Assigned.
35	Project Work Session #1	**Recon & Scanning**: Initial reconnaissance and vulnerability scanning of the target environment.	**Mentoring & Practical Lab**: Independent/group work with instructor support. Q4 (Network, Crypto, & Defense) via LMS.
Week 8: Final Project & Career Preparation			
36	Project Work Session #2	**Exploitation & Post-Exploit**: Gaining access and exploring the target network.	**Mentoring & Practical Lab**:

37	Project Work Session #3	**Analysis & Reporting**: Documenting findings, evidence, and preparing the report.	**Mentoring & Practical Lab**:
38	Project Demo & Presentation Day	Students present their findings from the final penetration test.	**Evaluation & Presentation**: Walkthrough of the attack path and report. Final Project Submission Due.
39	Course Wrap-up, Certification, & Next Steps	Cybersecurity certifications (CEH, CompTIA Security+, OSCP), career paths, continuous learning.	**Lecture & Open Forum**:
40	Final Exam / Capture The Flag (CTF)	A comprehensive CTF challenge incorporating all learned skills.	**Evaluation**: Practical exam.

4. Recommended Tools & Software

- **OS**: Kali Linux (Primary), Windows 10 VM (Target)
- **Virtualization**: VirtualBox or VMware
- **Vulnerable Practice Environments**: Metasploitable, bWAPP, DVWA, VulnHub machines
- **Scanners**: Nmap, Nessus (Home Free License), OpenVAS
- **Web Proxies**: Burp Suite Community, OWASP ZAP
- **Exploitation**: Metasploit Framework
- **Forensics**: Autopsy, Wireshark
- **Password Cracking**: John the Ripper, Hashcat

5. Assessment Strategy

- **Assignments (5 x 5 = 25 Marks)**: Practical lab reports and exercises.
  - **A1 (Week 1)**: Reconnaissance & Scanning Report
  - **A2 (Week 2)**: Vulnerability Assessment Report
  - **A3 (Week 3)**: System Exploitation Write-up
  - **A4 (Week 5)**: Web Application Vulnerability Report
  - **A5 (Week 6)**: Secure Network Design Proposal
- **Quizzes (5 x 5 = 25 Marks)**: MCQs on terminology, tool usage, and attack methodologies.
  - **Q1 (Week 2)**: Networking & Reconnaissance
  - **Q2 (Week 4)**: System Hacking & Web Intro
  - **Q3 (Week 5)**: Advanced Web Attacks
  - **Q4 (Week 7)**: Network, Crypto, & Defense
  - **Q5 (Week 8)**: All topics included.
- **Final Project (50 Marks)**: A comprehensive penetration test report.
  - **Timeline**: Assigned in Week 7, due end of Week 8.
  - **Evaluation Criteria**:
    - **Methodology & Thoroughness (20 pts)**: Completeness of the test and techniques used.
    - **Technical Accuracy (15 pts)**: Correct identification and exploitation of vulnerabilities.
    - **Reporting & Clarity (10 pts)**: Professionalism of the report, including executive summary and technical details.

- **Recommendations & Mitigations (5 pts)**: Quality and practicality of proposed security improvements.

6. Instructor Guidelines

- **Delivery**: Heavy emphasis on lab practice. Ratio: 30% lecture/concept, 70% hands-on lab exercises.
- **Evaluation**: Focus on the practical application of skills and the ability to document findings professionally.
- **Classroom Management**: Strictly enforce ethical guidelines. All activities must be contained within the isolated lab environment.
- **LMS Monitoring**: Use the LMS for lab report submissions, quiz administration, and final project delivery.
- **Device & Software Readiness:** All required devices and software must be set up by *Week 1, Day 2*. Offline installers should be provided where internet access is limited.
- **Accessibility:** Instructors should provide printed slides when possible, use larger fonts in IDEs, and ensure that video resources include captions or transcripts.

7. Certification Requirements

- Minimum 90% attendance.
- Minimum 50% total score (aggregate of assignments, quizzes, and final project).
- Strict adherence to ethical guidelines is mandatory. Any activity outside the lab environment results in immediate failure.

8. Learning Resources

- **Primary**: Instructor-provided lab guides, vulnerable VM links, and cheat sheets.
- **Recommended Readings**: "The Web Application Hacker's Handbook"; "Penetration Testing: A Hands-On Introduction to Hacking".
- **Online**: Cybrary, TryHackMe, Hack The Box (free tiers), OWASP documentation.

9. Policy Notes

- All assignments and projects must be submitted on time. Late submissions may affect certification eligibility.
- Confidential or sensitive data must not be uploaded to public repositories. Use anonymized or dummy datasets when sharing work publicly.
- Respectful communication and a collaborative attitude are expected at all times—whether in class, labs, or online forums.
- Plagiarism, copying, or misrepresentation of work is strictly prohibited.
- Students are allowed (and encouraged) to use AI tools for learning and productivity, but must cite their use clearly and not rely on them for full project submissions.
- Students are required to follow the disciplinary rules and guidelines of the university; violations may lead to formal action.
- Students may share course-related feedback or concerns through the designated channel; respectful reporting will be addressed promptly.

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Data Scientist

1. Course Overview

This course provides a rigorous foundation in data science, equipping students with the skills to extract insights and build predictive models from data. The journey begins with Python programming and advances through data manipulation with Pandas, statistical analysis, and machine learning. Students will learn to create compelling visualizations, handle big data concepts, and deploy models on cloud platforms. The curriculum is hands-on and project-based, culminating in a capstone project that solves a real-world problem, preparing students for roles as Data Analysts and Junior Data Scientists.

2. Learning Outcomes

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

- Program proficiently in Python for data manipulation and analysis using libraries like NumPy, Pandas, and Scikit-learn.
- Perform exploratory data analysis (EDA) and create insightful visualizations using Matplotlib and Seaborn.
- Apply descriptive and inferential statistics to draw conclusions from data.
- Build, evaluate, and tune machine learning models for classification and regression tasks.
- Understand the fundamentals of big data processing and cloud computing for data science.
- Complete an end-to-end data science project, from problem definition to presentation of results.

Apart from technical knowledge, students will also be able to:

- Improve presentation, communication, and professional writing skills.
- Strengthen soft skills: emotional intelligence, teamwork, and assertive communication.
- Create and set up a freelancing profile on at least one platform (e.g., Fiverr, Upwork, Freelancer), with at least one gig.
- Build or optimize a professional LinkedIn profile, add People's Information Technology Programme – MUET under Education, and connect with professionals, and industry.
- Develop an online portfolio (Kaggle, GitHub, or personal site) to display projects, assignments, and freelance-ready work.
- Prepare a CV aligned with LinkedIn, highlighting PITP training, skills, and projects.
- Learn to use AI tools for content creation, freelancing, and productivity.

3. Session-wise Breakdown

Day	Topic	Description / Key Activities	Mode of Delivery
Week 1: Python Foundation for Data Science			
1	Course Orientation & The Data Science Landscape	Introduction to the course, tools (Jupyter, Anaconda), and the data science workflow. Overview of applications in various industries.	**Lecture & Demo**: Instructor-led presentation and live environment setup.
2	Python Syntax & Data Structures I	Variables, data types, operators, and control flow (if-else, loops). Introduction to lists and tuples.	**Workshop**: Conceptual lecture followed by a guided, hands-on coding lab.

3	Python Syntax & Data Structures II	Dictionaries, sets, and functions. Introduction to list comprehensions.	**Practical Lab**: Hands-on coding exercises focusing on data structure manipulation.
4	**Mandatory**: Soft & Business Communication (Session 1/3)	***Core Soft Skills for Workplace Success: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture & Interactive Workshop**
5	**Project**: Data Wrangling with Python	**Lab**: Use Python fundamentals to clean and manipulate a provided messy dataset (e.g., simple sales data).	**Practical Lab & Mentoring**: Independent coding with instructor support. A1 Released.
Week 2: Data Analysis with Pandas			
6	**Pandas Fundamentals**: Series & DataFrames	Creating and understanding the core Pandas data structures. Basic indexing and selection.	**Workshop**: Demo of Pandas followed by targeted exercises.
7	Data Manipulation with Pandas	Loading data from CSV/Excel, filtering, sorting, and handling missing values.	**Practical Lab**: Students clean and explore a new dataset using learned methods.
8	Data Aggregation & GroupBy Operations	Using groupby, pivot_table, and agg to summarize data for analysis.	**Lecture & Code-Along**: Building complex summaries from data. A2 Released.
9	**Mandatory**: Soft & Business Communication (Session 2/3)	***Business Communication Basics: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Writing**
10	**Project**: Exploratory Data Analysis (EDA)	**Lab**: Perform a comprehensive EDA on a dataset (e.g., Titanic, Iris) using Pandas.	**Practical Lab**: Comprehensive analysis. Q1 (Python & Pandas Basics) via LMS.
Week 3: Data Visualization & Statistics Intro			
11	Visualization with Matplotlib	Creating line plots, bar charts, histograms, and scatter plots. Customizing aesthetics.	**Workshop**: Building plots from scratch and customizing them.
12	Advanced Visualization with Seaborn	**Creating statistical visualizations**: box plots, violin plots, heatmaps, and pair plots.	**Practical Lab**: Enhancing the EDA from Week 2 with advanced visualizations.
13	Descriptive Statistics & Distributions	Calculating mean, median, mode, variance, std. dev. Understanding distributions.	**Lecture & Practical Lab**: Calculating stats manually and with Pandas.
14	**Mandatory**: Soft & Business Communication (Session 3/3)	***Presentation Skills & Public Speaking: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Speaking**
15	**Project**: Telling a Story with Data	**Lab**: Create a dashboard (notebook) that uses visualizations and stats to tell a story from a dataset.	**Practical Lab**: Guided project work. A3 Released.
Week 4: Inferential Statistics & ML Foundations			

16	Introduction to Inferential Statistics	Concepts of sampling, central limit theorem, confidence intervals, and hypothesis testing.	**Lecture**: Conceptual understanding with real-world examples.
17	Correlation & Linear Regression	Understanding Pearson correlation. Building and interpreting a simple linear regression model.	**Workshop**: Implementing linear regression with Scikit-learn.
18	Introduction to Machine Learning	**Overview of ML**: Supervised vs. Unsupervised learning. The concept of training and testing sets.	**Lecture & Demo**: High-level overview with examples.
19	**Mandatory**: Intro to Freelancing Platforms	**Freelancing for Data Scientists**: Showcasing analysis and visualization skills on platforms like Upwork.	**Lecture & Case Study**: Analyzing successful data science gigs. (M - 3hr session)
20	**Project**: Statistical Analysis & Regression	**Lab**: Perform hypothesis testing and build a regression model on a dataset (e.g., housing prices).	**Practical Lab**: Application of stats and ML concepts. Q2 (Stats & Visualization) via LMS.
Week 5: Machine Learning with Scikit-learn			
21	Data Preprocessing	Handling categorical data (One-Hot Encoding), feature scaling (Standardization/Normalization).	**Workshop & Code-Along**: Preparing a real dataset for machine learning.
22	Classification Models I	Logistic Regression and K-Nearest Neighbors (KNN). Theory and application.	**Lecture & Practical Lab**: Building and evaluating classification models.
23	Classification Models II	Decision Trees and Random Forests. Understanding feature importance.	**Workshop**: Building more powerful ensemble models. A4 Released.
24	Model Evaluation Metrics	Accuracy, Precision, Recall, F1-Score, ROC-AUC. Choosing the right metric.	**Practical Lab**: Evaluating and comparing the models built in previous sessions.
25	**Project**: Predictive Modeling I	**Lab**: Build a best-in-class classifier for a dataset (e.g., customer churn).	**Practical Lab**: Model comparison and selection. Q3 (ML Fundamentals) via LMS.
Week 6: Advanced ML & Unsupervised Learning			
26	Model Improvement & Tuning	Cross-validation and Hyperparameter Tuning using GridSearchCV.	**Workshop**: Improving model performance systematically.
27	**Unsupervised Learning**: Clustering	K-Means clustering algorithm. Theory and application for customer segmentation.	**Lecture & Practical Lab**: Implementing K-Means and interpreting results.
28	**Dimensionality Reduction**: PCA	Introduction to Principal Component Analysis (PCA) for visualization and efficiency.	**Workshop**: Using PCA to simplify datasets. A5 Released.
29	**Mandatory**: LinkedIn Profile Creation	**Optimizing for Data Science**: Highlighting projects, showcasing visualizations, listing ML skills.	**Practical Workshop**: Building profiles with a focus on data portfolio. (M - 3hr session)
30	**Project**: Customer Segmentation	**Lab**: Perform clustering analysis on a customer dataset to identify distinct groups.	**Practical Lab**: End-to-end unsupervised learning project.

Week 7: Big Data, Cloud & Final Project Kick-off			
31	Introduction to Big Data	Concepts of Hadoop, Spark, and distributed computing.	**Lecture**: Overview of the big data ecosystem.
32	Cloud Computing for Data Science	Overview of AWS SageMaker, Google Colab, and Azure ML. Running a notebook in the cloud.	**Demo & Practical Lab**: Setting up and using a cloud-based Jupyter environment.
33	Final Project Kick-off & Ideation	Brainstorming project ideas. Discussion of datasets (e.g., Kaggle). Defining project scope and goals.	**Presentation & Workshop**: Student pitches and instructor feedback. Final Project Assigned.
34	Project Work Session #1	Data acquisition, cleaning, and exploratory data analysis for the final project.	**Mentoring & Practical Lab**: Independent/group work with instructor support.
35	Project Work Session #2	Feature engineering, model selection, and initial training for the final project.	**Mentoring & Practical Lab**: Q4 (Advanced ML & Cloud) via LMS.
Week 8: Final Project Completion & Review			
36	Project Work Session #3	Model tuning, evaluation, and visualization of results.	**Mentoring & Practical Lab**: Deep work session.
37	Project Work Session #4	Creating the final presentation and documentation (Jupyter Notebook + README).	**Mentoring & Practical Lab**: Focus on storytelling and documentation.
38	Project Demo & Presentation Day (Part 1)	Students present their final data science projects to the class and instructors.	**Evaluation & Presentation**: Live demo, walkthrough of insights, and Q&A. Final Project Submission Due.
39	Project Demo & Presentation Day (Part 2)	Continuation of project demos.	**Evaluation & Presentation**:
40	Course Wrap-up, Certification, & Next Steps	Review of the data science journey, career paths, Q&A.	**Lecture & Open Forum**:

4. Recommended Tools & Software

- **Distribution**: Anaconda Distribution
- **IDE/Notebook**: Jupyter Notebook / JupyterLab
- **Libraries**: NumPy, Pandas, Matplotlib, Seaborn, Scikit-learn, Statsmodels
- **Version Control**: Git, GitHub
- **Cloud Platforms**: Google Colab (Primary), AWS SageMaker / Azure ML Studio (Intro)
- **Communication**: Slack/Discord for collaboration

5. Assessment Strategy

- **Assignments (5 x 5 = 25 Marks)**: Practical applications of weekly modules.
  - **A1 (Week 1)**: Python Data Wrangling
  - **A2 (Week 2)**: Pandas GroupBy Operations
  - **A3 (Week 3)**: Data Storytelling Dashboard

    - **A4 (Week 5)**: Data Preprocessing & Model Building
    - **A5 (Week 6)**: Clustering Analysis
- **Quizzes (5 x 5 = 25 Marks)**: MCQs on theoretical concepts and code output.
    - **Q1 (Week 2)**: Python & Pandas
    - **Q2 (Week 4)**: Statistics & Visualization
    - **Q3 (Week 5)**: Machine Learning Fundamentals
    - **Q4 (Week 7)**: Advanced ML & Cloud
    - **Q5 (Week 8)**: All topics included.
- **Final Project (50 Marks)**: An end-to-end data science project on a dataset like Titanic, Housing Price Prediction, or Customer Churn.
    - **Timeline**: Assigned in Week 7, due end of Week 8.
    - **Evaluation Criteria**:
        - **Data Understanding & EDA (15 pts)**: Depth of analysis and visualization.
        - **Modeling & Evaluation (20 pts)**: Appropriateness and performance of chosen models.
        - **Documentation & Presentation (10 pts)**: Clarity of the notebook and presentation.
        - **Originality & Insight (5 pts)**: Unique findings or approach.

6. Instructor Guidelines

- **Delivery**: Foster a data-driven mindset. The recommended ratio is 50% hands-on coding labs, 30% lecture/demo, and 20% discussion of results and insights.
- **Evaluation**: Provide feedback not just on code correctness, but on the interpretation of results and clarity of visualizations.
- **Classroom Management**: Encourage students to use GitHub to host their project code. Use breakout rooms for collaborative analysis during labs.
- **LMS Monitoring**: Use the LMS to track quiz scores and assignment submissions. Provide rubrics for the final project upfront.
- **Device & Software Readiness:** All required devices and software must be set up by *Week 1, Day 2*. Offline installers should be provided where internet access is limited.
- **Accessibility:** Instructors should provide printed slides when possible, use larger fonts in IDEs, and ensure that video resources include captions or transcripts.

7. Certification Requirements

- Minimum 90% attendance.
- Minimum 50% total score (aggregate of assignments, quizzes, and final project).
- All submissions must be made through the official PITP LMS Portal.

8. Learning Resources

- **Primary**: Instructor-provided Jupyter Notebooks, datasets, and slides.
- **Recommended Readings**: "Python for Data Analysis" by Wes McKinney; "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron.
- **Online**: Kaggle Learn, Towards Data Science, Coursera.

9. Policy Notes

- All assignments and projects must be submitted on time. Late submissions may affect certification eligibility.
- Confidential or sensitive data must not be uploaded to public repositories. Use anonymized or dummy datasets when sharing work publicly.
- Respectful communication and a collaborative attitude are expected at all times—whether in class, labs, or online forums.
- Plagiarism, copying, or misrepresentation of work is strictly prohibited.
- Students are allowed (and encouraged) to use AI tools for learning and productivity, but must cite their use clearly and not rely on them for full project submissions.
- Students are required to follow the disciplinary rules and guidelines of the university; violations may lead to formal action.
- Students may share course-related feedback or concerns through the designated channel; respectful reporting will be addressed promptly.

For Any Assistance:

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Database Administrator

1. Course Overview

This course provides a comprehensive journey into the world of database administration, from foundational concepts to advanced practices. Students will master SQL for relational databases (MySQL/PostgreSQL) and explore NoSQL databases (MongoDB). The curriculum covers essential topics including database design, normalization, performance tuning, security, backup/recovery, and user management. Through hands-on labs and a capstone project, students will gain the practical skills required to design, manage, and secure robust database systems, preparing them for roles as Database Administrators and Database Developers.

2. Learning Outcomes

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

- Design and normalize efficient, scalable database schemas using Entity-Relationship diagrams.
- Write complex SQL queries involving joins, subqueries, and aggregate functions for data manipulation and reporting.
- Perform core database administration tasks including user management, backup, recovery, and routine maintenance.
- Analyze and optimize database performance using indexing and query tuning techniques.
- Implement fundamental database security measures to protect against threats and ensure compliance.
- Perform basic operations and understand the use cases for NoSQL databases like MongoDB.
- Design and implement a fully functional database system for a real-world application.

Apart from technical knowledge, students will also be able to:

- Improve presentation, communication, and professional writing skills.
- Strengthen soft skills: emotional intelligence, teamwork, and assertive communication.
- Create and set up a freelancing profile on at least one platform (e.g., Fiverr, Upwork, Freelancer), with at least one gig.
- Build or optimize a professional LinkedIn profile, add People's Information Technology Programme – MUET under Education, and connect with professionals, and industry.
- Develop an online portfolio (GitHub, Google Drive, or personal site) to display projects, assignments, and freelance-ready work.
- Prepare a CV aligned with LinkedIn, highlighting PITP training, skills, and projects.
- Learn to use AI tools for content creation, freelancing, and productivity.

3. Session-wise Breakdown

Day	Topic	Description / Key Activities	Mode of Delivery
Week 1: Database Foundations & SQL Basics			
1	Course Orientation & The World of Data	Introduction to DBMS vs. RDBMS, roles of a DBA, and course tools (MySQL, Workbench).	**Lecture & Demo**: Instructor-led presentation and live environment setup.

2	Relational Fundamentals & Data Definition Language (DDL)	Understanding tables, columns, keys (Primary, Foreign). Creating databases and tables (CREATE, DROP, ALTER).	**Workshop**: Conceptual lecture followed by a guided, hands-on lab.
3	Data Manipulation Language (DML) I	Inserting, updating, and deleting data (INSERT, UPDATE, DELETE). Basic SELECT statements with WHERE.	**Practical Lab**: Hands-on exercises populating and querying tables.
4	**Mandatory**: Soft & Business Communication (Session 1/3)	***Core Soft Skills for Workplace Success: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture & Interactive Workshop**
5	**Project**: Building a Simple Schema	**Lab**: Design and implement a simple 2-table database (e.g., Students/Courses) with relationships.	**Practical Lab & Mentoring**: Independent work with instructor support. A1 Released.
Week 2: Advanced SQL Querying			
6	**DML II**: Filtering, Sorting & Aggregation	Advanced WHERE clauses (IN, BETWEEN, LIKE). ORDER BY. Aggregate functions (COUNT, SUM, AVG, GROUP BY, HAVING).	**Workshop**: Demo of concepts followed by targeted query-writing exercises.
7	Combining Data with JOINS	Understanding relational algebra. Using INNER JOIN to combine data from multiple tables.	**Practical Lab**: Writing queries to solve business problems requiring joined data.
8	Outer Joins and Set Operations	LEFT JOIN, RIGHT JOIN, UNION. Understanding NULL values in joins.	**Lecture & Code-Along**: Building complex reports from multiple tables. A2 Released.
9	**Mandatory**: Soft & Business Communication (Session 2/3)	***Business Communication Basics: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Writing**
10	**Project**: Complex Reporting Queries	**Lab**: Write a set of sophisticated queries for a business database (e.g., sales, library) using joins and aggregates.	**Practical Lab**: Comprehensive query writing. Q1 (SQL Fundamentals) via LMS.
Week 3: Database Design & Theory			
11	Data Modeling & ER Diagrams	Identifying entities, attributes, and relationships. Drawing ER diagrams (Crow's Foot notation).	**Workshop**: Translating business requirements into a conceptual model.
12	Normalization I (1NF, 2NF)	Understanding update anomalies. Achieving First and Second Normal Form.	**Lecture & Practical Lab**: Normalizing sample tables in a step-by-step manner.
13	Normalization II (3NF)	Achieving Third Normal Form. Understanding the trade-offs of over-normalization.	**Practical Lab**: Completing the normalization of a complex dataset.

14	**Mandatory**: Soft & Business Communication (Session 3/3)	***Presentation Skills & Public Speaking: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Speaking**
15	**Project**: Design a Normalized Schema	**Lab**: Given a set of requirements, create a fully normalized ER diagram and implement it in SQL.	**Practical Lab**: Guided project work. A3 Released.
Week 4: Database Administration Essentials			
16	The DBA Role & User Management	Responsibilities of a DBA. Creating users, roles, and granting/revoking privileges (GRANT, REVOKE).	**Workshop**: Setting up a secure user access structure for a database.
17	Backup Strategies & Implementation	Types of backups (full, incremental). Using mysqldump or pg_dump for logical backups.	**Practical Lab**: Performing full and incremental backups of a database.
18	Recovery Techniques	Restoring databases from backups. Point-in-Time Recovery concepts.	**Workshop**: Simulating a failure and executing a recovery plan.
19	**Mandatory**: Intro to Freelancing Platforms	**Freelancing for DBAs**: Offering services for database design, optimization, and cleanup on platforms like Upwork.	Lecture & Case Study. (M - 3hr session)
20	**Project**: Admin Drill - Backup & Users	**Lab**: Create a comprehensive backup script and a user permission matrix for a given scenario.	**Practical Lab**: Application of admin concepts. Q2 (Design & Admin) via LMS.
Week 5: Performance Tuning & Optimization			
21	Understanding Query Execution	Introduction to execution plans (EXPLAIN / EXPLAIN ANALYZE). Identifying full table scans.	**Workshop & Demo**: Using explain to see how a query is executed.
22	Indexing for Performance	How indexes work (B-Tree). Creating effective indexes (CREATE INDEX). When to and not to index.	**Lecture & Practical Lab**: Analyzing slow queries and creating indexes to fix them.
23	Query Optimization Techniques	Rewriting queries for performance. Avoiding common pitfalls (e.g., functions in WHERE clauses).	**Workshop**: Hands-on optimization of a set of poorly performing queries. A4 Released.
24	Database Maintenance	**Routine tasks**: updating statistics, reindexing, vacuuming, and table optimization.	**Practical Lab**: Writing scripts to automate routine maintenance tasks.
25	**Project**: Performance Audit	**Lab**: Given a slow database, analyze queries, propose indexes, and rewrite queries for optimal performance.	**Practical Lab**: Performance troubleshooting. Q3 (Performance Tuning) via LMS.
Week 6: Security, Compliance & NoSQL Intro			
26	Database Security Principles	Common threats (SQL Injection). Preventing injection with parameterized queries. Data encryption at rest.	**Lecture & Demo**: Showing SQL injection attacks and how to prevent them.

27	Auditing & Compliance	Introduction to GDPR, HIPAA. Implementing basic auditing triggers to track data access.	**Workshop**: Designing an audit trail for sensitive data.
28	Introduction to NoSQL & MongoDB	**CAP theorem, types of NoSQL databases. MongoDB architecture**: databases, collections, documents.	**Lecture**: Conceptual overview of the NoSQL landscape.
29	**Mandatory**: LinkedIn Profile Creation	**Optimizing for DBA Roles**: Highlighting database projects, performance metrics improved, and security implementations.	Practical Workshop. (M - 3hr session)
30	MongoDB CRUD Operations	Connecting to MongoDB. Performing Create, Read, Update, Delete operations using the shell.	**Practical Lab**: Hands-on with MongoDB documents. A5 Released.
Week 7: Advanced MongoDB & Final Project Kick-off			
31	MongoDB Indexing & Aggregation	Creating indexes in MongoDB. Introduction to the Aggregation Pipeline ($match, $group, $project).	**Workshop**: Improving query performance and building complex data summaries.
32	Final Project Kick-off & Ideation	Brainstorming project ideas (e.g., e-commerce database, library system, CRM). Defining scope and requirements.	**Presentation & Workshop**: Student pitches and instructor feedback. Final Project Assigned.
33	Project Work Session #1	**Database design phase**: creating ER diagrams and schema for the chosen project.	**Mentoring & Practical Lab**: Independent/group work with instructor support.
34	Project Work Session #2	**Implementation phase**: creating tables, establishing relationships, and inserting sample data.	**Mentoring & Practical Lab**:
35	Project Work Session #3	**Advanced functionality phase**: writing complex queries, views, and stored procedures for the project.	**Mentoring & Practical Lab**: Q4 (Security & NoSQL) via LMS.
Week 8: Final Project Completion & Review			
36	Project Work Session #4	**Administration phase**: implementing user roles, permissions, and a backup plan for the project.	**Mentoring & Practical Lab**:
37	Project Work Session #5	**Documentation and finalization**: creating a project report with schema, queries, and admin instructions.	**Mentoring & Practical Lab**:
38	Project Demo & Presentation Day (Part 1)	Students present their final database projects.	**Evaluation & Presentation**: Live demo, schema walkthrough, and Q&A. Final Project Submission Due.
39	Project Demo & Presentation Day (Part 2)	Continuation of project demos.	**Evaluation & Presentation**:

40	Course Wrap-up, Certification, & Next Steps	Review of key DBA skills, career paths, Q&A.	**Lecture & Open Forum:**

4. Recommended Tools & Software

- **RDBMS**: MySQL or PostgreSQL
- **Management GUI**: MySQL Workbench / pgAdmin
- **NoSQL Database**: MongoDB Community Server
- **MongoDB GUI**: MongoDB Compass
- **Version Control**: Git, GitHub
- **Diagramming**: Draw.io / Lucidchart for ER Diagrams

5. Assessment Strategy

- **Assignments (5 x 5 = 25 Marks)**: Practical applications of weekly modules.
  - **A1 (Week 1)**: Simple Schema Implementation
  - **A2 (Week 2)**: Advanced SQL Querying
  - **A3 (Week 3)**: Normalized Schema Design
  - **A4 (Week 5)**: Query Optimization
  - **A5 (Week 6)**: MongoDB CRUD Operations
- **Quizzes (5 x 5 = 25 Marks)**: MCQs on theoretical concepts and SQL query output.
  - **Q1 (Week 2)**: SQL Fundamentals
  - **Q2 (Week 4)**: Design & Administration
  - **Q3 (Week 5)**: Performance Tuning
  - **Q4 (Week 7)**: Security & NoSQL
  - **Q5 (Week 8)**: All topics included.
- **Final Project (50 Marks)**: A complete end-to-end database solution for a domain like E-commerce, Inventory, or School Management.
  - **Timeline**: Assigned in Week 7, due end of Week 8.
  - **Evaluation Criteria**:
    - **Design & Normalization (15 pts)**: Quality of ER diagram and schema.
    - **Functionality & Query Complexity (20 pts)**: Implementation of advanced features and queries.
    - **Administration & Security (10 pts)**: User management and backup plan.
    - **Documentation & Presentation (5 pts)**: Clarity of the project report and demo.

6. Instructor Guidelines

- **Delivery**: Emphasize the "why" behind every command and design decision. Ratio: 60% hands-on labs, 30% lecture/demo, 10% discussion.
- **Evaluation**: Provide feedback on both the technical correctness and the practical efficiency of solutions (e.g., query performance, design elegance).
- **Classroom Management**: Encourage the use of GitHub for storing SQL scripts and documentation. Use real-world analogies to explain abstract concepts like normalization.
- **LMS Monitoring**: Use the LMS to track progress and provide rubrics for the final project upfront.
- **Device & Software Readiness:** All required devices and software must be set up by *Week 1, Day 2*. Offline installers should be provided where internet access is limited.

- **Accessibility:** Instructors should provide printed slides when possible, use larger fonts in IDEs, and ensure that video resources include captions or transcripts.

7. Certification Requirements

- Minimum 90% attendance.
- Minimum 50% total score (aggregate of assignments, quizzes, and final project).
- All submissions must be made through the official PITP LMS Portal.

8. Learning Resources

- **Primary**: Instructor-provided SQL scripts, datasets, and slide decks.
- **Recommended Readings**: "SQL in 10 Minutes" by Ben Forta; Official MySQL, PostgreSQL, and MongoDB documentation.
- **Online**: W3Schools SQL, SQLZoo, MongoDB University.

9. Policy Notes

- All assignments and projects must be submitted on time. Late submissions may affect certification eligibility.
- Confidential or sensitive data must not be uploaded to public repositories. Use anonymized or dummy datasets when sharing work publicly.
- Respectful communication and a collaborative attitude are expected at all times—whether in class, labs, or online forums.
- Plagiarism, copying, or misrepresentation of work is strictly prohibited.
- Students are allowed (and encouraged) to use AI tools for learning and productivity, but must cite their use clearly and not rely on them for full project submissions.
- Students are required to follow the disciplinary rules and guidelines of the university; violations may lead to formal action.
- Students may share course-related feedback or concerns through the designated channel; respectful reporting will be addressed promptly.

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Digital Marketing Professional

1. Course Overview

This course provides a comprehensive, hands-on exploration of the digital marketing landscape. Students will master the core pillars of modern marketing, including Search Engine Optimization (SEO), Social Media Marketing (SMM), Pay-Per-Click (PPC) advertising with Google Ads, content marketing, and email marketing. The curriculum emphasizes data-driven decision-making, teaching students to use analytics tools to track, measure, and optimize campaigns for real-world impact. Through practical exercises and a capstone project, students will develop the skills to create, execute, and manage a complete digital marketing strategy.

2. Learning Outcomes

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

- Develop a integrated digital marketing strategy with clear goals and measurable KPIs.
- Optimize websites for search engines through on-page and off-page SEO techniques.
- Create, manage, and optimize paid advertising campaigns on platforms like Google Ads.
- Build and engage an audience through strategic social media content and community management.
- Plan and execute effective email marketing and content marketing campaigns.
- Use Google Analytics to track performance, generate reports, and derive actionable insights.
- Launch and present a comprehensive digital marketing campaign for a brand or product.

Apart from technical knowledge, students will also be able to:

- Improve presentation, communication, and professional writing skills.
- Strengthen soft skills: emotional intelligence, teamwork, and assertive communication.
- Create and set up a freelancing profile on at least one platform (e.g., Fiverr, Upwork, Freelancer), with at least one gig.
- Build or optimize a professional LinkedIn profile, add People's Information Technology Programme – MUET under Education, and connect with professionals, and industry.
- Develop an online portfolio (Canva, Behance, Google Drive, or personal site) to display projects, assignments, and freelance-ready work.
- Prepare a CV aligned with LinkedIn, highlighting PITP training, skills, and projects.
- Learn to use AI tools for content creation, freelancing, and productivity.

3. Session-wise Breakdown

Day	Topic	Description / Key Activities	Mode of Delivery
Week 1: Digital Marketing Foundation			
1	Course Orientation & The Digital Landscape	Introduction to the customer journey, the digital marketing funnel (TOFU, MOFU, BOFU), and course tools.	**Lecture & Demo**: Instructor-led presentation and overview of key platforms.
2	The Digital Marketing Mix & Funnel	Deep dive into each channel (SEO, SMM, SEM, Content, Email). Setting SMART goals.	**Workshop**: Students analyze a brand's current digital presence and define goals.

3	Introduction to KPIs & Analytics	Key metrics for each channel (Traffic, CTR, Conversion Rate, CPA, ROAS). Introduction to Google Analytics.	**Practical Lab**: Navigating Google Analytics interface and identifying key reports.
4	**Mandatory**: Soft & Business Communication (Session 1/3)	***Core Soft Skills for Workplace Success: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture & Interactive Workshop**
5	**Project**: Digital Audit & Strategy Draft	**Lab**: Perform a basic digital audit of a local business and draft a one-page marketing plan with goals.	**Practical Lab & Mentoring**: Independent analysis with instructor support. A1 Released.
Week 2: Search Engine Optimization (SEO)			
6	SEO Fundamentals & Keyword Research	How search engines work. Using tools (Google Keyword Planner, Ubersuggest) for keyword research.	**Workshop**: Finding high-intent keywords for a sample business and analyzing competition.
7	On-Page SEO Mastery	Title tags, meta descriptions, header tags, image optimization, internal linking.	**Practical Lab**: Optimizing a sample web page for a target keyword.
8	Technical SEO & Off-Page SEO	Basics of site speed, mobile-friendliness, XML sitemaps. Introduction to link building and local SEO.	**Lecture & Demo**: Using Google Search Console to identify technical issues. A2 Released.
9	**Mandatory**: Soft & Business Communication (Session 2/3)	***Business Communication Basics: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Writing**
10	**Project**: Complete SEO Plan	**Lab**: Create a full SEO strategy for a website, including keyword list, on-page recommendations, and link-building ideas.	**Practical Lab**: Comprehensive strategy development. Q1 (Digital Foundations & SEO) via LMS.
Week 3: Social Media Marketing (SMM)			
11	SMM Strategy & Platform Overview	Defining goals for each platform (Facebook, Instagram, LinkedIn, Twitter). Understanding platform algorithms.	**Workshop**: Choosing the right platforms for a target audience and business objective.
12	Content Creation & Brand Identity	Developing a brand voice, visual identity, and content pillars. Creating engaging formats (images, video, stories).	**Practical Lab**: Designing a set of social media posts using Canva.
13	Community Management & Scheduling	Strategies for engagement, responding to comments, and crisis management. Using schedulers (e.g., Meta Business Suite).	**Practical Lab**: Scheduling a one-week content calendar for a brand.

14	**Mandatory**: Soft & Business Communication (Session 3/3)	***Presentation Skills & Public Speaking: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Speaking**
15	**Project**: Social Media Launch Kit	**Lab**: Create a complete social media profile optimization, content calendar, and community guidelines document.	**Practical Lab**: Guided project work. A3 Released.
Week 4: Search Engine Marketing (SEM) & PPC			
16	Google Ads Fundamentals	Campaign structure (Campaigns, Ad Groups, Keywords, Ads). Setting budgets and bids.	**Lecture & Demo**: Tour of the Google Ads interface and campaign setup walkthrough.
17	Keyword Strategy & Ad Creation	Match types (Broad, Phrase, Exact). Writing compelling ad copy with CTAs.	**Workshop**: Conducting keyword research specifically for PPC and writing multiple ad variations.
18	Landing Page Optimization & Conversion Tracking	Principles of high-converting landing pages. Setting up Google Ads conversion tracking.	**Practical Lab**: Analyzing landing pages and setting up a conversion tag.
19	**Mandatory**: Intro to Freelancing Platforms	**Freelancing in Digital Marketing**: Selling SEO audits, social media management packages, and Google Ads management.	Lecture & Case Study. (M - 3hr session)
20	**Project**: Google Ads Campaign Setup	**Lab**: Build a complete Search Network campaign in Google Ads (in a sandbox mode or with a mock budget).	**Practical Lab**: Hands-on campaign setup. Q2 (SMM & PPC) via LMS.
Week 5: Content & Email Marketing			
21	Content Marketing Strategy	The role of blogs, videos, and podcasts. Developing a content funnel. Content repurposing.	**Workshop**: Brainstorming content ideas for each stage of the marketing funnel.
22	Email Marketing Fundamentals	Building an email list (lead magnets, signup forms). Understanding email compliance (GDPR/anti-spam).	**Lecture & Demo**: Overview of email platforms (Mailchimp, Brevo).
23	Crafting Effective Emails	Writing subject lines and email body copy. Designing responsive email templates. A/B testing basics.	**Practical Lab**: Creating an email sequence for a welcome campaign. A4 Released.
24	Analytics for Content & Email	Measuring content performance (pageviews, time on page). Email metrics (open rate, click rate, unsubscribe rate).	**Practical Lab**: Analyzing reports in an email marketing platform.
25	**Project**: Integrated Content Plan	**Lab**: Develop a blog post outline and a corresponding email campaign to promote it.	**Practical Lab**: Connecting content and email strategies. Q3 (Content & Email) via LMS.

Week 6: Analytics, Reporting & Automation			
26	Google Analytics Deep Dive	Audience, Acquisition, and Behavior reports. Setting up goals and custom dashboards.	**Workshop**: Building a custom dashboard to track KPIs for a sample business.
27	Generating Insights & Reporting	Moving beyond data to insights. Creating client-friendly reports that tell a story.	**Practical Lab**: Creating a monthly performance report from provided analytics data.
28	Marketing Automation Tools	Introduction to automation workflows (e.g., welcome series, abandoned cart emails).	**Demo & Discussion**: Overview of tools like Zapier and marketing automation features.
29	**Mandatory**: LinkedIn Profile Creation	**Building a Digital Marketer's Profile**: Showcasing certifications, campaign results, and content samples. Using LinkedIn for lead generation.	Practical Workshop. (M - 3hr session)
30	**Project**: Performance Analysis Report	**Lab**: Analyze a dataset of marketing metrics, identify trends, and provide three recommendations for optimization.	**Practical Lab**: Data analysis and strategic thinking. A5 Released.
Week 7: Strategy Integration & Final Project Kick-off			
31	Budget Allocation & Omnichannel Strategy	Allocating budget across channels. Ensuring a consistent brand message everywhere.	**Lecture & Workshop**: Creating a quarterly budget plan for a mock client.
32	Final Project Kick-off & Ideation	Brainstorming final project ideas. Choosing a brand/product to market. Defining core objectives and KPIs.	**Presentation & Workshop**: Student pitches and instructor feedback. Final Project Assigned.
33	Project Work Session #1	**Strategy Phase**: Defining target audience, channels, budget, and key campaigns for the project.	**Mentoring & Practical Lab**: Independent/group work with instructor support.
34	Project Work Session #2	**Asset Creation Phase**: Developing ad copy, social posts, email content, and a simple landing page design.	**Mentoring & Practical Lab**:
35	Project Work Session #3	**Setup Phase**: Configuring analytics, building email lists, and setting up campaign tracking.	**Mentoring & Practical Lab**: Q4 (Analytics & Strategy) via LMS.
Week 8: Final Project Completion & Review			
36	Project Work Session #4	**Simulation & Reporting**: Projecting potential results, creating a performance report template.	**Mentoring & Practical Lab**:
37	Project Work Session #5	**Presentation Preparation**: Compiling all assets into a professional strategy deck.	**Mentoring & Practical Lab**:
38	Project Demo & Presentation Day (Part 1)	Students present their comprehensive digital marketing strategy.	**Evaluation & Presentation**: Live presentation of the strategy

			deck. Final Project Submission Due.
39	Project Demo & Presentation Day (Part 2)	Continuation of project presentations.	**Evaluation & Presentation**:
40	Course Wrap-up, Certification, & Next Steps	Industry trends, career paths (in-house vs. agency vs. freelance), Q&A.	**Lecture & Open Forum**:

4. Recommended Tools & Software

- **SEO**: Google Keyword Planner, Ubersuggest, Google Search Console
- **Social Media**: Canva, Meta Business Suite, Hootsuite (free trial)
- **PPC**: Google Ads (Sandbox for practice)
- **Email Marketing**: Mailchimp / Brevo (Free tiers)
- **Analytics**: Google Analytics (Demo Account), Google Trends
- **Productivity**: Google Sheets/Excel for reporting

5. Assessment Strategy

- **Assignments (5 x 5 = 25 Marks)**: Practical applications of weekly modules.
  - **A1 (Week 1)**: Digital Audit & 1-Page Plan
  - **A2 (Week 2)**: On-Page SEO Optimization
  - **A3 (Week 3)**: Social Media Content Calendar
  - **A4 (Week 5)**: Email Campaign Creation
  - **A5 (Week 6)**: Performance Analysis Report
- **Quizzes (5 x 5 = 25 Marks)**: MCQs on terminology, platform functions, and data interpretation.
  - **Q1 (Week 2)**: Digital Foundations & SEO
  - **Q2 (Week 4)**: SMM & PPC
  - **Q3 (Week 5)**: Content & Email Marketing
  - **Q4 (Week 7)**: Analytics & Strategy
  - **Q5 (Week 8)**: All topics included.
- **Final Project (50 Marks)**: A comprehensive digital marketing strategy for a chosen product or service.
  - **Timeline**: Assigned in Week 7, due end of Week 8.
  - **Evaluation Criteria**:
    - **Strategy & Planning (15 pts)**: Depth of audience analysis, channel selection, and goal setting.
    - **Asset Quality & Creativity (15 pts)**: Quality of created ad copy, social posts, and emails.
    - **Analytics & Measurement (10 pts)**: Appropriateness of KPIs and reporting plan.
    - **Presentation & Justification (10 pts)**: Clarity, professionalism, and data-backed reasoning.

6. Instructor Guidelines

- **Delivery**: Focus on strategy and "why" behind tactics. Ratio: 40% lecture/demo, 60% hands-on lab and workshop.

- **Evaluation**: Provide feedback on the strategic thinking and practicality of campaigns, not just completion of tasks.
- **Classroom Management**: Encourage the use of free tool tiers and foster a collaborative environment for sharing campaign ideas.
- **LMS Monitoring**: Use the LMS for quiz administration and to collect links to student-created assets (e.g., Google Docs, Canva designs).
- **Device & Software Readiness:** All required devices and software must be set up by *Week 1, Day 2*. Offline installers should be provided where internet access is limited.
- **Accessibility:** Instructors should provide printed slides when possible, use larger fonts in IDEs, and ensure that video resources include captions or transcripts.

7. Certification Requirements

- Minimum 90% attendance.
- Minimum 50% total score (aggregate of assignments, quizzes, and final project).
- All submissions must be made through the official PITP LMS Portal.

8. Learning Resources

- **Primary**: Instructor-provided slide decks, campaign templates, and case studies.
- **Recommended Readings**: Google's Digital Garage Certification; HubSpot Academy Inbound Certification.
- **Online**: HubSpot Blog, Search Engine Land, Social Media Examiner.

9. Policy Notes

- All assignments and projects must be submitted on time. Late submissions may affect certification eligibility.
- Confidential or sensitive data must not be uploaded to public repositories. Use anonymized or dummy datasets when sharing work publicly.
- Respectful communication and a collaborative attitude are expected at all times—whether in class, labs, or online forums.
- Plagiarism, copying, or misrepresentation of work is strictly prohibited.
- Students are allowed (and encouraged) to use AI tools for learning and productivity, but must cite their use clearly and not rely on them for full project submissions.
- Students are required to follow the disciplinary rules and guidelines of the university; violations may lead to formal action.
- Students may share course-related feedback or concerns through the designated channel; respectful reporting will be addressed promptly.

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E-Commerce Professional

1. Course Overview

This comprehensive course provides students with the practical skills and strategic knowledge needed to build, manage, and grow a successful online store. From selecting the right e-commerce platform to mastering product management, digital marketing, and customer retention, students will learn the entire lifecycle of an e-commerce business. The curriculum emphasizes hands-on experience with tools like Shopify and WooCommerce, data-driven decision-making, and a strong foundation in legal and ethical practices. Graduates will be equipped to launch their own ventures or manage e-commerce operations for businesses.

2. Learning Outcomes

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

- Evaluate and select an appropriate e-commerce platform based on business needs.
- Set up and customize a fully functional online store, including product catalogs, payment gateways, and shipping options.
- Implement effective product and inventory management strategies.
- Apply UX principles to design a user-friendly, mobile-responsive store that maximizes conversions.
- Develop and execute a basic digital marketing plan incorporating SEO, social media, and email marketing.
- Understand and implement key customer service, legal compliance, and data protection practices.
- Launch a complete e-commerce store as a final project, ready for real-world operation.

Apart from technical knowledge, students will also be able to:

- Improve presentation, communication, and professional writing skills.
- Strengthen soft skills: emotional intelligence, teamwork, and assertive communication.
- Create and set up a freelancing profile on at least one platform (e.g., Fiverr, Upwork, Freelancer), with at least one gig.
- Build or optimize a professional LinkedIn profile, add People's Information Technology Programme – MUET under Education, and connect with professionals, and industry.
- Develop an online portfolio (Shopify, WooCommerce/WordPress, Canva or personal site) to display projects, assignments, and freelance-ready work.
- Prepare a CV aligned with LinkedIn, highlighting PITP training, skills, and projects.
- Learn to use AI tools for content creation, freelancing, and productivity.

3. Session-wise Breakdown

Day	Topic	Description / Key Activities	Mode of Delivery
Week 1: E-Commerce Foundations			
1	Course Orientation & The E-Commerce Landscape	Introduction to the global and local e-commerce landscape, business models (B2C, B2B, C2C), and career opportunities.	**Lecture & Demo**: Overview of successful e-commerce stores and platforms.

2	Choosing Your E-Commerce Platform	Deep dive into platform options (Shopify, WooCommerce, etc.). Comparing features, costs, and scalability.	**Workshop**: A guided analysis to choose the right platform for different business scenarios.
3	Store Setup & Configuration	Registering a domain, setting up hosting (for WooCommerce), or starting a trial (Shopify). Basic store settings and configuration.	**Practical Lab**: Step-by-step guided setup of a demo store on a chosen platform.
4	**Mandatory**: Soft & Business Communication (Session 1/3)	***Core Soft Skills for Workplace Success: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture & Interactive Workshop**
5	**Project**: Store Foundation	**Lab**: Complete the initial setup of a personal store, including basic branding (name, logo) and configuration.	**Practical Lab & Mentoring**: Independent work with instructor support. A1 Released.
Week 2: Product & Inventory Management			
6	Product Listing Mastery	**Adding products**: high-quality images, compelling descriptions, SEO-friendly titles, pricing, and variants (sizes, colors).	**Workshop**: Hands-on session on creating product listings that convert.
7	Inventory Management Systems	Setting up SKUs, stock levels, and low-stock alerts. Managing bundles and digital products.	**Practical Lab**: Adding a full product catalog and configuring inventory tracking.
8	Pricing & Promotion Strategies	Understanding COGS, profit margins. Creating discounts, promo codes, and implementing a pricing strategy.	**Lecture & Code-Along**: Configuring automatic discounts and seasonal sales. A2 Released.
9	**Mandatory**: Soft & Business Communication (Session 2/3)	***Business Communication Basics: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Writing**
10	**Project**: Full Product Catalog	**Lab**: Populate the store with a minimum of 10 products, with complete details, inventory, and pricing.	**Practical Lab**: Comprehensive catalog building. Q1 (Platform & Products) via LMS.
Week 3: Website Design & User Experience (UX)			
11	Principles of E-Commerce UX	Understanding the customer journey, reducing friction, and designing for trust and credibility.	**Lecture & Case Study**: Analyzing good and bad e-commerce UX examples.
12	Theme Customization & Navigation	Selecting and customizing a theme. Creating intuitive navigation menus, categories, and filters.	**Practical Lab**: Customizing the store's look, feel, and navigation structure.

13	Mobile Optimization & Speed	Ensuring the store is fully responsive. Introduction to page speed optimization and its impact on sales.	**Practical Lab**: Testing and optimizing the store for mobile devices.
14	**Mandatory**: Soft & Business Communication (Session 3/3)	***Presentation Skills & Public Speaking: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Speaking**
15	**Project**: UX Optimization	**Lab**: Perform a UX audit on a partner's store and implement improvements to your own store's design.	**Practical Lab**: Guided project work. A3 Released.
Week 4: Payments, Shipping & Security			
16	Payment Gateway Integration	Overview of local and international gateways (JazzCash, EasyPaisa, Stripe, PayPal). Configuring secure payment options.	**Demo & Practical Lab**: Setting up a test payment gateway in the demo store.
17	Shipping & Fulfillment Strategies	Setting up shipping zones, rates (free, flat, calculated), and integrating with carriers. Managing orders and fulfillment.	**Workshop**: Configuring shipping for a complex product range (e.g., different weights/sizes).
18	Security, Fraud Prevention & Legal Basics	Implementing SSL, PCI compliance basics. Understanding common fraud patterns. Intro to consumer protection laws.	**Lecture**: Essential security and legal knowledge for every store owner.
19	**Mandatory**: Intro to Freelancing Platforms	**Freelancing in E-Commerce**: Offering store setup, product listing, and platform migration services on Fiverr/Upwork.	Lecture & Case Study. (M - 3hr session)
20	**Project**: Checkout Configuration	**Lab**: Fully configure payment, shipping, and tax settings. Perform a test order from start to finish.	**Practical Lab**: End-to-end configuration and testing. Q2 (UX, Payments, Shipping) via LMS.
Week 5: Digital Marketing for E-Commerce			
21	E-Commerce SEO & Content Marketing	On-page SEO for product pages and blogs. Keyword research for product categories. Creating a content plan.	**Workshop**: Optimizing all product pages and writing a blog post to drive traffic.
22	Social Media Marketing (SMM) for Sales	Using Facebook/Instagram Shops. Running targeted ad campaigns. Leveraging user-generated content.	**Practical Lab**: Setting up a Facebook Shop and creating a simple ad campaign.
23	Email Marketing & Retention	Building an email list from store traffic. Creating welcome series,	**Workshop**: Setting up an automated email sequence using

		abandoned cart emails, and newsletters.	an app like Klaviyo or Omnisend. A4 Released.
24	Measuring Marketing ROI	Introduction to Google Analytics for E-commerce. Tracking sales, conversion rates, and customer acquisition cost.	**Practical Lab**: Setting up Google Analytics and understanding key e-commerce reports.
25	**Project**: Marketing Plan	**Lab**: Develop a one-month marketing plan for the store, including SEO, social media, and email strategies.	**Practical Lab**: Strategic planning. Q3 (Digital Marketing) via LMS.
Week 6: Customer Service & Analytics			
26	Customer Service Excellence	Setting up help desks/FAQ pages. Handling returns, refunds, and difficult customers professionally.	**Lecture & Role-Play**: Best practices for customer communication and conflict resolution.
27	Building Loyalty & Retention	Implementing loyalty programs, referral systems, and post-purchase engagement strategies.	**Workshop**: Researching and proposing a loyalty program for the student's store.
28	Analytics & Data-Driven Decisions	**Deep dive into key metrics**: AOV, LTV, conversion rate. Using data to make decisions about products and marketing.	**Practical Lab**: Analyzing store data (from a provided dataset) to find insights.
29	**Mandatory**: LinkedIn Profile Creation	**The E-Com Professional Profile**: Highlighting store projects, technical skills (platforms, marketing), and business acumen.	Practical Workshop. (M - 3hr session)
30	**Project**: Customer Journey Map	**Lab**: Create a detailed map of the customer journey for your store and identify key touchpoints for improvement.	**Practical Lab**: Strategic analysis. A5 Released.
Week 7: Legal, Ethics & Final Project Kick-off			
31	Legal & Ethical Deep Dive	Privacy policies, terms of service, return policies. Understanding GDPR/Data Protection laws. Ethical marketing and sourcing.	**Lecture & Workshop**: Drafting essential store policies.
32	Final Project Kick-off & Ideation	Finalizing the store concept for the final project. Defining target audience, product niche, and unique value proposition.	**Presentation & Workshop**: Student pitches and instructor feedback. Final Project Assigned.
33	Project Work Session #1	**Build Phase**: Completing the store setup, adding all products, and configuring all settings.	**Mentoring & Practical Lab**: Independent/group work with instructor support.
34	Project Work Session #2	**Marketing Phase**: Implementing the marketing plan (creating social content, writing blog posts, setting up emails).	**Mentoring & Practical Lab**:

35	Project Work Session #3	**Documentation Phase**: Preparing store policies, a strategy document, and a report on the target audience.	**Mentoring & Practical Lab**: Q4 (Customer Service & Analytics) via LMS.
Week 8: Final Project Completion & Review			
36	Project Work Session #4	**Testing Phase**: Performing thorough testing of the entire user journey, from landing page to checkout.	**Mentoring & Practical Lab**:
37	Project Work Session #5	**Presentation Preparation**: Preparing a live demo and a presentation explaining the business strategy.	**Mentoring & Practical Lab**:
38	Project Demo & Presentation Day (Part 1)	Students present their live e-commerce stores and business strategy.	**Evaluation & Presentation**: Live store walkthrough. Final Project Submission Due.
39	Project Demo & Presentation Day (Part 2)	Continuation of project presentations.	**Evaluation & Presentation**:
40	Course Wrap-up, Certification, & Next Steps	**Pathways to launching**: funding, scaling, outsourcing. Q&A.	**Lecture & Open Forum**:

4. Recommended Tools & Software

- **E-Commerce Platforms**: Shopify (Primary), WooCommerce (Secondary)
- **Productivity & Design**: Canva, Google Workspace (Sheets, Docs)
- **Marketing**: Google Analytics, Meta Business Suite, Email Marketing App (Klaviyo/Omnisend)
- **SEO**: Ubersuggest, Google Keyword Planner
- **Payments**: Test gateways for Shopify/Stripe

5. Assessment Strategy

- **Assignments (5 x 5 = 25 Marks)**: Practical build-outs for the student's store.
  - **A1 (Week 1)**: Store Foundation & Setup
  - **A2 (Week 2)**: Product Catalog & Inventory
  - **A3 (Week 3)**: UX/Theme Customization
  - **A4 (Week 5)**: Email Marketing Sequence
  - **A5 (Week 6)**: Customer Journey Map
- **Quizzes (5 x 5 = 25 Marks)**: MCQs on platform knowledge, marketing concepts, and best practices.
  - **Q1 (Week 2)**: Platform & Product Management
  - **Q2 (Week 4)**: UX, Payments, Shipping
  - **Q3 (Week 5)**: Digital Marketing
  - **Q4 (Week 7)**: Customer Service & Analytics
  - **Q5 (Week 8)**: All topics included.
- **Final Project (50 Marks)**: A complete, functional, and documented e-commerce store.
  - **Timeline**: Assigned in Week 7, due end of Week 8.
  - **Evaluation Criteria**:

- **Functionality & Completeness (20 pts)**: Everything works (payments, shipping, etc.).
- **Design & User Experience (15 pts)**: Professional, responsive, and easy to use.
- **Marketing & Strategy (10 pts)**: Coherent marketing plan and SEO implementation.
- **Documentation & Presentation (5 pts)**: Quality of supporting business documents and live demo.

6. Instructor Guidelines

- **Delivery**: Highly practical and hands-on. Ratio: 30% lecture, 70% guided lab and independent building.
- **Evaluation**: Focus on the functionality and strategic thinking behind the student's store. Provide actionable feedback.
- **Classroom Management**: Encourage peer reviews and collaboration. Students will learn from seeing each other's stores.
- **LMS Monitoring**: Use the LMS to collect store URLs and documentation for grading.
- **Device & Software Readiness:** All required devices and software must be set up by *Week 1, Day 2*. Offline installers should be provided where internet access is limited.
- **Accessibility:** Instructors should provide printed slides when possible, use larger fonts in IDEs, and ensure that video resources include captions or transcripts.

7. Certification Requirements

- Minimum 90% attendance.
- Minimum 50% total score (aggregate of assignments, quizzes, and final project).
- All submissions (store URLs, documents) must be made through the official PITP LMS Portal.

8. Learning Resources

- **Primary**: Instructor-provided checklists, template policies, and video tutorials.
- **Recommended Readings**: Shopify Help Center, WooCommerce Documentation, blogs from Oberlo and SaleHoo.
- **Online**: YouTube tutorials on specific platform features.

9. Policy Notes

- Students must use original images or properly licensed stock photos for their projects.
- The focus is on learning the process; the store does not need to be launched with real money.
- All assignments and projects must be submitted on time. Late submissions may affect certification eligibility.
- Confidential or sensitive data must not be uploaded to public repositories. Use anonymized or dummy datasets when sharing work publicly.
- Respectful communication and a collaborative attitude are expected at all times—whether in class, labs, or online forums.
- Plagiarism, copying, or misrepresentation of work is strictly prohibited.
- Students are allowed (and encouraged) to use AI tools for learning and productivity, but must cite their use clearly and not rely on them for full project submissions.
- Students are required to follow the disciplinary rules and guidelines of the university; violations may lead to formal action.

- Students may share course-related feedback or concerns through the designated channel; respectful reporting will be addressed promptly.

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Graphic Designer

1. Course Overview

This comprehensive course equips students with the fundamental skills of graphic design and introduces the principles of UI/UX design for digital products. Students will master industry-standard tools like Adobe Photoshop and Illustrator, learning to create everything from logos and branding packages to web and mobile app interfaces. The curriculum emphasizes design thinking, typography, color theory, and user-centered design processes. Through hands-on projects and a capstone design project, students will build a professional portfolio that demonstrates their ability to solve visual communication problems effectively.

2. Learning Outcomes

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

- Demonstrate proficiency in Adobe Photoshop and Illustrator for image editing and vector graphic creation.
- Apply core design principles (contrast, alignment, repetition, proximity, typography, color theory) to various media.
- Develop a complete brand identity system, including logo, color palette, typography, and business collateral.
- Understand and apply the basics of UI (User Interface) and UX (User Experience) design principles.
- Create wireframes, mockups, and prototypes for web and mobile applications.
- Execute a complete design project from concept to final presentation-ready assets.

Apart from technical knowledge, students will also be able to:

- Improve presentation, communication, and professional writing skills.
- Strengthen soft skills: emotional intelligence, teamwork, and assertive communication.
- Create and set up a freelancing profile on at least one platform (e.g., Fiverr, Upwork, Freelancer), with at least one gig.
- Build or optimize a professional LinkedIn profile, add People's Information Technology Programme – MUET under Education, and connect with professionals, and industry.
- Develop an online portfolio (Behance, Dribbble, Canva or personal site) to display projects, assignments, and freelance-ready work.
- Prepare a CV aligned with LinkedIn, highlighting PITP training, skills, and projects.
- Learn to use AI tools for content creation, freelancing, and productivity.

3. Session-wise Breakdown

Day	Topic	Description / Key Activities	Mode of Delivery
Week 1: Design Foundations & Photoshop Basics			
1	Course Orientation & Design Principles	**Introduction to the course, the role of a designer. Core principles**: CRAP (Contrast, Repetition, Alignment, Proximity), typography, color theory.	**Lecture & Demo**: Analysis of good and bad design examples.

2	**Adobe Photoshop**: The Interface & Essentials	Workspace setup, tools panel, layers panel, file types. Basic image adjustments (cropping, levels, curves).	**Workshop**: Guided tour of Photoshop followed by simple image correction exercises.
3	Selections & Masking Mastery	Using Marquee, Lasso, Quick Selection, and Magic Wand tools. Creating and refining layer masks for non-destructive editing.	**Practical Lab**: Complex image cutouts and compositing exercises.
4	**Mandatory**: Soft & Business Communication (Session 1/3)	***Core Soft Skills for Workplace Success: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture & Interactive Workshop**
5	**Project**: Digital Collage Poster	**Lab**: Create a thematic poster using advanced selection, masking, and compositing techniques.	**Practical Lab & Mentoring**: Independent creative work. A1 Released.
Week 2: Advanced Photoshop & Typography			
6	Advanced Layers & Blending Modes	Using layer groups, adjustment layers, and blending modes to create complex visual effects.	**Workshop**: Creating realistic text effects and lighting using layer styles.
7	**Photoshop for UI**: Buttons & Icons	Designing modern, vector-shaped buttons and icons for web and mobile using shape layers and styles.	**Practical Lab**: Designing a set of cohesive UI elements.
8	Typography in Design	Anatomy of type, choosing fonts, kerning, leading, tracking. Creating impactful text-based graphics.	**Lecture & Practical Lab**: Typesetting a magazine cover and a social media post. A2 Released.
9	**Mandatory**: Soft & Business Communication (Session 2/3)	***Business Communication Basics: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Writing**
10	**Project**: Movie Poster Redesign	**Lab**: Redesign a movie poster, focusing on typography, composition, and visual hierarchy.	**Practical Lab**: Application of advanced Photoshop skills. Q1 (Design Principles & Photoshop) via LMS.
Week 3: Vector Graphics with Illustrator			
11	**Adobe Illustrator**: The Vector Workspace	Difference between raster and vector. Illustrator interface, artboards, shapes, paths, and the Pen tool.	**Workshop**: Mastering the Pen tool through tracing exercises.
12	Logo Design Fundamentals	Principles of effective logo design (simplicity, memorability, versatility). Sketching and conceptualizing.	**Practical Lab**: Creating mind maps and sketching multiple logo concepts for a brand.
13	Vectorizing & Refining Logos	Using the Pen tool, Pathfinder, and Shape Builder to create clean, scalable vector logos.	**Practical Lab**: Digitizing the best sketch from the previous session into a polished vector logo.

14	**Mandatory**: Soft & Business Communication (Session 3/3)	***Presentation Skills & Public Speaking: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Speaking**
15	**Project**: Brand Logo & Style Guide	**Lab**: Finalize the vector logo and create a simple one-page style guide showing color codes and fonts.	**Practical Lab**: Guided project work. A3 Released.
Week 4: Branding & Identity Systems			
16	Building a Brand Identity	**Extending a logo into a full system**: business cards, letterheads, social media assets.	**Workshop**: Using Illustrator and Photoshop to create branded collateral.
17	Design Systems & Consistency	The importance of consistency. Creating reusable components and templates.	**Practical Lab**: Designing a full stationery set for the brand from Week 3.
18	Introduction to UI/UX Design	Difference between UI (interface) and UX (experience). Overview of the design thinking process.	**Lecture**: Introduction to user personas, user journeys, and usability.
19	**Mandatory**: Intro to Freelancing Platforms	**Freelancing for Designers**: Showcasing a portfolio on Behance/Dribbble. Finding clients on Upwork/Fiverr for logo and branding projects.	Lecture & Case Study. (M - 3hr session)
20	**Project**: Complete Branding Package	**Lab**: Deliver the final branding package, including logo, style guide, and 3 branded items.	**Practical Lab**: Finalizing and packaging design assets. Q2 (Illustrator & Branding) via LMS.
Week 5: UI/UX & Web Design Principles			
21	UX Research & Wireframing	**Creating user personas and user flows. Introduction to wireframing**: low-fidelity sketches for layout.	**Workshop**: Using pen/paper or simple tools to wireframe a website's homepage.
22	**UI Design for Web**: Layout & Grids	The 12-column grid system. Spacing, visual hierarchy, and common web patterns (hero sections, nav bars).	**Practical Lab**: Translating a wireframe into a mid-fidelity mockup in Illustrator/Figma.
23	Designing for Interaction	States of UI elements (default, hover, active). Designing buttons, forms, and navigation menus.	**Workshop**: Creating interactive states for the web mockup. A4 Released.
24	Introduction to Prototyping	Connecting screens to demonstrate user flow. Introduction to prototyping tools (Figma, Adobe XD).	**Demo & Practical Lab**: Creating a simple clickable prototype from the mockup.
25	**Project**: Website Homepage Design	**Lab**: Design a high-fidelity, responsive homepage mockup for a local business and create a simple prototype.	**Practical Lab**: Application of UI/UX principles. Q3 (UI/UX Principles) via LMS.
Week 6: Mobile UI & Portfolio Development			

26	Mobile App UI Design	**Platform differences (iOS vs. Material Design). Mobile-specific patterns**: tab bars, gesture interactions.	**Lecture & Workshop**: Designing a key screen for a mobile app.
27	Portfolio Building & Presentation	How to curate and present design work online. Introduction to Behance, Dribbble, and personal portfolio sites.	**Workshop**: Students begin assembling their best work from the course into a portfolio format.
28	Design Critique & Feedback	Participating in and benefiting from design critiques. Iterating based on feedback.	**Practical Lab**: Peer review session of website and mobile app designs.
29	**Mandatory**: LinkedIn Profile Creation	**The Designer's Profile**: Showcasing the portfolio, listing software skills, and networking with creative professionals.	Practical Workshop. (M - 3hr session)
30	**Project**: Mobile App Screen Design	**Lab**: Design a set of 3 connected screens for a mobile app (e.g., e-commerce product flow).	**Practical Lab**: A5 Released.
Week 7: Final Project Integration			
31	**Design Tools Deep Dive**: Figma	**Comprehensive introduction to Figma**: components, auto-layout, and collaborative features.	**Workshop**: Recreating one previous design in Figma to experience modern workflow.
32	Final Project Kick-off & Ideation	**Students choose a final project**: a full branding package OR a multi-screen app/website UX/UI project.	**Presentation & Workshop**: Student pitches and instructor feedback. Final Project Assigned.
33	Project Work Session #1	**Research & Wireframing**: Defining the problem, target audience, and creating low-fidelity wireframes.	**Mentoring & Practical Lab**: Independent work with instructor support.
34	Project Work Session #2	**Design & Mockup**: Creating high-fidelity mockups for all required screens or assets.	**Mentoring & Practical Lab**:
35	Project Work Session #3	**Prototyping & Polish**: Building a prototype and refining the visual design based on feedback.	**Mentoring & Practical Lab**: Q4 (Portfolio & Tools) via LMS.
Week 8: Final Project Completion & Review			
36	Project Work Session #4	**Portfolio Integration**: Preparing the final project for portfolio presentation.	**Mentoring & Practical Lab**:
37	Project Work Session #5	**Presentation Preparation**: Creating a case study slide deck that explains the design process and decisions.	**Mentoring & Practical Lab**:
38	Project Demo & Presentation Day (Part 1)	Students present their final projects, walking through their design process and showcasing the final assets.	**Evaluation & Presentation**: Live portfolio review. Final Project Submission Due.

39	Project Demo & Presentation Day (Part 2)	Continuation of project presentations.	**Evaluation & Presentation**:
40	Course Wrap-up, Certification, & Next Steps	How to continue learning, following design trends, and pursuing a career in design. Q&A.	**Lecture & Open Forum**:

4. Recommended Tools & Software

- **Raster Graphics**: Adobe Photoshop
- **Vector Graphics**: Adobe Illustrator
- **UI/UX & Prototyping**: Figma (Free plan available, primary), Adobe XD
- **Productivity**: Behance or Dribbble for portfolio

5. Assessment Strategy

- **Assignments (5 x 5 = 25 Marks)**: Practical design projects.
  - **A1 (Week 1)**: Photoshop Collage Poster
  - **A2 (Week 2)**: Typographic Design
  - **A3 (Week 3)**: Vector Logo & Style Guide
  - **A4 (Week 5)**: Website UI Mockup
  - **A5 (Week 6)**: Mobile App UI Screens
- **Quizzes (5 x 5 = 25 Marks)**: MCQs on design principles, software tools, and UI/UX terminology.
  - **Q1 (Week 2)**: Design Principles & Photoshop
  - **Q2 (Week 4)**: Illustrator & Branding
  - **Q3 (Week 5)**: UI/UX Principles
  - **Q4 (Week 7)**: Portfolio & Tools
  - **Q5 (Week 8)**: All topics included.
- **Final Project (50 Marks)**: A comprehensive branding package or a multi-screen UI/UX project.
  - **Timeline**: Assigned in Week 7, due end of Week 8.
  - **Evaluation Criteria**:
    - **Concept & Creativity (15 pts)**: Originality and effectiveness of the design solution.
    - **Execution & Craftsmanship (20 pts)**: Technical proficiency with software and attention to detail.
    - **Adherence to Principles (10 pts)**: Application of design and UI/UX principles.
    - **Presentation & Process (5 pts)**: Clarity of the presentation and evidence of a design thinking process.

6. Instructor Guidelines

- **Delivery**: Focus on hands-on creation. Ratio: 30% lecture/demo, 70% practical lab and design studio time.
- **Evaluation**: Provide feedback that is constructive and focused on both technical execution and conceptual thinking.
- **Classroom Management**: Foster a studio environment where students feel comfortable giving and receiving critique. Encourage the use of mood boards and design inspiration.

- **LMS Monitoring**: Use the LMS to collect digital files (JPEG, PNG, PDF) and links to online portfolios.
- **Device & Software Readiness:** All required devices and software must be set up by *Week 1, Day 2*. Offline installers should be provided where internet access is limited.
- **Accessibility:** Instructors should provide printed slides when possible, use larger fonts in IDEs, and ensure that video resources include captions or transcripts.

7. Certification Requirements

- Minimum 90% attendance.
- Minimum 50% total score (aggregate of assignments, quizzes, and final project).
- All submissions must be made through the official PITP LMS Portal.

8. Learning Resources

- **Primary**: Instructor-provided project briefs, design assets, and video tutorials.
- **Recommended Readings**: "Don't Make Me Think" by Steve Krug (UX); "Thinking with Type" by Ellen Lupton.
- **Online**: Adobe Tutorials, Figma Community, Behance, Dribbble.

9. Policy Notes

- Students must use original artwork or properly licensed assets (e.g., from Adobe Stock, Unsplash).
- All assignments and projects must be submitted on time. Late submissions may affect certification eligibility.
- Confidential or sensitive data must not be uploaded to public repositories. Use anonymized or dummy datasets when sharing work publicly.
- Respectful communication and a collaborative attitude are expected at all times—whether in class, labs, or online forums.
- Plagiarism, copying, or misrepresentation of work is strictly prohibited.
- Students are allowed (and encouraged) to use AI tools for learning and productivity, but must cite their use clearly and not rely on them for full project submissions.
- Students are required to follow the disciplinary rules and guidelines of the university; violations may lead to formal action.
- Students may share course-related feedback or concerns through the designated channel; respectful reporting will be addressed promptly.

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Java Developer

1. Course Overview

This comprehensive Java Development course is designed to take students from fundamental programming concepts to building robust, object-oriented applications with database connectivity and web development basics. Students will master core Java syntax, advanced OOP principles, collections framework, GUI development with Swing, and JDBC for database operations. The course culminates with an introduction to web technologies using Servlets and JSP, preparing students for entry-level Java developer roles and providing a strong foundation for enterprise Java development.

2. Learning Outcomes

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

- Write, compile, and execute Java programs using fundamental programming constructs.
- Design and implement object-oriented solutions using classes, objects, inheritance, polymorphism, and interfaces.
- Implement exception handling and work with arrays, strings, and collections framework effectively.
- Develop desktop applications with graphical user interfaces using Java Swing.
- Connect Java applications to databases using JDBC and perform CRUD operations.
- Build basic web applications using Java Servlets and JSP.
- Develop a complete Java application as a final project, demonstrating full-stack capabilities.

Apart from technical knowledge, students will also be able to:

- Improve presentation, communication, and professional writing skills.
- Strengthen soft skills: emotional intelligence, teamwork, and assertive communication.
- Create and set up a freelancing profile on at least one platform (e.g., Fiverr, Upwork, Freelancer), with at least one gig.
- Build or optimize a professional LinkedIn profile, add People's Information Technology Programme – MUET under Education, and connect with professionals, and industry.
- Develop an online portfolio (GitHub, GitLab, or personal site) to display projects, assignments, and freelance-ready work.
- Prepare a CV aligned with LinkedIn, highlighting PITP training, skills, and projects.
- Learn to use AI tools for content creation, freelancing, and productivity.

3. Session-wise Breakdown

Day	Topic	Description / Key Activities	Mode of Delivery
Week 1: Java Foundations			
1	Course Orientation & Java Ecosystem	Introduction to Java, JVM, JRE, JDK. Setting up IDE (IntelliJ IDEA/Eclipse). Writing first "Hello World" program.	**Lecture & Demo**: Environment setup and basic program execution.
2	Java Syntax & Data Types	Variables, primitive data types, operators, type casting. Basic input/output using Scanner class.	**Workshop**: Hands-on coding exercises with different data types and operations.

3	Control Structures & Methods	Conditional statements (if-else, switch), loops (for, while, do-while). Defining and calling methods.	**Practical Lab**: Solving algorithmic problems using control structures and methods.
4	**Mandatory**: Soft & Business Communication (Session 1/3)	***Core Soft Skills for Workplace Success: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture & Interactive Workshop**
5	**Project**: Basic Calculator Application	**Lab**: Build a console-based calculator that can perform basic arithmetic operations.	**Practical Lab & Mentoring**: Independent coding with instructor support. A1 Released.
Week 2: Object-Oriented Programming Fundamentals			
6	Classes & Objects	Defining classes, creating objects, understanding constructors. The 'this' keyword.	**Workshop**: Creating multiple classes and objects to model real-world entities.
7	Encapsulation & Methods	Access modifiers (public, private), getters/setters, method overloading.	**Practical Lab**: Implementing encapsulation in class designs.
8	Inheritance & Polymorphism	extends keyword, method overriding, super keyword, runtime polymorphism.	**Lecture & Code-Along**: Building class hierarchies and demonstrating polymorphism. A2 Released.
9	**Mandatory**: Soft & Business Communication (Session 2/3)	***Business Communication Basics: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Writing**
10	**Project**: Library Management System (OOP)	**Lab**: Implement core classes for a library system (Book, Member, Library) using OOP principles.	**Practical Lab**: Comprehensive OOP implementation. Q1 (Java Fundamentals & OOP) via LMS.
Week 3: Advanced OOP & Exception Handling			
11	Abstract Classes & Interfaces	Understanding abstraction, defining abstract classes and interfaces, implementation.	**Workshop**: Creating abstract classes and implementing interfaces in practical scenarios.
12	Exception Handling	Try-catch-finally blocks, multiple catch blocks, custom exceptions.	**Practical Lab**: Writing robust code that handles various exceptions gracefully.
13	Arrays & Strings	Working with arrays, multi-dimensional arrays, String class methods, StringBuilder.	**Practical Lab**: Algorithms with arrays and string manipulation exercises.
14	**Mandatory**: Soft & Business Communication (Session 3/3)	***Presentation Skills & Public Speaking: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Speaking**
15	**Project**: Student Grade Calculator	**Lab**: Create an application that calculates student grades with exception handling for invalid inputs.	**Practical Lab**: Guided project work. A3 Released.

Week 4: Collections Framework & File I/O			
16	Collections Framework Overview	Introduction to List, Set, Map interfaces. ArrayList, LinkedList, HashSet, HashMap.	**Workshop**: Hands-on with different collection types and their use cases.
17	Working with Collections	Iterating through collections, using iterators, sorting collections with Comparable/Comparator.	**Practical Lab**: Implementing various collection operations and algorithms.
18	File I/O Operations	Reading and writing text files using FileReader, FileWriter, BufferedReader, BufferedWriter.	**Workshop**: Reading data from files and writing results back to files.
19	**Mandatory**: Intro to Freelancing Platforms	**Freelancing for Java Developers**: Showcasing projects, finding client work, and managing Java development projects.	Lecture & Case Study. (M - 3hr session)
20	**Project**: Employee Management System	**Lab**: Build a system that manages employee data using collections and file persistence.	**Practical Lab**: Application of collections and file I/O. Q2 (Advanced OOP & Collections) via LMS.
Week 5: GUI Development with Java Swing			
21	Introduction to Swing	Swing components overview (JFrame, JButton, JTextField, JLabel). Creating basic GUI applications.	**Lecture & Demo**: Building a simple window with interactive elements.
22	Layout Managers	FlowLayout, BorderLayout, GridLayout. Creating complex UI arrangements.	**Workshop**: Designing different UI layouts using various layout managers.
23	Event Handling	ActionListener, MouseListener, KeyListener. Making GUI applications interactive.	**Practical Lab**: Creating responsive GUI applications with event handling. A4 Released.
24	Advanced Swing Components	JTable, JComboBox, JMenu, JDialog. Building more sophisticated interfaces.	**Practical Lab**: Implementing advanced components in a GUI application.
25	**Project**: Calculator with GUI	**Lab**: Convert the Week 1 calculator into a fully functional GUI application.	**Practical Lab**: Comprehensive GUI development. Q3 (Swing GUI) via LMS.
Week 6: Database Connectivity with JDBC			
26	Introduction to JDBC	JDBC architecture, drivers, establishing database connections.	**Lecture & Demo**: Connecting to MySQL database from Java application.
27	CRUD Operations with JDBC	Statement, PreparedStatement. Executing INSERT, UPDATE, DELETE, SELECT operations.	**Workshop**: Performing all CRUD operations on a sample database.
28	ResultSet & Transaction Management	Processing query results, handling transactions with commit/rollback.	**Practical Lab**: Retrieving and displaying data from database with transaction support.
29	**Mandatory**: LinkedIn Profile Creation	**The Java Developer Profile**: Highlighting Java projects,	Practical Workshop. (M - 3hr session)

		technical skills, and contributions to coding platforms.	
30	**Project**: Database-Driven Application	**Lab**: Create a GUI application that performs CRUD operations on a database (e.g., product inventory).	**Practical Lab**: Integrating GUI with database. A5 Released.
Week 7: Web Development Basics & Final Project Kick-off			
31	Introduction to Web Applications	HTTP protocol, servlet lifecycle, web container overview.	**Lecture**: Fundamentals of web development with Java.
32	Java Servlets	Creating servlets, handling GET/POST requests, request dispatching.	**Workshop**: Building simple servlets that process form data.
33	JSP (JavaServer Pages)	JSP syntax, scriptlets, expressions, declarations. Integrating servlets and JSP.	**Practical Lab**: Creating dynamic web pages with JSP.
34	Final Project Kick-off & Ideation	**Students choose final project**: desktop application with database OR basic web application.	**Presentation & Workshop**: Project proposals and technical planning. Final Project Assigned.
35	Project Work Session #1	**Design & Architecture**: Planning classes, database schema, and application flow.	**Mentoring & Practical Lab**: Independent/group work with instructor support. Q4 (JDBC & Web Basics) via LMS.
Week 8: Final Project Completion & Review			
36	Project Work Session #2	**Core Implementation**: Developing the main functionality of the application.	**Mentoring & Practical Lab**:
37	Project Work Session #3	**Integration & Testing**: Connecting components, testing functionality, debugging.	**Mentoring & Practical Lab**:
38	Project Work Session #4	**Polish & Documentation**: Final touches, code comments, user documentation.	**Mentoring & Practical Lab**:
39	Project Demo & Presentation Day	Students present their final Java applications, explaining architecture and demonstrating functionality.	**Evaluation & Presentation**: Live demo and code walkthrough. Final Project Submission Due.
40	Course Wrap-up, Certification, & Next Steps	Next learning steps (Spring Framework, Hibernate), career paths, Q&A.	**Lecture & Open Forum**:

4. Recommended Tools & Software

- **JDK**: Java Development Kit 11 or 17 (LTS versions)
- **IDE**: IntelliJ IDEA (Community Edition) or Eclipse
- **Database**: MySQL or PostgreSQL
- **Web Server**: Apache Tomcat
- **Version Control**: Git, GitHub
- **Build Tool**: Maven (Introduction)

5. Assessment Strategy

- **Assignments (5 x 5 = 25 Marks)**: Practical coding exercises.
    - **A1 (Week 1)**: Console Calculator
    - **A2 (Week 2)**: OOP Principles Implementation
    - **A3 (Week 3)**: Exception Handling Application
    - **A4 (Week 5)**: GUI Component Implementation
    - **A5 (Week 6)**: JDBC CRUD Operations
- **Quizzes (5 x 5 = 25 Marks)**: MCQs on Java concepts, syntax, and best practices.
    - **Q1 (Week 2)**: Java Fundamentals & OOP
    - **Q2 (Week 4)**: Advanced OOP & Collections
    - **Q3 (Week 5)**: Swing GUI Development
    - **Q4 (Week 7)**: JDBC & Web Basics
    - **Q5 (Week 8)**: All topics included.
- **Final Project (50 Marks)**: A complete Java application (desktop with database or web application).
    - **Timeline**: Assigned in Week 7, due end of Week 8.
    - **Evaluation Criteria**:
        - **Functionality & Completeness (20 pts)**: Application works as specified with all features implemented.
        - **Code Quality & Design (15 pts)**: Proper OOP design, clean code, appropriate use of patterns.
        - **Error Handling & Robustness (10 pts)**: Graceful handling of edge cases and errors.
        - **Documentation & Presentation (5 pts)**: Code comments, user guide, and clear demonstration.

6. Instructor Guidelines

- **Delivery**: Balance between theory and hands-on coding. Ratio: 40% lecture/concept explanation, 60% coding labs and workshops.
- **Evaluation**: Focus on code functionality, design patterns, and best practices. Provide specific feedback on code improvements.
- **Classroom Management**: Encourage pair programming for complex exercises. Maintain a coding-friendly environment with regular breaks.
- **LMS Monitoring**: Use the LMS for code submissions (GitHub links preferred), quiz administration, and tracking progress.
- **Device & Software Readiness:** All required devices and software must be set up by *Week 1, Day 2*. Offline installers should be provided where internet access is limited.
- **Accessibility:** Instructors should provide printed slides when possible, use larger fonts in IDEs, and ensure that video resources include captions or transcripts.

7. Certification Requirements

- Minimum 90% attendance.
- Minimum 50% total score (aggregate of assignments, quizzes, and final project).
- All code submissions must be made through the official PITP LMS Portal or linked GitHub repositories.

8. Learning Resources

- **Primary**: Instructor-provided code examples, exercises, and project specifications.
- **Recommended Readings**: "Head First Java" by Kathy Sierra & Bert Bates; Oracle Java Documentation.
- **Online**: Java documentation, Baeldung Java tutorials, GitHub Java projects.

9. Policy Notes

- All assignments and projects must be submitted on time. Late submissions may affect certification eligibility.
- Confidential or sensitive data must not be uploaded to public repositories. Use anonymized or dummy datasets when sharing work publicly.
- Respectful communication and a collaborative attitude are expected at all times—whether in class, labs, or online forums.
- Plagiarism, copying, or misrepresentation of work is strictly prohibited.
- Students are allowed (and encouraged) to use AI tools for learning and productivity, but must cite their use clearly and not rely on them for full project submissions.
- Students are required to follow the disciplinary rules and guidelines of the university; violations may lead to formal action.
- Students may share course-related feedback or concerns through the designated channel; respectful reporting will be addressed promptly.

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Mobile App Developer

1. Course Overview

This comprehensive course provides students with the skills to become proficient Android developers using modern Android development practices. Students will learn to build robust, responsive mobile applications from the ground up, covering everything from UI design and user navigation to data persistence, networking, and advanced Android features. The curriculum emphasizes hands-on learning with Kotlin, Android Studio, and industry-standard libraries like Retrofit and Room. By the end of the course, students will have developed a portfolio of applications and a capstone project, preparing them for entry-level Android developer roles.

2. Learning Outcomes

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

- Set up and configure Android Studio development environment effectively.
- Design and implement responsive user interfaces using XML and modern Android UI components.
- Implement navigation between activities and fragments using intents and navigation components.
- Manage data persistence using both SQLite database with Room persistence library and SharedPreferences.
- Integrate RESTful APIs into Android applications using Retrofit and handle JSON data parsing.
- Implement advanced Android features including background tasks, notifications, and location services.
- Test, debug, and prepare an application for deployment on the Google Play Store.
- Develop a complete, functional mobile application as a final project.

Apart from technical knowledge, students will also be able to:

- Improve presentation, communication, and professional writing skills.
- Strengthen soft skills: emotional intelligence, teamwork, and assertive communication.
- Create and set up a freelancing profile on at least one platform (e.g., Fiverr, Upwork, Freelancer), with at least one gig.
- Build or optimize a professional LinkedIn profile, add People's Information Technology Programme – MUET under Education, and connect with professionals, and industry.
- Develop an online portfolio (GitHub, Behance, Google Play Store, or personal site) to display projects, assignments, and freelance-ready work.
- Prepare a CV aligned with LinkedIn, highlighting PITP training, skills, and projects.
- Learn to use AI tools for content creation, freelancing, and productivity.

3. Session-wise Breakdown

Day	Topic	Description / Key Activities	Mode of Delivery
Week 1: Android Foundations			
1	Course Orientation & Android Ecosystem	Introduction to Android architecture, Kotlin vs Java, Android Studio overview. Setting	**Lecture & Demo**: Environment setup and creating first project.

		up emulators and physical device debugging.	
2	Kotlin Fundamentals for Android	Basic syntax, variables, control flow, functions, null safety. Android project structure exploration.	**Workshop**: Kotlin playground exercises and exploring Android project structure.
3	Your First Android App	Understanding Activities, Views, and Layouts. Creating a simple "Hello World" app with basic interactivity.	**Practical Lab**: Building and running app on emulator/device with click handlers.
4	**Mandatory**: Soft & Business Communication (Session 1/3)	***Core Soft Skills for Workplace Success: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture & Interactive Workshop**
5	**Project**: Personal Profile App	**Lab**: Create an app that displays personal information, skills, and contact details with interactive elements.	**Practical Lab & Mentoring**: Independent development with instructor support. A1 Released.
Week 2: User Interface Design			
6	XML Layouts & ViewGroups	LinearLayout, RelativeLayout, ConstraintLayout. Using the Layout Editor effectively.	**Workshop**: Creating different layouts for various screen sizes and orientations.
7	Basic UI Components	TextView, EditText, Button, ImageView, ScrollView. Styling with themes and styles.	**Practical Lab**: Building forms and interactive UI elements with proper styling.
8	Advanced UI Components	RecyclerView, CardView, Spinner, ProgressBar. Creating lists and grids efficiently.	**Lecture & Code-Along**: Implementing a RecyclerView with custom adapter. A2 Released.
9	**Mandatory**: Soft & Business Communication (Session 2/3)	***Business Communication Basics: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Writing**
10	**Project**: Recipe Display App	**Lab**: Create an app with a list of recipes (RecyclerView) that shows details when clicked.	**Practical Lab**: Comprehensive UI implementation. Q1 (Android Basics & UI) via LMS.
Week 3: Navigation & User Interaction			
11	Activity Lifecycle & Intents	Understanding lifecycle methods, explicit and implicit intents, passing data between activities.	**Workshop**: Managing activity states and implementing screen navigation.
12	Fragments & Navigation Component	Creating fragments, fragment lifecycle, using Navigation Component for modern navigation.	**Practical Lab**: Implementing a bottom navigation bar with multiple fragments.
13	User Input Handling	Click listeners, touch events, gestures, input validation, and dialogs.	**Practical Lab**: Creating interactive interfaces with various input methods.
14	**Mandatory**: Soft & Business	***Presentation Skills & Public Speaking: For detailed***	**Lecture, Interactive Workshop & Speaking**

	Communication (Session 3/3)	***information, refer to the Soft & Business Communication course manual.***	
15	**Project**: Multi-Screen Quiz App	**Lab**: Build a quiz app with multiple questions, navigation between screens, and score calculation.	**Practical Lab**: Guided project work. A3 Released.
Week 4: Data Storage & Management			
16	SharedPreferences & File Storage	Storing simple data with SharedPreferences, reading/writing to internal and external storage.	**Workshop**: Implementing app settings and caching with SharedPreferences.
17	SQLite Database Fundamentals	Understanding SQLite, creating databases, CRUD operations with SQLiteOpenHelper.	**Practical Lab**: Building a simple database-backed application.
18	Room Persistence Library	Entities, DAOs, Database class. Modern database access with Room.	**Demo & Practical Lab**: Migrating SQLite implementation to Room.
19	**Mandatory**: Intro to Freelancing Platforms	**Freelancing for Mobile Developers**: Showcasing apps on GitHub, creating developer portfolios, finding client work.	Lecture & Case Study. (M - 3hr session)
20	**Project**: Notes App with Room	**Lab**: Create a fully functional notes app with create, read, update, delete operations using Room.	**Practical Lab**: Complete data persistence implementation. Q2 (Navigation & Data Storage) via LMS.
Week 5: Networking & APIs			
21	Networking Fundamentals	HTTP methods, REST API concepts, permissions, and networking on Android.	**Lecture**: Understanding networking concepts and Android network security configuration.
22	Retrofit for API Calls	Setting up Retrofit, defining interfaces, making GET/POST requests.	**Workshop**: Configuring Retrofit and making simple API calls.
23	JSON Parsing & Data Handling	Moshi/Gson for JSON parsing, handling responses, error handling.	**Practical Lab**: Parsing complex JSON responses and displaying data. A4 Released.
24	RecyclerView with Network Data	Displaying API data in RecyclerView, loading states, error states.	**Practical Lab**: Creating a modern API-driven list interface.
25	**Project**: News App with API	**Lab**: Build a news app that fetches data from a news API and displays articles in a RecyclerView.	**Practical Lab**: Comprehensive networking implementation. Q3 (Networking & APIs) via LMS.
Week 6: Advanced Android Features			
26	Background Tasks with Coroutines	Introduction to Kotlin coroutines for background processing, replacing AsyncTask.	**Workshop**: Implementing coroutines for network calls and database operations.

27	Notifications & AlarmManager	Creating and managing notifications, scheduling tasks with AlarmManager.	**Practical Lab**: Building reminder functionality with notifications.
28	Location Services	Getting user location, permissions handling, using FusedLocationProviderClient.	**Workshop**: Implementing location-based features in an app.
29	**Mandatory**: LinkedIn Profile Creation	**The Mobile Developer Profile**: Showcasing Android projects, listing technical skills, contributing to open source.	Practical Workshop. (M - 3hr session)
30	**Project**: Location-Based Reminder App	**Lab**: Create an app that sets location-based reminders using geofencing and notifications.	**Practical Lab**: A5 Released.
Week 7: App Deployment & Final Project Kick-off			
31	Testing & Debugging	Unit tests with JUnit, UI tests with Espresso, debugging techniques.	**Workshop**: Writing and running tests for Android applications.
32	Performance Optimization	Memory management, reducing battery usage, optimizing layouts and images.	**Lecture & Demo**: Using Android Profiler to identify performance issues.
33	Preparing for Play Store	Generating signed APK/bundle, creating store listing, privacy policy, and deployment checklist.	**Workshop**: Going through the complete Play Store preparation process.
34	Final Project Kick-off & Ideation	**Students choose final project**: social app, e-commerce app, utility app, or game.	**Presentation & Workshop**: Project pitches and technical planning. Final Project Assigned.
35	Project Work Session #1	**Architecture & Design**: Planning app structure, choosing libraries, designing database schema.	**Mentoring & Practical Lab**: Independent/group work with instructor support. Q4 (Advanced Features & Deployment) via LMS.
Week 8: Final Project Completion & Review			
36	Project Work Session #2	**Core Implementation**: Developing main features and functionality.	**Mentoring & Practical Lab**:
37	Project Work Session #3	**Integration & Testing**: Connecting components, writing tests, debugging issues.	**Mentoring & Practical Lab**:
38	Project Work Session #4	**Polish & Optimization**: Final touches, performance optimization, UI refinements.	**Mentoring & Practical Lab**:
39	Project Demo & Presentation Day	Students present their final apps, demonstrating functionality and explaining technical implementation.	**Evaluation & Presentation**: Live demo and code walkthrough. Final Project Submission Due.
40	Course Wrap-up, Certification, & Next Steps	Next steps in Android development (Jetpack Compose, Architecture Components), career paths, Q&A.	**Lecture & Open Forum**:

4. Recommended Tools & Software

- **IDE**: Android Studio (latest version)
- **Language**: Kotlin
- **Build Tool**: Gradle
- **Libraries**: Android Jetpack (Room, Navigation, LiveData), Retrofit, Coroutines
- **Version Control**: Git, GitHub
- **API Testing**: Postman
- **Database Viewer**: Stetho or Database Inspector

5. Assessment Strategy

- **Assignments (5 x 5 = 25 Marks)**: Practical app development projects.
    - **A1 (Week 1)**: Personal Profile App
    - **A2 (Week 2)**: Recipe Display App
    - **A3 (Week 3)**: Multi-Screen Quiz App
    - **A4 (Week 5)**: News App with API Integration
    - **A5 (Week 6)**: Location-Based Reminder App
- **Quizzes (5 x 5 = 25 Marks)**: MCQs on Android concepts, Kotlin syntax, and development practices.
    - **Q1 (Week 2)**: Android Basics & UI
    - **Q2 (Week 4)**: Navigation & Data Storage
    - **Q3 (Week 5)**: Networking & APIs
    - **Q4 (Week 7)**: Advanced Features & Deployment
    - **Q5 (Week 8)**: All topics included.
- **Final Project (50 Marks)**: A complete, functional Android application incorporating multiple concepts learned.
    - **Timeline**: Assigned in Week 7, due end of Week 8.
    - **Evaluation Criteria**:
        - **Functionality & Features (20 pts)**: App works as intended with all core features implemented.
        - **Code Quality & Architecture (15 pts)**: Clean code, proper separation of concerns, use of appropriate patterns.
        - **UI/UX Design (10 pts)**: Responsive, intuitive, and visually appealing user interface.
        - **Technical Complexity (5 pts)**: Incorporation of multiple advanced concepts (database, networking, etc.).

6. Instructor Guidelines

- **Delivery**: Hands-on coding focused. Ratio: 30% lecture/demo, 70% practical coding labs and project work.
- **Evaluation**: Focus on working code, proper implementation of concepts, and code quality. Provide specific feedback on improvements.
- **Classroom Management**: Encourage pair programming, code reviews, and collaborative problem-solving. Ensure all students have functioning development environments.
- **LMS Monitoring**: Use the LMS for GitHub repository submissions, quiz administration, and tracking project progress.
- **Device & Software Readiness:** All required devices and software must be set up by *Week 1, Day 2*. Offline installers should be provided where internet access is limited.

- **Accessibility:** Instructors should provide printed slides when possible, use larger fonts in IDEs, and ensure that video resources include captions or transcripts.

7. Certification Requirements

- Minimum 90% attendance.
- Minimum 50% total score (aggregate of assignments, quizzes, and final project).
- All code submissions must be made through GitHub repositories linked via the PITP LMS Portal.

8. Learning Resources

- **Primary**: Instructor-provided code samples, project specifications, and Android documentation references.
- **Recommended Readings**: Android Developer Documentation, "Android Programming: The Big Nerd Ranch Guide".
- **Online**: Android Developers YouTube channel, Stack Overflow, GitHub open-source projects.

9. Policy Notes

- All assignments and projects must be submitted on time. Late submissions may affect certification eligibility.
- Confidential or sensitive data must not be uploaded to public repositories. Use anonymized or dummy datasets when sharing work publicly.
- Respectful communication and a collaborative attitude are expected at all times—whether in class, labs, or online forums.
- Plagiarism, copying, or misrepresentation of work is strictly prohibited.
- Students are allowed (and encouraged) to use AI tools for learning and productivity, but must cite their use clearly and not rely on them for full project submissions.
- Students are required to follow the disciplinary rules and guidelines of the university; violations may lead to formal action.
- Students may share course-related feedback or concerns through the designated channel; respectful reporting will be addressed promptly.

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Python Developer

1. Course Overview

This comprehensive Python Development course is designed to take students from absolute beginners to proficient Python programmers capable of building various applications. The curriculum covers fundamental programming concepts, advanced data structures, object-oriented programming, file handling, web development with Flask, and data analysis/visualization. Through hands-on projects and practical exercises, students will gain the skills needed for backend development, data analysis, automation scripting, and general software development roles using Python.

2. Learning Outcomes

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

- Write, debug, and execute Python programs using fundamental programming constructs.
- Implement functions, handle exceptions, and work with modules and packages effectively.
- Utilize advanced data structures (lists, tuples, dictionaries, sets) for efficient data manipulation.
- Design and implement object-oriented solutions using classes, inheritance, and polymorphism.
- Perform file operations and work with standard Python libraries for various tasks.
- Build basic web applications using the Flask framework.
- Perform data analysis and create visualizations using Pandas and Matplotlib/Seaborn.
- Develop a complete Python application as a final project.

Apart from technical knowledge, students will also be able to:

- Improve presentation, communication, and professional writing skills.
- Strengthen soft skills: emotional intelligence, teamwork, and assertive communication.
- Create and set up a freelancing profile on at least one platform (e.g., Fiverr, Upwork, Freelancer), with at least one gig.
- Build or optimize a professional LinkedIn profile, add People's Information Technology Programme – MUET under Education, and connect with professionals, and industry.
- Develop an online portfolio (GitHub, Kaggle, or personal site) to display projects, assignments, and freelance-ready work.
- Prepare a CV aligned with LinkedIn, highlighting PITP training, skills, and projects.
- Learn to use AI tools for content creation, freelancing, and productivity.

3. Session-wise Breakdown

Day	Topic	Description / Key Activities	Mode of Delivery
Week 1: Python Foundations			
1	Course Orientation & Python Ecosystem	Introduction to Python, its applications, setting up Python and VS Code/PyCharm, using Jupyter Notebooks.	**Lecture & Demo**: Environment setup and first Python program.

2	Python Syntax & Data Types	Variables, data types (int, float, str, bool), type conversion, basic operators, and input/output.	**Workshop**: Hands-on exercises with different data types and operations.
3	Control Structures & Basic Logic	Conditional statements (if, elif, else), loops (for, while), break and continue statements.	**Practical Lab**: Solving problems using control structures and logical operations.
4	**Mandatory**: Soft & Business Communication (Session 1/3)	***Core Soft Skills for Workplace Success: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture & Interactive Workshop**
5	**Project**: Basic Calculator & Number Games	**Lab**: Build a calculator and simple number guessing game using basic Python concepts.	**Practical Lab & Mentoring**: Independent coding with instructor support. A1 Released.
Week 2: Functions & Modules			
6	Functions & Scope	Defining functions, parameters, return values, variable scope (local vs global).	**Workshop**: Creating reusable functions for common tasks.
7	Modules & Packages	Importing modules, creating custom modules, understanding Python package structure.	**Practical Lab**: Building a multi-module application.
8	Error Handling & Exceptions	Try-except blocks, handling specific exceptions, raising exceptions, finally clause.	**Lecture & Code-Along**: Writing robust code with proper error handling. A2 Released.
9	**Mandatory**: Soft & Business Communication (Session 2/3)	***Business Communication Basics: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Writing**
10	**Project**: File Processor with Error Handling	**Lab**: Create a program that processes files with comprehensive error handling.	**Practical Lab**: Comprehensive function and error handling implementation. Q1 (Python Fundamentals) via LMS.
Week 3: Data Structures			
11	Lists & Tuples	List operations, slicing, list comprehensions, tuple packing/unpacking, immutable vs mutable.	**Workshop**: Advanced list manipulations and tuple operations.
12	Dictionaries & Sets	Key-value pairs, dictionary methods, set operations, use cases for each data structure.	**Practical Lab**: Solving problems using dictionaries and sets.
13	String Manipulation & Formatting	String methods, formatting (f-strings, format()), regular expressions introduction.	**Practical Lab**: Text processing and manipulation exercises.
14	**Mandatory**: Soft & Business Communication (Session 3/3)	***Presentation Skills & Public Speaking: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Speaking**

15	**Project**: Data Analysis Toolkit	**Lab**: Create a set of functions for basic data analysis using various data structures.	**Practical Lab**: Guided project work. A3 Released.
Week 4: Object-Oriented Programming			
16	Classes & Objects	Defining classes, creating objects, understanding self, attributes and methods.	**Workshop**: Modeling real-world entities as classes.
17	Methods & Constructors	Instance methods, class methods, static methods, init method, property decorators.	**Practical Lab**: Implementing different types of methods and constructors.
18	Inheritance & Polymorphism	Single and multiple inheritance, method overriding, super() function, polymorphism in Python.	**Workshop**: Building class hierarchies and demonstrating polymorphism.
19	**Mandatory**: Intro to Freelancing Platforms	**Freelancing for Python Developers**: Showcasing projects, finding client work, managing Python projects.	Lecture & Case Study. (M - 3hr session)
20	**Project**: Library Management System (OOP)	**Lab**: Build a library system using OOP principles with classes for Book, Member, Library.	**Practical Lab**: Complete OOP implementation. Q2 (Functions & OOP) via LMS.
Week 5: File I/O & Advanced Libraries			
21	File Input/Output	Reading/writing text files, working with CSV files, context managers (with statement).	**Workshop**: Processing different file formats and handling file operations.
22	Working with JSON & CSV	json module, csv module, serialization/deserialization, working with data files.	**Practical Lab**: Creating data processing scripts for JSON and CSV files.
23	**Advanced Libraries**: Requests	Making HTTP requests, working with APIs, handling responses.	**Practical Lab**: Building a simple API client. A4 Released.
24	**Advanced Libraries**: DateTime	Working with dates and times, timezones, timedelta, formatting datetime objects.	**Workshop**: Building applications that handle date and time calculations.
25	**Project**: Weather CLI Application	**Lab**: Create a command-line weather app that fetches data from an API and saves to file.	**Practical Lab**: Integrating multiple concepts. Q3 (File I/O & Libraries) via LMS.
Week 6: Web Development with Flask			
26	Introduction to Flask	Flask framework setup, basic routing, templating with Jinja2.	**Lecture & Demo**: Creating first Flask application.
27	Handling Requests & Forms	GET vs POST requests, form handling, request object, form validation.	**Workshop**: Building interactive web forms with Flask.
28	Database Integration with Flask-SQLAlchemy	Setting up databases, ORM concepts, basic CRUD operations.	**Practical Lab**: Creating a database-backed web application.
29	**Mandatory**: LinkedIn Profile Creation	**The Python Developer Profile**: Showcasing projects, technical skills, open source contributions.	Practical Workshop. (M - 3hr session)

30	**Project**: Todo Web Application	**Lab**: Build a complete todo list application with Flask including CRUD operations.	**Practical Lab**: A5 Released.
Week 7: Data Analysis & Visualization			
31	Introduction to Pandas	DataFrames and Series, reading data from files, basic data manipulation.	**Workshop**: Data cleaning and transformation with Pandas.
32	Data Analysis with Pandas	Grouping, aggregation, filtering, handling missing data, descriptive statistics.	**Practical Lab**: Performing data analysis on real-world datasets.
33	Data Visualization	Matplotlib fundamentals, creating plots, customizing visualizations.	**Workshop**: Creating various types of charts and graphs.
34	Final Project Kick-off & Ideation	**Students choose final project**: web app, data analysis tool, automation script, or API service.	**Presentation & Workshop**: Project proposals and technical planning. Final Project Assigned.
35	Project Work Session #1	**Design & Architecture**: Planning project structure, choosing libraries, designing data flow.	**Mentoring & Practical Lab**: Independent/group work with instructor support. Q4 (Flask & Data Analysis) via LMS.
Week 8: Final Project Completion & Review			
36	Project Work Session #2	**Core Implementation**: Developing main functionality and features.	**Mentoring & Practical Lab**:
37	Project Work Session #3	**Testing & Debugging**: Writing tests, debugging issues, optimizing code.	**Mentoring & Practical Lab**:
38	Project Work Session #4	**Documentation & Polish**: Writing documentation, adding comments, final touches.	**Mentoring & Practical Lab**:
39	Project Demo & Presentation Day	Students present their final projects, demonstrating functionality and explaining implementation.	**Evaluation & Presentation**: Live demo and code walkthrough. Final Project Submission Due.
40	Course Wrap-up, Certification, & Next Steps	Advanced Python topics, career paths, continuing education resources, Q&A.	**Lecture & Open Forum**:

4. Recommended Tools & Software

- **Python Version**: Python 3.8+
- **IDE**: VS Code with Python extension or PyCharm Community Edition
- **Development Tools**: Jupyter Notebook, Git
- **Web Framework**: Flask
- **Data Analysis**: Pandas, NumPy
- **Data Visualization**: Matplotlib, Seaborn
- **HTTP Requests**: Requests library
- **Database**: SQLite (for learning), PostgreSQL/MySQL (for production)

5. Assessment Strategy

- **Assignments (5 x 5 = 25 Marks)**: Practical coding exercises and mini-projects.
    - **A1 (Week 1)**: Basic Calculator & Number Games
    - **A2 (Week 2)**: File Processor with Error Handling
    - **A3 (Week 3)**: Data Analysis Toolkit
    - **A4 (Week 5)**: Weather CLI Application
    - **A5 (Week 6)**: Todo Web Application
- **Quizzes (5 x 5 = 25 Marks)**: MCQs on Python concepts, syntax, and best practices.
    - **Q1 (Week 2)**: Python Fundamentals
    - **Q2 (Week 4)**: Functions & OOP
    - **Q3 (Week 5)**: File I/O & Libraries
    - **Q4 (Week 7)**: Flask & Data Analysis
    - **Q5 (Week 8)**: All topics included.
- **Final Project (50 Marks)**: A complete Python application demonstrating multiple concepts learned.
    - **Timeline**: Assigned in Week 7, due end of Week 8.
    - **Evaluation Criteria**:
        - **Functionality & Completeness (20 pts)**: Application works as specified with all features implemented.
        - **Code Quality & Design (15 pts)**: Clean code, proper structure, adherence to Python conventions.
        - **Complexity & Technical Skills (10 pts)**: Incorporation of multiple concepts (OOP, error handling, etc.).
        - **Documentation & Presentation (5 pts)**: Clear documentation and effective demonstration.

6. Instructor Guidelines

- **Delivery**: Balance between theory and hands-on coding. Ratio: 40% lecture/concept explanation, 60% coding labs and workshops.
- **Evaluation**: Focus on working code, proper implementation of concepts, and Python best practices (PEP 8).
- **Classroom Management**: Encourage pair programming, code reviews, and collaborative problem-solving.
- **LMS Monitoring**: Use the LMS for code submissions, quiz administration, and tracking project progress.
- **Device & Software Readiness:** All required devices and software must be set up by *Week 1, Day 2*. Offline installers should be provided where internet access is limited.
- **Accessibility:** Instructors should provide printed slides when possible, use larger fonts in IDEs, and ensure that video resources include captions or transcripts.

7. Certification Requirements

- Minimum 90% attendance.
- Minimum 50% total score (aggregate of assignments, quizzes, and final project).
- All code submissions must be made through the official PITP LMS Portal or linked GitHub repositories.

8. Learning Resources

- **Primary**: Instructor-provided code examples, exercises, and project specifications.
- **Recommended Readings**: "Python Crash Course" by Eric Matthes, official Python documentation.
- **Online**: Real Python tutorials, Python.org documentation, Stack Overflow, GitHub repositories.

9. Policy Notes

- All assignments and projects must be submitted on time. Late submissions may affect certification eligibility.
- Confidential or sensitive data must not be uploaded to public repositories. Use anonymized or dummy datasets when sharing work publicly.
- Respectful communication and a collaborative attitude are expected at all times—whether in class, labs, or online forums.
- Plagiarism, copying, or misrepresentation of work is strictly prohibited.
- Students are allowed (and encouraged) to use AI tools for learning and productivity, but must cite their use clearly and not rely on them for full project submissions.
- Students are required to follow the disciplinary rules and guidelines of the university; violations may lead to formal action.
- Students may share course-related feedback or concerns through the designated channel; respectful reporting will be addressed promptly.

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Social Media Management Professional

1. Course Overview

This comprehensive Social Media Management course equips students with the strategic and practical skills needed to build, grow, and manage powerful brand presences across major social media platforms. The curriculum covers content strategy, community management, advertising, analytics, and emerging trends. Students will learn to create engaging content, run effective paid campaigns, analyze performance data, and develop full social media strategies. Through hands-on projects and a capstone campaign, students will be prepared for roles as Social Media Managers, Content Creators, and Digital Marketing Specialists.

2. Learning Outcomes

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

- Develop a comprehensive social media strategy aligned with business goals.
- Create and curate engaging content (text, image, video) optimized for each platform.
- Manage and grow an online community, effectively engaging with followers and customers.
- Plan, execute, and optimize paid social media advertising campaigns.
- Use analytics tools to track, measure, and report on social media performance (ROI).
- Create a content calendar and manage social media workflows efficiently.
- Understand and leverage emerging trends and platform-specific features.
- Develop a complete social media campaign from concept to execution and analysis.

Apart from technical knowledge, students will also be able to:

- Improve presentation, communication, and professional writing skills.
- Strengthen soft skills: emotional intelligence, teamwork, and assertive communication.
- Create and set up a freelancing profile on at least one platform (e.g., Fiverr, Upwork, Freelancer), with at least one gig.
- Build or optimize a professional LinkedIn profile, add People's Information Technology Programme – MUET under Education, and connect with professionals, and industry.
- Develop an online portfolio (Canva, Behance, Google Drive, or personal site) to display projects, assignments, and freelance-ready work.
- Prepare a CV aligned with LinkedIn, highlighting PITP training, skills, and projects.
- Learn to use AI tools for content creation, freelancing, and productivity.

3. Session-wise Breakdown

Day	Topic	Description / Key Activities	Mode of Delivery
Week 1: Social Media Strategy & Foundation			
1	Course Orientation & The Social Landscape	Introduction to major platforms (Facebook, Instagram, X (Twitter), LinkedIn, TikTok, YouTube), their demographics, and business uses.	**Lecture & Demo**: Overview of the social media ecosystem and career paths.
2	Developing a Social Media Strategy	Setting SMART goals, identifying target audience, conducting	**Workshop**: Creating a social media strategy document for a sample brand.

		competitor analysis, defining brand voice.	
3	**Platform Deep Dive**: Facebook & Instagram	Pages vs. Profiles, algorithm overview, key features for businesses (Shops, Reels).	**Practical Lab**: Setting up and optimizing a professional Facebook Page and Instagram Business profile.
4	**Mandatory**: Soft & Business Communication (Session 1/3)	***Core Soft Skills for Workplace Success: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture & Interactive Workshop**
5	**Project**: Brand Audit & Strategy	**Lab**: Perform a competitive audit for a local business and draft a one-page social media strategy.	**Practical Lab & Mentoring**: Independent analysis and strategy development. A1 Released.
Week 2: Content Creation & Curation			
6	Content Strategy & The Content Mix	The rule of thirds (Promote, Engage, Inspire), content pillars, ideation techniques.	**Workshop**: Brainstorming content ideas and defining content pillars for a brand.
7	Visual Content Creation with Canva	Designing posts, stories, and covers. Using templates, branding kits, and animation.	**Practical Lab**: Creating a set of visually cohesive posts for a brand using Canva.
8	Introduction to Video Content	Storytelling with Reels/Short Videos, basic editing with CapCut/InShot, best practices.	**Lecture & Demo**: Shooting and editing a simple, engaging video Reel. A2 Released.
9	**Mandatory**: Soft & Business Communication (Session 2/3)	***Business Communication Basics: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Writing**
10	**Project**: Content Calendar Development	**Lab**: Build a two-week content calendar for a brand, including captions and visual assets.	**Practical Lab**: Comprehensive content planning. Q1 (Strategy & Content) via LMS.
Week 3: Community Management & Engagement			
11	Community Management Fundamentals	Building relationships, responding to comments/DMs, handling negative feedback, crisis management.	**Workshop**: Developing response templates and community guidelines.
12	Growth Strategies & Hashtag Research	Organic growth tactics, hashtag strategy, engagement pods, collaborations.	**Practical Lab**: Conducting hashtag research and planning a growth initiative.
13	**Platform Deep Dive**: Twitter & LinkedIn	Twitter chats, LinkedIn articles, B2B networking, thought leadership.	**Practical Lab**: Crafting engaging posts and threads for Twitter and LinkedIn.
14	**Mandatory**: Soft & Business Communication (Session 3/3)	***Presentation Skills & Public Speaking: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Speaking**

15	**Project**: Engagement Campaign	**Lab**: Design a one-week campaign (e.g., a giveaway or Q&A) to boost engagement on a platform.	**Practical Lab**: Guided project work. A3 Released.
Week 4: Social Media Advertising			
16	Facebook & Instagram Ads Manager	Campaign structure (Campaign, Ad Set, Ad), objectives (Awareness, Consideration, Conversion).	**Workshop**: Tour of Ads Manager interface and setting up a mock campaign.
17	Targeting & Audience Building	Core, Custom, and Lookalike Audiences. Defining demographics, interests, and behaviors.	**Practical Lab**: Building sophisticated target audiences for different goals.
18	Ad Creative & Budgeting	Designing effective ad visuals and copy. Setting budgets, scheduling, and bidding strategies.	**Workshop**: Creating a full ad set with multiple creatives and copy variations.
19	**Mandatory**: Intro to Freelancing Platforms	**Freelancing in SMM**: Offering social media management packages, content creation services on Fiverr/Upwork.	Lecture & Case Study. (M - 3hr session)
20	**Project**: Ad Campaign Proposal	**Lab**: Create a complete ad campaign proposal for a brand, including target audience, creatives, and budget.	**Practical Lab**: Strategic advertising planning. Q2 (Community & Ads) via LMS.
Week 5: Analytics, Reporting & Platform Trends			
21	**Analytics**: Facebook Insights & Instagram Analytics	Key metrics (Reach, Engagement, Clicks), interpreting data, identifying trends.	**Workshop**: Analyzing a provided analytics report and extracting insights.
22	**Analytics**: Twitter Analytics & LinkedIn Analytics	Follower growth, engagement rate, top tweets, LinkedIn visitor analytics.	**Practical Lab**: Comparing performance across different platforms.
23	Reporting & Demonstrating ROI	Creating client-friendly reports, calculating ROI, presenting results effectively.	**Workshop**: Building a monthly performance report dashboard. A4 Released.
24	Emerging Platforms & Trends	Overview of TikTok, Pinterest, Snapchat for business. Leveraging new features (Audio, AR).	**Lecture & Discussion**: Evaluating new platforms for a brand's strategy.
25	**Project**: Performance Analysis Report	**Lab**: Analyze a dataset of social metrics, identify what's working, and provide recommendations.	**Practical Lab**: Data-driven decision making. Q3 (Advertising & Analytics) via LMS.
Week 6: Advanced Tools & Management			
26	Social Media Management Tools	Overview of tools like Hootsuite, Buffer, Sprout Social for scheduling and monitoring.	**Demo & Practical Lab**: Scheduling a week of content using a management tool.
27	Introduction to Influencer Marketing	Finding influencers, outreach strategies, campaign	**Workshop**: Drafting an influencer collaboration brief.

		management, measuring impact.	
28	Social Listening & Brand Monitoring	Using tools to track brand mentions, industry conversations, and sentiment.	**Practical Lab**: Setting up Google Alerts and using free listening tools.
29	**Mandatory**: LinkedIn Profile Creation	**The SMM Professional Profile**: Showcasing campaigns, results, and content skills. Building a network.	Practical Workshop. (M - 3hr session)
30	**Project**: Influencer Campaign Outline	**Lab**: Plan a micro-influencer campaign for a product launch, including outreach strategy.	**Practical Lab**: A5 Released.
Week 7: Strategy Integration & Final Project Kick-off			
31	Integrating Social with Overall Marketing	Connecting social efforts to email marketing, SEO, and website content.	**Lecture & Workshop**: Creating an integrated marketing plan.
32	Final Project Kick-off & Ideation	**Students choose a final project**: a complete social media launch for a new brand or a rebrand for an existing one.	**Presentation & Workshop**: Student pitches and strategy development. Final Project Assigned.
33	Project Work Session #1	**Strategy & Planning**: Defining goals, audience, content pillars, and key performance indicators (KPIs).	**Mentoring & Practical Lab**: Independent/group work with instructor support.
34	Project Work Session #2	**Content Creation**: Developing a full content calendar and creating all visual assets.	**Mentoring & Practical Lab**:
35	Project Work Session #3	**Advertising & Community Plan**: Drafting an ad strategy and community management guidelines.	**Mentoring & Practical Lab**: Q4 (Tools & Strategy) via LMS.
Week 8: Final Project Completion & Review			
36	Project Work Session #4	**Reporting Framework**: Creating the template for the final performance report.	**Mentoring & Practical Lab**:
37	Project Work Session #5	**Presentation Preparation**: Compiling all assets into a professional strategy deck.	**Mentoring & Practical Lab**:
38	Project Demo & Presentation Day	Students present their complete social media strategy and sample content.	**Evaluation & Presentation**: Live presentation of the strategy deck. Final Project Submission Due.
39	Course Wrap-up, Certification, & Next Steps	Building a portfolio, staying updated with trends, career paths (agency vs. in-house).	**Lecture & Open Forum**:
40	Portfolio Review Session	One-on-one feedback sessions on students' completed portfolios from the course.	**Evaluation & Feedback**:

4. Recommended Tools & Software

- **Design & Video**: Canva (Pro), CapCut, InShot
- **Scheduling & Management**: Hootsuite Free Plan, Buffer Free Plan
- **Analytics**: Native Platform Insights (Facebook, Instagram, Twitter, LinkedIn)
- **Advertising**: Facebook Ads Manager (Sandbox/Test Mode)
- **Listening**: Google Alerts, Mention.com (free tier)
- **Productivity**: Trello, Google Sheets/Excel for calendars

5. Assessment Strategy

- **Assignments (5 x 5 = 25 Marks)**: Practical strategy and content projects.
  - **A1 (Week 1)**: Brand Audit & Strategy
  - **A2 (Week 2)**: Content Calendar & Assets
  - **A3 (Week 3)**: Engagement Campaign Plan
  - **A4 (Week 5)**: Performance Report
  - **A5 (Week 6)**: Influencer Campaign Outline
- **Quizzes (5 x 5 = 25 Marks)**: MCQs on platform algorithms, best practices, and terminology.
  - **Q1 (Week 2)**: Strategy & Content
  - **Q2 (Week 4)**: Community & Advertising
  - **Q3 (Week 5)**: Advertising & Analytics
  - **Q4 (Week 7)**: Tools & Strategy
  - **Q5 (Week 8)**: All topics included.
- **Final Project (50 Marks)**: A complete social media strategy and content portfolio for a brand.
  - **Timeline**: Assigned in Week 7, due end of Week 8.
  - **Evaluation Criteria**:
    - **Strategy & Planning (15 pts)**: Depth of audience analysis, goal setting, and strategic thinking.
    - **Content Quality & Creativity (20 pts)**: Quality, originality, and platform-optimization of created content.
    - **Analytics & Measurement (10 pts)**: Appropriateness of KPIs and reporting plan.
    - **Presentation & Professionalism (5 pts)**: Clarity and polish of the final presentation deck.

6. Instructor Guidelines

- **Delivery**: Focus on creativity and strategic thinking. Ratio: 40% lecture/discussion, 60% workshop and lab time for content creation.
- **Evaluation**: Provide feedback on both the creative execution and the strategic rationale behind content choices.
- **Classroom Management**: Encourage peer feedback and create a collaborative environment for sharing ideas.
- **LMS Monitoring**: Use the LMS for collecting strategy documents, links to content (Canva, etc.), and quiz administration.
- **Device & Software Readiness:** All required devices and software must be set up by *Week 1, Day 2*. Offline installers should be provided where internet access is limited.
- **Accessibility:** Instructors should provide printed slides when possible, use larger fonts in IDEs, and ensure that video resources include captions or transcripts.

7. Certification Requirements

- Minimum 90% attendance.
- Minimum 50% total score (aggregate of assignments, quizzes, and final project).
- All submissions must be made through the official PITP LMS Portal.

8. Learning Resources

- **Primary**: Instructor-provated strategy templates, content briefs, and case studies.
- **Recommended Readings**: Bloggs from HubSpot, Social Media Examiner, Buffer.
- **Online**: Platform-specific business help centers (Meta Business Hub), YouTube tutorials.

9. Policy Notes

- Focus is on strategy and learning; using real brand accounts is not required but encouraged if possible.
- All assignments and projects must be submitted on time. Late submissions may affect certification eligibility.
- Confidential or sensitive data must not be uploaded to public repositories. Use anonymized or dummy datasets when sharing work publicly.
- Respectful communication and a collaborative attitude are expected at all times—whether in class, labs, or online forums.
- Plagiarism, copying, or misrepresentation of work is strictly prohibited.
- Students are allowed (and encouraged) to use AI tools for learning and productivity, but must cite their use clearly and not rely on them for full project submissions.
- Students are required to follow the disciplinary rules and guidelines of the university; violations may lead to formal action.
- Students may share course-related feedback or concerns through the designated channel; respectful reporting will be addressed promptly.

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Web Developer

1. Course Overview

This comprehensive Web Development course is designed to take students from absolute beginners to proficient full-stack developers. The curriculum covers the entire web development stack, including HTML5, CSS3, JavaScript (ES6+), React.js, Node.js, Express.js, and MongoDB. Students will learn to build responsive, interactive, and dynamic web applications with modern frameworks and tools. Through hands-on projects and a capstone final project, students will gain the skills needed for front-end, back-end, and full-stack development roles.

2. Learning Outcomes

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

- Build semantic, accessible HTML5 structures and stylish layouts with CSS3 and Flexbox/Grid.
- Create dynamic, interactive web pages with modern JavaScript (ES6+) and DOM manipulation.
- Develop responsive web applications that work seamlessly across various devices and screen sizes.
- Build single-page applications (SPAs) using React.js with hooks and component-based architecture.
- Develop RESTful APIs and server-side applications using Node.js and Express.js.
- Perform CRUD operations and manage data with MongoDB and Mongoose ODM.
- Implement user authentication and authorization with JWT.
- Deploy full-stack applications to cloud platforms like Heroku and Netlify.
- Use Git and GitHub for version control and collaborative development.

Apart from technical knowledge, students will also be able to:

- Improve presentation, communication, and professional writing skills.
- Strengthen soft skills: emotional intelligence, teamwork, and assertive communication.
- Create and set up a freelancing profile on at least one platform (e.g., Fiverr, Upwork, Freelancer), with at least one gig.
- Build or optimize a professional LinkedIn profile, add People's Information Technology Programme – MUET under Education, and connect with professionals, and industry.
- Develop an online portfolio (GitHub, Netlify or personal site) to display projects, assignments, and freelance-ready work.
- Prepare a CV aligned with LinkedIn, highlighting PITP training, skills, and projects.
- Learn to use AI tools for content creation, freelancing, and productivity.

3. Session-wise Breakdown

Day	Topic	Description / Key Activities	Mode of Delivery
Week 1: Web Foundations & HTML5			
1	Course Orientation & Web Fundamentals	How the web works, client-server model, front-end vs back-end, developer tools setup.	**Lecture & Demo**: Environment setup and first webpage.
2	HTML5 Semantic Structure	Document structure, semantic tags (header, nav, main, section,	**Workshop**: Building a semantic HTML structure for a blog.

		article, footer), forms, accessibility.	
3	Advanced HTML & Multimedia	HTML5 forms validation, audio/video tags, iframes, tables for data.	**Practical Lab**: Creating an accessible, multimedia-rich webpage.
4	**Mandatory**: Soft & Business Communication (Session 1/3)	***Core Soft Skills for Workplace Success: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture & Interactive Workshop**
5	**Project**: Personal Portfolio (HTML)	**Lab**: Build a multi-page personal portfolio website with semantic HTML and forms.	**Practical Lab & Mentoring**: Independent coding with instructor support. A1 Released.
Week 2: CSS3 & Responsive Design			
6	CSS Fundamentals	Selectors, box model, typography, colors, positioning (static, relative, absolute, fixed).	**Workshop**: Styling the portfolio from Week 1 with fundamental CSS.
7	**CSS Layouts**: Flexbox	Flex container and item properties, creating responsive navigation, card layouts.	**Practical Lab**: Implementing Flexbox for layout challenges.
8	**CSS Layouts**: Grid & Responsive Design	Grid template areas, responsive units (rem, em, %), media queries.	**Lecture & Code-Along**: Building a responsive photo gallery. A2 Released.
9	**Mandatory**: Soft & Business Communication (Session 2/3)	***Business Communication Basics: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Writing**
10	**Project**: Responsive Business Website	**Lab**: Convert the portfolio into a fully responsive business site using Flexbox/Grid.	**Practical Lab**: Comprehensive responsive implementation. Q1 (HTML & CSS) via LMS.
Week 3: JavaScript Fundamentals			
11	JavaScript Basics & DOM	Variables (let, const), data types, operators, DOM selection/manipulation (getElementById, querySelector).	**Workshop**: Making the business website interactive (e.g., toggle menu).
12	Control Flow & Functions	Conditionals, loops, functions, arrow functions, template literals.	**Practical Lab**: Building an interactive quiz or calculator.
13	Events & Async JavaScript	Event listeners (click, submit, input), setTimeout, setInterval, callback functions.	**Practical Lab**: Creating a dynamic image slider or countdown timer.
14	**Mandatory**: Soft & Business Communication (Session 3/3)	***Presentation Skills & Public Speaking: For detailed information, refer to the Soft & Business Communication course manual.***	**Lecture, Interactive Workshop & Speaking**

15	**Project**: Interactive Task Manager	**Lab**: Build a task manager with add, delete, and mark-complete functionality using pure JS.	**Practical Lab**: Guided project work. A3 Released.
Week 4: Modern JavaScript (ES6+) & APIs			
16	ES6+ Features	Destructuring, spread/rest operators, modules (import/export), map/filter/reduce.	**Workshop**: Refactoring previous projects with modern JS features.
17	Asynchronous JavaScript & APIs	Promises, async/await, fetching data from public APIs (e.g., JSONPlaceholder, Weather API).	**Practical Lab**: Fetching and displaying data from an API.
18	Working with JSON & Local Storage	JSON.parse/stringify, storing data in browser's local storage.	**Workshop**: Persisting task manager data using local storage.
19	**Mandatory**: Intro to Freelancing Platforms	**Freelancing for Web Developers**: Building a portfolio on GitHub, finding clients on Upwork/Fiverr for web projects.	Lecture & Case Study. (M - 3hr session)
20	**Project**: Weather App or News App	**Lab**: Build an app that fetches data from a public API and displays it dynamically.	**Practical Lab**: API integration project. Q2 (JavaScript & APIs) via LMS.
Week 5: React.js Fundamentals			
21	Introduction to React & JSX	React ecosystem, components, JSX syntax, props.	**Lecture & Demo**: Setting up a React app (Create React App or Vite).
22	State & Events in React	useState hook, handling events, conditional rendering.	**Workshop**: Building a dynamic React component (e.g., counter, toggle).
23	Lists & Forms in React	Rendering lists with map(), keys, controlled components, form handling.	**Practical Lab**: Building a React-based task manager. A4 Released.
24	useEffect & Data Fetching	useEffect hook, fetching data in React, dependency array.	**Practical Lab**: Fetching and displaying API data in a React app.
25	**Project**: React Portfolio	**Lab**: Rebuild the personal portfolio as a single-page application (SPA) using React.	**Practical Lab**: Comprehensive React implementation. Q3 (React Fundamentals) via LMS.
Week 6: Backend with Node.js, Express & MongoDB			
26	Introduction to Node.js & Express	Setting up Node/Express, creating a server, basic routing.	**Workshop**: Building a simple REST API with Express.
27	MongoDB & Mongoose ODM	Connecting to MongoDB, defining schemas and models, basic CRUD operations.	**Practical Lab**: Creating API endpoints for a simple data model (e.g., Blog Posts).
28	RESTful API Design	REST principles, structuring routes, middleware, error handling.	**Workshop**: Building a robust CRUD API.
29	**Mandatory**: LinkedIn Profile Creation	**The Web Developer Profile**: Showcasing projects,	Practical Workshop. (M - 3hr session)

		contributing to GitHub, networking.	
30	**Project**: RESTful Blog API	**Lab**: Build a complete REST API for a blog with endpoints for posts, comments, etc.	**Practical Lab**: A5 Released.
Week 7: Full-Stack Integration & Deployment			
31	Connecting React Frontend to Express Backend	Using fetch or Axios in React to consume the Express API, handling CORS.	**Workshop**: Connecting the React portfolio to the Blog API to display dynamic content.
32	User Authentication with JWT	Implementing register/login routes, JWT tokens, protecting routes.	**Practical Lab**: Adding authentication to the Blog API.
33	Deployment Strategies	Deploying backend to Heroku/Railway, frontend to Netlify/Vercel, environment variables.	**Demo & Practical Lab**: Deploying the full-stack blog application.
34	Final Project Kick-off & Ideation	**Students choose final project**: MERN stack app (e.g., e-commerce, social media, SaaS).	**Presentation & Workshop**: Project pitches and architecture planning. Final Project Assigned.
35	Project Work Session #1	**Setup & Backend**: Initializing project, designing database, building core API.	**Mentoring & Practical Lab**: Independent/group work with instructor support. Q4 (Backend & Full-Stack) via LMS.
Week 8: Final Project Completion & Review			
36	Project Work Session #2	**Frontend Development**: Building the React frontend, integrating with API.	**Mentoring & Practical Lab**:
37	Project Work Session #3	**Authentication & Features**: Implementing auth, adding advanced features, styling.	**Mentoring & Practical Lab**:
38	Project Work Session #4	**Testing, Debugging & Deployment**: Final testing, bug fixes, deploying the application.	**Mentoring & Practical Lab**:
39	Project Demo & Presentation Day	Students present their live, deployed full-stack applications.	**Evaluation & Presentation**: Live demo and code review. Final Project Submission Due.
40	Course Wrap-up, Certification, & Next Steps	Next steps (Next.js, TypeScript, DevOps), career paths, Q&A.	**Lecture & Open Forum**:

4. Recommended Tools & Software

- **Code Editor**: VS Code with essential extensions (ES7+, Prettier, Live Server)
- **Frontend**: React.js (with Vite or Create React App)
- **Backend**: Node.js, Express.js
- **Database**: MongoDB Atlas (Cloud)
- **Version Control**: Git, GitHub
- **API Testing**: Postman or Thunder Client (VS Code extension)

- **Deployment**: Netlify (Frontend), Heroku/Railway (Backend)

5. Assessment Strategy

- **Assignments (5 x 5 = 25 Marks)**: Practical development projects.
    - **A1 (Week 1)**: Semantic HTML Portfolio
    - **A2 (Week 2)**: Responsive CSS Website
    - **A3 (Week 3)**: Interactive JS Task Manager
    - **A4 (Week 5)**: React Portfolio SPA
    - **A5 (Week 6)**: RESTful Blog API
- **Quizzes (5 x 5 = 25 Marks)**: MCQs on web development concepts, syntax, and best practices.
    - **Q1 (Week 2)**: HTML & CSS
    - **Q2 (Week 4)**: JavaScript & APIs
    - **Q3 (Week 5)**: React Fundamentals
    - **Q4 (Week 7)**: Backend & Full-Stack
    - **Q5 (Week 8)**: All topics included.
- **Final Project (50 Marks)**: A complete, deployed full-stack MERN application.
    - **Timeline**: Assigned in Week 7, due end of Week 8.
    - **Evaluation Criteria**:
        - **Functionality & Features (20 pts)**: All core features work as intended.
        - **Code Quality & Architecture (15 pts)**: Clean code, proper component structure, efficient API design.
        - **UI/UX & Design (10 pts)**: Responsive, modern, and user-friendly interface.
        - **Deployment & Documentation (5 pts)**: Successful deployment and clear README documentation.

6. Instructor Guidelines

- **Delivery**: Highly practical and hands-on. Ratio: 30% lecture/demo, 70% coding labs and project work.
- **Evaluation**: Focus on working, deployed applications and modern development practices.
- **Classroom Management**: Foster a collaborative environment. Use breakout rooms for group projects and peer programming.
- **LMS Monitoring**: Use the LMS for GitHub repository links, deployed project URLs, and quiz administration.
- **Device & Software Readiness:** All required devices and software must be set up by *Week 1, Day 2*. Offline installers should be provided where internet access is limited.
- **Accessibility:** Instructors should provide printed slides when possible, use larger fonts in IDEs, and ensure that video resources include captions or transcripts.

7. Certification Requirements

- Minimum 90% attendance.
- Minimum 50% total score (aggregate of assignments, quizzes, and final project).
- All projects must be submitted via GitHub repositories and live deployment links on the PITP LMS.

8. Learning Resources

- **Primary**: Instructor-provided code snippets, project starters, and documentation links.
- **Recommended Readings**: MDN Web Docs, React Documentation, Express.js Guide.
- **Online**: FreeCodeCamp, Codecademy, YouTube tutorials (Web Dev Simplified, Traversy Media).

9. Policy Notes

- All assignments and projects must be submitted on time. Late submissions may affect certification eligibility.
- Confidential or sensitive data must not be uploaded to public repositories. Use anonymized or dummy datasets when sharing work publicly.
- Respectful communication and a collaborative attitude are expected at all times—whether in class, labs, or online forums.
- Plagiarism, copying, or misrepresentation of work is strictly prohibited.
- Students are allowed (and encouraged) to use AI tools for learning and productivity, but must cite their use clearly and not rely on them for full project submissions.
- Students are required to follow the disciplinary rules and guidelines of the university; violations may lead to formal action.
- Students may share course-related feedback or concerns through the designated channel; respectful reporting will be addressed promptly.

For Any Assistance:

- **Support Email**: pitp@admin.muet.edu.pk
- **WhatsApp**: +92 329 2065148
- **Website**: https://pitp.muet.edu.pk