

**Institute of Information and Communication Technology (IICT)  
Khulna University of Engineering & Technology (KUET)**

**Module Structure and Outline for  
Professional Diploma and Training Programs**

**Professional Diploma Outline:**

<b>Sl. No.</b>	<b>Professional Diploma</b>	<b>Module</b>	<b>Conduct Hours (Duration)</b>
1.	Diploma in Computer Applications (DCA)	DICT 100: Project	312 Hours (6 Months)
		DICT 101: Computer Basics	
		DICT 102: Office Application Packages	
		DICT 103: Computer Troubleshooting	
		DICT 201: Programming Fundamentals	
		DICT 301: Computer Networks	
		DICT 401: Internet and Web Technologies	
2.	Diploma in Software Engineering (DSE)	DICT 100: Project	312 Hours (6 Months)
		DICT 101: Computer Basics	
		DICT 201: Programming Fundamentals	
		DICT 202: Object Oriented Programming	
		DICT 301: Computer Networks	
		DICT 401: Internet and Web Technologies	
		DICT 501: Database System	
DICT 502: Information System Analysis and Design			
3.	Diploma in Computer Networks and System Administration (DNSA)	DICT 100: Project	312 Hours (6 Months)
		DICT 101: Computer Basics	
		DICT 201: Programming Fundamentals	
		DICT 301: Computer Networks	
		DICT 302: IP Addressing and Routing Protocols	
		DICT 303: Linux Installation and Server Management	
		DICT 304: Network Devices and Configuration	
DICT 305: Network Testing and Troubleshooting			
4.	Diploma in Internet Programming and Web Development (DIPW)	DICT 100: Project	312 Hours (6 Months)
		DICT 301: Computer Networks	
		DICT 401: Internet and Web Technologies	
		DICT 402: Server Side Scripting	
		DICT 403: Client Side Scripting	
		DICT 501: Database System	
		DICT 502: Information System Analysis and Design	
DICT 701: Open Source Tool(Joomla) OR DICT 702: Open Source Tool( Drupal) OR DICT 703: Open Source Tool ( Wordpress )			
5.	Diploma in Mobile Applications Development (DMAD)	DICT 100: Project	312 Hours (6 Months)
		DICT 202: Object Oriented Programming.	
		DICT 301: Computer Networks	
		DICT 401: Internet and Web Technologies	
		DICT 404: Mobile Programming	
		DICT 501: Database System	
DICT 502: Information System Analysis and Design			

6.	Diploma in Multimedia and Graphics Design (DMGD)	DICT 100: Project	312 Hours (6 Months)
		DICT 101: Computer Basics	
		DICT 201: Programming Fundamentals	
		DICT 502: Information System Analysis and Design	
		DICT 601: Adobe Photoshop CS6	
		DICT 602: Adobe Illustrator	
		DICT 603: Adobe Flash Professional	
		DICT 604: Audio and Video Processing	
7.	Diploma in Communication Technology (DCT)	DICT 100: Project	312 Hours (6 Months)
		DICT 301: Computer Networks	
		DICT 801: Fundamentals of Analog and Digital Communications	
		DICT 802: Fundamentals of Mobile Communications	
		DICT 803: Basic Telecommunication Systems	
		DICT 804: Fundamentals of Optical Fiber Communications	
		DICT 805: Basic Satellite Communications	

### Training Program Outline:

Sl. No.	Training Program	Module	Conduct Hours (Duration)
1.	Certificate on Web Based Application Development on Dot Net platform	DICT 203: Dot Net Fundamentals	240 Hours (6 Months)
		DICT 204: Dot Net Programming and Web Technology	
		DICT 205: Project Development in Dot Net Platform	
2.	Certificate on Database Design and Administration	DICT 503: Oracle Database 10g (SQL)	240 Hours (6 Months)
		DICT 504: Oracle Database 10g (Admin 1)	
		DICT 505: Oracle Database 10g (Admin 2)	

**N. B.: Training programs may also be offered with one or few individual module(s).**

### Details Outline of the Modules:

#### DICT 100: Project for Professional Diploma

A student must complete a Project under the guidance of a supervisor.

#### DICT 101: Computer Basics

Introduction of computer, types, history and generation of computer; Basic organization and functional units of computer, Input and output devices; Binary, decimal, octal and hexadecimal numbers, conversion between different number systems, BCD and ASCII codes; Integer and floating number representation; Different types of gates and their truth tables; Boolean algebra; Types of software and languages; Language translator, interpreter, compiler; Operating Systems: introduction, function and types of operating system; Goals of office automation.

#### DICT 102: Office Application Packages

Windows Desktop and its various components, Word Processing (Microsoft Word), Spreadsheet Analysis (Microsoft Excel), Presentation Software (Microsoft PowerPoint), Database software (Microsoft Access), Windows Desktop and its various components.

**DICT 103: Computer Troubleshooting**

PC Overview ,Tools and ESD , Motherboards : Architecture and Form Factor, Tour of Parts and Components, Assembly/Disassembly, Diagnose/Repair, BIOS , Buses and Expansion Slots, Resources and Ports , Peripherals and Input , Audio, Video, Cameras , Storage, Memory , Power Supply, Printers , Laptops ,OS Installation, Interface and Compatibility, Windows Files , Users, Groups, File Resources , IP Addressing , Networking and Information Sharing, Windows Tools and Diagnostics, Windows Troubleshooting, Security, Windows 7 Update.

**DICT 201: Programming Fundamentals**

Programming concepts; Program development stages; Flow charts; Structured programming language: identifiers and keywords, data types, variable declaration, expression, statement, operators; Scope rules and storage classes; Library functions: data input and output; Control statements; Function; Recursion; Array; Pointer; User defined data types: structures, unions, enumerations; Data files; Preprocessors; Command line arguments; Graphics.

**DICT 202: Object Oriented Programming**

Concept of Object Oriented Programming (OOP); Features of OOP; Advantages of OOP over structured programming; Classes and Objects; Constructors, destructors and copy constructors; Array of objects, object references; Function Overloading; Operator Overloading and type conversion of objects. Inheritance; single and multiple inheritance; Difference between Composition and Inheritance; Polymorphism: abstract classes, virtual functions overriding, Exception Handling; Template functions and classes; Namespace; Standard Template Library; Multi-threaded programming.

**DICT 203: Dot Net Fundamentals**

Mapping Object Oriented Concept, Introduction to Framework, Introduction to Layer architecture, Documentation Comments, ADO.Net, Crystal report in C# application, LINQ to object, LINQ to SQL, Unit testing & Test Driven Development.

**DICT 204: Dot Net Programming and Web Technology**

Familiarization with ASP.Net, Web Forms Architecture, ASP.NET and HTTP, Application Management, ASP.Net controls, Master Page, Nested Master Page, Web.Config, Global.asax, and Caching in Asp.Net, CSS, and Ajax.

**DICT 205: Project Development in Dot Net Platform**

A complete real life enterprise application using C#.net (Desktop), ASP.Net (Web) and SQL Server with Securing Windows Forms and Web Applications (From User requirements, analysis, UML and Database design, Coding and Testing).

**DICT 301: Computer Networks**

Network concept, Network Accessories, Network software, Network Protocol, Network topologies, Types of Network, OSI architecture, routing and IP address, communication by networking and its application, DLL: Error detection and correction, the channel allocation problem, Multiple Access Protocols, Ethernet, Wireless LANs, Broadband Wireless, Blue tooth etc., Routing Algorithms, Congestion Control Algorithms, Quality of service, Internetworking, Network Security, Web security.

### **DICT 302: IP Addressing and Routing Protocols**

TCP/IP Services and Application, Introduction to Routing and Packet Forwarding, Static Routing, Introduction to Dynamic Routing Protocols, Distance Vector Routing Protocols, RIP version 1, VLSM and CIDR, RIPv2, The Routing Table: A Closer Look, EIGRP, Link-State Routing Protocols, OSPF, Routing in VLAN.

### **DICT 303: Linux Installation and Server Management**

Introduction and Installation of Linux, Hardware requirements for installation, Partitioning of hard Disk prior to installation, Classes of Installation - Simple Installation, Custom Installation, Structure of Linux File system, File System Navigation, Changing Directories, Listing Directory Contents, Examining File Contents, Examining the Contents of a File, Directory and File access permissions, Commands and Utilities like Find, SED, AWK, GREP/EGREP, Domain name systems (DNS) - Installation & Configuration, Samba Configuration, Sharing with NFS and NIS, Apache Web Server & its configuration, Dynamic Host Configuration Protocol FTP & Telnet-Installation & Configuration, Squid Proxy Server and its configuration, Handling Electronic Mail, Setting Up An Internet Site, Working With The Kernel, Backup And Recovery Procedures, Scheduling Jobs, Shell Scripting.

### **DICT 304: Network Devices and Configuration**

Introduction to Network Devices, Implementing switched network, network segmentation, switch configuration tasks, Implementing security for a switch, resolving common switched network media issues, configuration issues, VLAN, Implementing routed network, basic routing concepts, Static Routing and Default routing, operation of Cisco routers, Managing Internetwork devices, troubleshooting routers, Configuring NAT/PAT on routers, routine preventative measures.

### **DICT 305: Network Testing and Troubleshooting**

Introduction to Network Testing, IOS basics, Configuration Files, Applying a Basic Configuration Using Cisco IOS, Devices Need Names, Limiting Device Access – Configuring Passwords and Using Banners, Managing Configuration Files, Configuring Interfaces, Verifying Connectivity, Test the Stack, Testing the Interface Assignment, Testing Local Network, Testing Gateway and Remote Connectivity, Tracing and Interpreting Trace Results, Monitoring and Documenting of Networks, Basic Network Baselines, Capturing and Interpreting Trace Information, Learning About the Nodes on the Network, Lab Activity, Basic Cisco Device Configuration, Managing Device Configuration, Configure Host Computers for IP Networking, Network Testing, Network Documentation with Utility Commands, Case Study .

### **DICT 401: Internet and Web Technologies**

Introduction to Internet services, Impacts of internet, Internet structure protocols and access overview, Internet protocol model overview, Internet addresses, Internet protocols, Transport layer, Upper layer protocols, Internet access & applications; Router technology: introduction, network fundamentals, internet routing & new developments, router market, Web server, from internet, intranet to extranet; WWW Works: Hyper Text Transfer Protocol (HTTP); Web Servers; Web access; Related Web capabilities; WWW proxies; Future of the web; WWW technology – virtual reality and the VRML, intranet and firewalls, Introduction to HTML, XHTML, HTML5 and CSS.

**DICT 402: Server Side Scripting**

PHP Overview, Exploring Data Types, Control Structures, Looping, User-Defined Functions, Debugging, Building Web Pages, Using and Setup Dreamweaver for PHP development, Environment, Using and Setup Dreamweaver for PHP development, Code Igniter: Getting Started With the Framework and Database selecting Methods, Sending Emails, Newsletter Signup, CRUD, Login, Pagination, AJAX, Working with File and Directory, Shopping Cart, Security, Framework Extending, Profiling, Bookmaking and Hooks, Tabular Data, Searching without query string, Discussion and distribution Project for Submission, Final Examination and Project Submission.

**DICT 403: Client Side Scripting**

Core JavaScript Syntax, Types and Objects, DOM, Events and Event Listeners, Debugging JavaScript, JavaScript Libraries, JavaScript and HTML5, Advanced JavaScript Features, Understanding JavaScript Exception Handling, Object-Oriented JavaScript, Practical JavaScript Examples, Tools and Tips for Developing and Debugging, Overview of Jquery, Jquery: Retrieving Page Content, Manipulating Page Content, Jquery: Working with Events, Jquery Animations and Effects, Jquery: Using the Jquery UI Plug-In, AJAX: Understanding the DOM and XML Formats, XML HTTP Requests, Previewing Links with AJAX, AJAX: Creating Dynamic Forms, Creating Dynamic Maps, Understanding AJAX Frameworks, YUI Animation Widget, Jquery Projects.

**DICT 404: Mobile Programming**

Installing the SDK tools on a Windows machine, Creating an Android Virtual Device (emulator), Installing Eclipse on a Windows machine, Installing the Android Development Tools, Android App Fundamentals, The User Interface and Controls, Graphics and Styling, Supporting Multiple Screens, Animation and Graphics, Menus and Dialogs, Notifications and Toast, Working with Media, Preferences and Data Storage, Locations and Maps, Creating a Home Screen Widget, Publishing Application, Creating First Mobile App, Setting Up an Android Work Environment, Building a Mobile App from Scratch, Crafting a Form for Mobile, Advanced Features .

**DICT 501: Database System**

Database fundamentals, Database management system, Database system application, Database system versus file system, View of data, Entity relationship data model, Relational data model, Database administration, Database system structure, Data dictionary, Entity sets, Relationship sets, Mapping Cardinalities, Keys, Attributes, Weak entity sets, Database Schema, Relational Algebra and SQL. Writing Basic PL/SQL statements, Single-Row-Functions, Displaying Data from multiple tables, Aggregating data using Group Functions, Sub queries, Manipulating Data, Creating and Managing Tables including constraints, Controlling User Access, Declaring Variables, writing Executable Statements.

**DICT 502: Information System Analysis and Design**

Introduction: Different Types of Information Attributes of Information, Roles, Tasks and Attributes of a System Analyst, Sources of Information, Information gathering Techniques, Handling of Missing information. Analysis and Design: Steps of System Analysis, Cost-Benefit Analysis, Design of an Information System, Networks Models for Project time Estimation, Estimation of Confidence Levels, Simplex Method for Minimization of Project Time, Project Effort Analysis, Designing of Inputs and Outputs, Project Team Organization, Database and Files Design, Project Management and Documentation, Analysis of System maintenance and Upgrading, Ethics and Privacy, Control and Security.

**DICT 503: Oracle Database 10g (SQL)**

SQL and RDMS Basics, Restricting and Sorting Data, Using Single Row function to Customize Output, Reporting Aggregated Data Using Group Function, Displaying Data from Multiple Table, Using DDL Statements to Create and Manager Table, Creating Other Schema Object, Controlling User Access, Manipulating Data, Managing Objects with Data Dictionary Views, Using Sub queries to solve Query, Managing Object with Data Dictionary Views.

**DICT 504: Oracle Database 10g (Admin 1)**

Installing Oracle Database Software, Oracle Database Architecture, Managing Oracle Instance, Managing Database Storage Structures, Managing Undo Data, Managing Redo Log files, Flashback Database, Backup and Recovery Concepts, Performing Database Backup, Auditing in Oracle 10g Release 2, Recovering Database and Recovering Database Using RMAN.

**DICT 505: Oracle Database 10g (Admin 2)**

User Managed Backup, RMAN Backup ,User Managed Complete Recovery , User Managed Incomplete Recovery, RMAN Complete Recovery, RMAN Incomplete Recovery, Configure Catalog Database, Automatic Performance Management, Managing Schema Object, Resources Plan, Managing Storage, Configure ASM.

**DICT 601: Adobe Photoshop CS6**

Content-Aware Collection, Adjusting Levels, Sharpening Details, Creating and Formatting Text, Drawing Shapes, Layer Effects, Paragraph, Character, and Layer Styles, Scale, Rotate, Skew, and Warp, Liquefying an Image, Converting to Black & White, Printing an Image, Saving for the Web, Shortcuts and Settings, Smart Objects, Shadows/Highlights, Using Curves, Camera Raw, Color Range and Quick Mask, The Pen Tool.

**DICT 602: Adobe Illustrator**

Introduction of Illustrator, Working with the Control panel, Working with Documents, Selecting and Transforming Objects, Working with Color, Working with Fills and Strokes, Working with Paths, Creating Shapes, Using the Pen Tool, Using Type in Illustrator, Adjusting Appearance, Working with Layers, Working with Images, Creating and Using Symbols, Drawing in Perspective, Printing, Saving, and Exporting, Pattern Creation, Image Tracing, File Management.

**DICT 603: Adobe Flash Professional**

Introduction to the Flash Interface, Importing Graphics, Structuring a Flash Document, Drawing Basic Shapes, Beyond Basic Shapes, Using graphic symbols, Creating and Modifying motion tweens, Motion Tweening Tools and Techniques, Shape Tweens, Inverse Kinematics, Effects and Masks, Comparing Text Layout Framework (TLF) vs. Classic text, Exploring types of TLF and Classic text, Exploring TLF text features, Importing and using audio, Affecting playback control, Choosing audio compression settings, Integrating with Photoshop, Integrating with Illustrator, Creating Desktop and Mobile Applications.

**DICT 604: Audio and Video Processing**

Fundamentals of digital audio: Sampling; Dithering; Quantization; psychoacoustic model, Basic digital audio processing techniques: Anti-aliasing filtering; Oversampling; Analog-to-digital conversion; Noise shaping; Digital-to-analog Conversion; Equalization, Digital Audio compression:

Critical bands; threshold of hearing; Amplitude masking; Temporal masking; Waveform coding; Perceptual coding; Coding techniques: Sub band coding and Transform coding; Fundamentals of digital video: Basics of digital video; Digital video formats, Basic digital video processing techniques: Motion estimation; Intra and Inter frame coding; Motion-compensated filtering; Error concealment, Video coding techniques: Temporal redundancy; Spatial redundancy; Block-based motion estimation and compensation; Coding techniques: Model-based coding, Motion-compensated waveform coding; Codec examples.

### **DICT 701: Open Source Tool (Joomla)**

Understanding Joomla!, Installing Joomla!, A General Overview of Joomla!, Creating Categories, Creating Articles and Basic Formatting, Creating Menus, Advanced Article Formatting, Setting Display Options, Using Modules, Using Components, Using Templates, Extending Joomla! 2.5, Launching Site and Beyond, Migrating from Joomla 1.5 to Joomla 2.5: Using jUpgrade, Tweaking Extensions and Commercial Templates for Joomla! 2.5, Security: Managing Extensions, Tips, Tricks, and Industry Secrets, Handling Vulnerabilities, Applying Best Practices, Styling with CSS: Menus, Module and Content Settings and Styling, Creating and Editing Custom Templates: Understanding Templates, Converting the HTML Comp to Joomla! Templates, Creating and Editing Custom Templates: Installing the Joomla! Template Package File, Working with CSS, Index.php, and Joomla! Creating and Editing Custom Templates: Styling Joomla! Template Advanced Template Features, Understanding Access Control Lists, Allowing Front-End Site Administration, Creating a Simplified Back End for Clients, ACL Tips and Tricks, Packaging Extensions: Understanding Structure and Framework, Installing Extensions.

### **DICT 702: Open Source Tool (Drupal)**

Defining Drupal, Understanding How Drupal Works, Installing Drupal, Controlling Drupal, Building a Drupal Site, Controlling Content, Enabling Other Content Types, Extending Content, Managing Users, Changing a Site's Interface, Displaying Information with Views, Administrating Drupal, Moving from Development to Production, Integrating with Other Sites, Making Your Site More Social, Touring Drupal 7 Web Applications, Final Project, Drupal Gardens: Getting Around Drupal Gardens, Content, Site Structure, Drupal Gardens: Site Membership, Making Sites Interact with the World, Theme Builder, Drupal Gardens: Perfecting Site Designs, Managing Sites, Reporting and Visualizing Data: Mastering Drupal's Data-Storage Model, Importing, Connecting, and Presenting Data, Reporting and Visualizing Data: Views, Reporting and Visualizing Data: Working with Location Data, Putting Data in Other Forms, Drupal Commerce: Setting Up Drupal Commerce, Getting Ready for Sales, Drupal Commerce: Understanding How Drupal Commerce Works, Listing Products, Drupal Commerce: Managing Workflow, Organizing Store, Drupal Commerce: Increasing Sales, Drupal 7 New Features: General Setup and What's New.

### **DICT 703: Open Source Tool (Wordpress)**

Installing WordPress, Using the WordPress toolbar, Creating Posts, Creating Pages, Managing Images, Video, and Other Media, Weekly assessment Extending WordPress Functionality with Plugins, Working with Themes, Using Twenty Eleven Theme, The Appearance Tab, WordPress Settings, Exporting and Importing WordPress Content, Getting Readers, Developing Secure Sites, Advanced Tips and Tricks about security, Building Child Themes: Theme-Building and Restyling Workflow, Customizing the Header, Adding New Custom Menus, Building Child Themes: Customizing the Sidebar, Customizing the Footer, Working with the Featured Image, Adding the Finishing Touches, Creating and Editing Custom Themes: From Spec to Photoshop, Converting Photoshop to

HTML/CSS, Creating and Editing Custom Themes: Converting HTML/CSS to a WordPress Theme, Building Responsive Themes: Importance, Using Media Queries, Building Responsive Themes: Creating a Responsive Header, Creating a Responsive Menu, Creating a Responsive Main Area.

### **DICT 801: Fundamentals of Analog and Digital Communications**

Introduction, Fourier Techniques (Fourier series and Fourier transformation), Signal Analysis and Linear Systems (unit impulse signal, signal's energy and power, energy/power signal, ESD, PSD, correlation, orthogonal signal, ideal and practical filter), Information Theory and Huffman Coding (information measure, entropy, encoding, uniquely decodable coding, optimal coding). Analog Communications, Double-sideband Suppressed Carrier (DSB-SC) Modulation, Amplitude Modulation (AM), Frequency Modulation (FM). Digital Communications; Sampling, Quantization, Modulation (PAM, PCM, PWM, PPM, DPCM, DM; detection), Carrier Systems (ASK, FSK, PSK, DPSK; detection), Line Coding, Scrambling, Detection Error Probability, M-ary Communications.

### **DICT 802: Fundamentals of Mobile Communications**

Introduction and Mobile Applications, Wireless Web and Wireless Platforms WAP, Wireless Communication Fundamentals, Wireless Communication Technology (spread spectrum, coding and error control), Wireless LANs and Mobile adhoc networks, IEEE 802.11, WPANs, Bluetooth, Home R/F, Cellular Networks - 2G, 2.5G, 3G, Fixed wireless networks and wireless local loops Satellite communications, Wireless Architectures and Traffic Engineering, Wireless security, Wireless development environments & standards.

### **DICT 803: Basic Telecommunication Systems**

Basic techniques in telecommunication systems for both analog and digital signal transmission, characteristics of electromagnetic wave propagation and transmission lines, media characteristics, channel capacity, multiplexing techniques T1 and T3, telephone network systems concept and applications, fundamentals of data communications and computer networks, switching technology; theoretical and analytical aspects of space division and time division techniques, circuit switching and packet switching systems and traffic characteristics.

### **DICT 804: Fundamentals of Optical Fiber Communications**

Summary of basic concepts of components and system related aspects in optical fiber communication, mono and multi-mode fiber, Types of Light Sources Laser, LED, modulation bandwidth, noise, detectors, Acquaintance with practical handling of optical fibers and with design of optical fiber links (multiplexing, switching, coherent communication, wavelength multiplexing, optical switching, local optical networks, Types of Optical Amplifiers.

### **DICT 805: Basic Satellite Communications**

Introduction to satellite systems, transponder and earth station design, antenna design, analog and digital modulation techniques, satellite networks, satellite propagation and transmission equations, free-space propagation over flat and spherical surfaces, design of microwave links, over-the-horizon microwave links, atmospheric absorption, orbit and earth-satellite geometry, satellite microwave link, modulation and multiplexing, multiple access, earth stations, interference.