



CENTRE OF EXCELLENCE IN INFORMATION TECHNOLOGY (CEIT)



UNIVERSITY OF PAPUA NEW GUINEA



CENTRE FOR DEVELOPMENT OF ADVANCED COMPUTING

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Independent State of
PAPUA NEW GUINEA

Mahatma Gandhi Centre of Excellence in IT

A premier institute for training and enhancement of Information Technology skills funded by the Government of the Republic of India in collaboration with the Government of the Independent State of Papua New Guinea and operated in association with University of Papua New Guinea (UPNG) and Centre for Development of Advanced Computing (C-DAC).

Vision

Create a pool of knowledge workers and generate employment opportunities by producing world class IT professionals.

Mission

- To emerge as a premier platform in Information and Communication Technologies in Papua New Guinea country for human advancement.
- To generate knowledge with the dissemination of cutting edge ICT programs, for promoting professional and economic growth.
- To groom the students to work on current technology as well as prepare them to keep pace with the changing face of technology and the requirements of the growing IT industry.
- To create an industry-ready talent pool to cater the Information and communications technology (ICT)

About MG-CEIT

“Mahatma Gandhi Centre of Excellence in IT” in Papua New Guinea- National Capital District at University of Papua New Guinea (UPNG), is the outcome of the interest of the Papua New Guinea government in seeking assistance from India for development of ICT in Papua New Guinea.

A MoU was signed between the two countries for training in the specialized field of IT and expanding the area of cooperation between the two countries in these fields. The Government of India proposed the setting up of MG-CEIT having international outreach for imparting ICT education in Papua New Guinea. The Ministry of External Affairs (MEA), Government of India, entrusted the responsibility for setting up of a MG-CEIT at UPNG in Papua New Guinea- National Capital District, to Centre for Development of Advanced Computing (C-DAC).

MG-CEIT is targeted to offer courses on basic IT education, intermediate and advanced level certificate courses as well as courses to bridge the gap between academia and industry.

MG-CEIT offers latest courseware and reference books for training of Teachers, Students, Government Officials & Working Professionals.

Through its state-of-the-art training methodology, it will fulfill its objective of creating highly skilled IT resources and will be recognized by major corporate in Papua New Guinea. Majority of the students will get placed and shall acquire high positions in the industry. At one front, the Institute will assist Papua New Guinea to leapfrog into IT and at the other hand will bridge the digital divide of urban and rural students.

MG-CEIT will produce value-added human capital for research & software development in Papua New Guinea. The quality of education at other higher learning institutions in the other region of Papua New Guinea will be improved by MG-CEIT educated faculty & trained students.

About C-DAC

Centre for Development of Advanced Computing (C-DAC) is the premier R&D organization of the Ministry of Electronics and Information Technology (MeitY) for carrying out R&D in IT, Electronics and associated areas.

C-DAC has today emerged as a premier R&D organization in IT&E (Information Technologies and Electronics) in the country working on strengthening national technological capabilities in the context of global developments in the field and responding to change in the market need in selected foundation areas.

As an institution for high-end Research and Development (R&D), C-DAC has been at the forefront of the Information Technology (IT) revolution, constantly building capacities in emerging/enabling technologies and innovating and leveraging its expertise, caliber, skill sets to develop and deploy IT products and solutions for different sectors of the economy, as per the mandate of its parent, the Ministry of Electronics and Information Technology, Ministry of Communications and Information Technology, Government of India and other stakeholders including funding agencies, collaborators, users and the market-place.

Advanced Computing Training School (ACTS)

CDAC had set up the Advanced Computing Training School (ACTS) as the top finishing school in IT training to meet the ever-increasing skilled manpower requirements of the IT industry as well as supplement its intellectual resource base for cutting edge R&D. Through its state-of-the-art training methodology, it is fulfilling its objective of creating highly skilled IT resources and recognized by major corporate in India to be a preferred high-end provider of skilled manpower in areas of ICT.

International Cooperation Division (ICD)

Over the years International Cooperation Division (ICD) CDAC Delhi has progressively grown to build an eco-system and institutional framework and acquired necessary expertise, strength and technical resources by implementing, supervising and managing large bi-lateral projects in developing countries. Till today CDAC-ICD Delhi has successfully implemented over 50 projects in Africa, East Europe, South-East Asia, Central Asia, Middle East, Arab, Latin America and Pacific Island Countries in close association with Ministry of External Affairs (MEA) and Ministry of Electronics & IT(MeitY), Government of India.

About UPNG

The University of Papua New Guinea (UPNG) is a university located in Port Moresby, capital of Papua New Guinea. It was established by ordinance of the Australian administration in 1965.

The UPNG offers various programs in Medicine, Pharmacy, Health Sciences, Physical and Natural Sciences, Law, Business, Humanities, Social Sciences, Sustainable Development fields.

Vision

The Vision of the University of Papua New Guinea is to be the Premier University dedicated to excellence and providing quality education, research, and service to Papua New Guinea and the Pacific.

Mission

The Mission of the University of Papua New Guinea is to deliver excellent education and research results for nation building and global advancement towards an innovative and empowered society.



SL No	Certificate Programs	Duration (Weeks)
1	Certificate Program in Office Automation Skills in Operating System, Database concepts and Office Automation tools.	7-8
2	Certificate Program in Information Technology Skills in Office Automation tools, Database and Networking concepts.	12-14
3	Certificate Program in Database Management Expertise in Database Technologies and Administration.	16-18
4	Certificate Program in Advanced Web Technology Expertise in Web development using HTML, CSS, Javascript, PHP and SQL.	16-18
5	Certificate Program in Java Programming Professionalize in Core Java and Enterprise Java for Web Development.	16-18
6	Certificate Program in Android Programming Expertise in Android Programming which includes Core Java and Mobile – Wireless Technologies.	16-18
7	Certificate Program in Linux System Administration Professionalize in OS Administration and Networking.	16-18
8	Certificate Program in Network Security Professionalize in Network Defense and IT Infrastructure Management.	16-18
9	Certificate Program in Data Communication and Networking Professionalize in Networking Concepts and Windows Server Administration.	9-10
10	Certificate Program in Internet of Things Professionalize in technologies such as NodeJS , Python and Embedded Linux to develop IoT.	16-18
11	Certificate Program in Big Data Analytics Expertise in Big Data Analytic domain. Analyze and visualize Big Data using Statistics with R.	16-18
12	Certificate Program in Advanced Information Technology Expertise in Programming using C# .Net and Database concepts.	16-18

Certificate program consists series of courses of study and a project.

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Program Descriptions

Certificate Program in Office Automation

The objective of this program is to provide students with skills in Software Systems, Office Automation Tools and Database.

Duration : 7 – 8 Weeks (150 Hours)

Eligibility : Minimum of Grade 12 Certificate

Program Prerequisite

Sound knowledge of Basic Computer Fundamentals.

Outcome

The Certificate Program in Office Automation provides essential knowledge on how to work with Client Software Systems, Office Automation tools and Database.

Courses of Study

SL No	Courses	Hours
1	Fundamentals of Computer and OS Concepts	20
2	Client Software Systems	20
3	Office Automation Tools	60
4	Database Concepts	30
5	Database Management using MS Access	20

Certificate Program in Information Technology

The objective of this program is to provide students with expertise in IT for Management, Office Automation tools, Database and Networking concepts. .

Duration : 12 – 14 Weeks (250 Hours)

Eligibility : Minimum of Grade 12 Certificate

Program Prerequisite

Sound knowledge of Basic Computer Fundamentals

Outcome

The Certificate Program in Information Technology provides essential knowledge in Information Technology for management and how to work in Office Automation Tools and Networking.

Courses of Study

SL No	Courses	Hours
1	Fundamentals of Computer and OS Concepts	20
2	Networking Fundamentals	20
3	IT for Management	50
4	Office Automation Tools	60
5	Database Concepts	30
6	Database Management using MS access	30
7	Capstone Project	30

Certificate Program in Database Management

The objective of this program is to provide students with expertise in Database Technologies and Administration.

Duration : 16 – 18 Weeks (320 Hours)

Eligibility : Minimum of Grade 12 Certificate

Program Prerequisite

Candidate should have basic knowledge of computers.

Outcome

The candidates will be trained in Database Technologies and Administration skills. After the completion of the program, students can work as Database Administrator/Database Developer.

Courses of Study

SL No	Courses	Hours
1	Fundamentals of Computer and OS Concepts	20
2	C Programming	40
3	Software Development Life Cycle	10
4	Database Technologies	80
5	Database Administration	70
6	Management Development Program	40
7	Capstone Project	60

Certificate Program in Advanced Web Technology

The objective of this program is to provide students with expertise in Website development.

Duration : 16 – 18 Weeks (320 Hours)

Eligibility : Minimum of Grade 12 Certificate

Program Prerequisite

Sound knowledge of Computing Fundamentals.

Outcome

The Certificate Program in Advanced Web Technology (CPAWT) aims to groom the students and enable them to work on web technology. After the completion of the program, students can work as Web Developer / Web Designer / IT Support Staff.

Courses of Study

SL No	Courses	Hours
1	Fundamentals of Computer and OS Concepts	20
2	Client Side Web Technologies	70
3	Database Concepts	30
4	Server Side Web Technologies (PHP, Laravel)	100
5	Internet Terminologies and Application Deployment	20
6	Management Development Program	40
7	Capstone Project	60

Certificate Program in Android Development

The objective of this program is to provide students with expertise in Android Programming. This includes Core Java and Mobile and Wireless Technologies. After doing the program, the student will be able to design, develop and maintain android applications effectively.

Duration : 16 – 18 Weeks (320 Hours)

Eligibility : Minimum of Grade 12 Certificate

Program Prerequisite

Sound knowledge of Computing Fundamentals.

Outcome

The candidates will be trained in Android Programming, Java Programming and Management skills. After the completion of the program, they can start career as Android Developer.

Courses of Study

SL No	Courses	Hours
1	Fundamentals of Computer and OS Concepts	20
2	Database Concepts	30
3	Java Programming	50
4	Mobile and Wireless Technologies	20
5	Android Programming	100
6	Management Development Program	40
7	Capstone Project	60

Certificate Program in Java Web Development

The objective of this program is to provide students with expertise in Web development using Java. This includes both the Core Java and Advanced Java programming. After doing the program, the student will be able to design, develop and maintain web based enterprise applications effectively.

Duration : 16 – 18 Weeks (320 Hours)

Eligibility : Minimum of Grade 12 Certificate

Program Prerequisite

Sound knowledge of Computing Fundamentals.

Outcome

Java is one of the most popular languages in the IT industry and many existing/upcoming technologies like Android, Hadoop use java framework, which java assures demand for java professional in the IT market in the coming future. After the completion of the program, students can work as a Software Developer or Programmer / IT Support staff / Trainee / Technical Support in associated service sectors.

Courses of Study

SL No	Courses	Hours
1	Fundamentals of Computer and OS Concepts	20
2	Software Development Life Cycle	10
3	Database Concepts	30
4	Client Side Web Technologies	40
5	Java Programming	50
6	Enterprise Java	70
7	Management Development Program	40
8	Capstone Project	60

Certificate Program in Linux System Administration

The objective of this program is to provide students with expertise in Linux System Administration. .

Duration : 16 – 18 Weeks (320 Hours)

Eligibility : Minimum of Grade 12 Certificate

Program Prerequisite

Candidate should have basic knowledge of Computer, Operating System and Networking fundamentals with logical approach.

Outcome

The candidates will be trained in Networking, System Administration and Linux Administration skills. Linux System administrators can work in a variety of industries, ranging from telecommunications to security exchanges. Jobs for Linux System administrators are expected to increase at an average rate over the next several years. After the completion of the program, students can work as Linux Administrator/Operations Engineer/Site Reliability Engineer/Devops Engineer.

Courses of Study

SL No	Courses	Hours
1	Basic of Linux Administration	50
2	Networking Fundamentals	40
3	System Administration	130
4	Management Development Program	40
5	Capstone Project	60

Certificate Program in Network Security

The objective of this program is to provide expertise in Network Defense and IT Infrastructure Management.

Duration : 16 – 18 Weeks (320 Hours)

Eligibility : Minimum of Grade 12 Certificate

Program Prerequisite

Candidate should have basic knowledge of computer and networking fundamentals with logical approach.

Outcome

The Certificate Program in Network Security (CPNS) provide skills on networking and its maintenance and will help the students to make carrier in Network management. After the completion of the program, students can work as Network Administrator/Operations Engineer/Site Reliability Engineer/security Engineer/ IT Infrastructure Engineer/Information Security Assurance.

Courses of Study

SL No	Courses	Hours
1	Networking Fundamentals	40
2	Network Defense and Countermeasures	100
3	IT Infrastructure Management	80
4	Management Development Program	40
5	Capstone Project	60

Certificate Program in Data Communication and Networking

The objective of this program is to enable students to understand the basic networking concepts, to design a local area network and supervise the physical implementation of the same. Also students will be trained on Windows Server 2016.

Duration : 9 – 10 Weeks (180 Hours)

Eligibility : Minimum of Grade 12 Certificate

Program Prerequisite

Basic understanding on peripheral devices, computer hardware and software, memory, storage devices, some common PC utilities, Internet concepts

Outcome

After the completion of the program, Student should be able to perform all administrative operations on a Local Area Network independently, including configuring software in the Windows environment, connecting and configuring peripherals such as printers, scanners etc., granting and restricting access to the network and the internet through a proxy server.

Courses of Study

SL No	Courses	Hours
1	Networking Fundamentals	40
2	Windows Server	70
3	Basic of Linux Administration	50
4	Configuration of Routers and Switches using Simulation Tool	20

Certificate Program in Advanced Information Technology

The objective of this program is to provide students with expertise in Programming. Also students will be trained in MS .NET technologies.

Duration : 16 – 18 Weeks (320 Hours)

Eligibility : Minimum of Grade 12 Certificate

Program Prerequisite

Sound knowledge of Computing Fundamentals.

Outcome

The candidates will be trained in Database and .NET Technologies After the completion of the program, students can work as Software Engineer and associated service sectors.

Courses of Study

SL No	Courses	Hours
1	Fundamentals of computer and OS Concepts	20
2	C Programming	40
3	Software Development Life Cycle	10
5	OOPs, Data Structures and Algorithm using C++	80
6	Database Concepts	30
7	MS.Net using C#	40
8	Management Development Program	40
9	Capstone Project	60

Certificate Program in Big Data Analytics

The objective of Certificate Program in Big Data Analytics (CPBDA) is to provide students with expertise in Big Data Analytic domain. Analyze the big data using Statistics with R, Data Visualization Analysis and Reporting, Business Analytics.

Duration : 16 – 18 Weeks (320 Hours)

Eligibility : Minimum of Grade 12 Certificate

Program Prerequisite

Sound knowledge of Computing Fundamentals, Database Technology and Java Programming.

Outcome

After the completion of the program, students can work in domain of Analytics. Also students will be able work in Statistics using R, Data Visualization and Business Analytics.

Courses of Study

SL No	Courses	Hours
1	Big Data Fundamentals	30
2	Statistical Analysis with R	90
3	Data Visualization – Analysis and Reporting	40
4	Business Analytics	60
5	Effective Communication and Soft Skills	60
6	Capstone Project	40

Certificate Program in Internet of Things

The objective of this program is to enable students to work on technologies such as NodeJS, Python and Embedded Linux to develop IoT.

Duration : 16 – 18 Weeks (320 Hours)

Eligibility : Minimum of Grade 12 Certificate

Program Prerequisite

Sound knowledge of Computing Fundamentals.

Outcome

Candidates will be trained in communication protocols, tools such as NodeJS and Python for development and embedded Linux After the completion of the program, students can work as a Software Developer or Programmer /IT Support staff/ Trainee / Technical Support for the IoT based products and its associated service sectors.

Courses of Study

SL No	Courses	Hours
1	Fundamentals of IoT	30
2	IoT prototyping using NodeJS	30
3	Python Programming	30
4	Embedded Linux	35
5	Wireless Network	30
6	Communication Models and IoT Protocols	30
7	Cloud Platforms for IoT	35
8	Management Development Program	40
9	Capstone Project	60

Course Descriptions

Management Development Program

Candidate will be learning Management Development Program and Organizational behaviour to communicate written and oral. Candidate can improve Aptitude, basic understanding of the social political and natural environment with good analytical and managerial skills. Students can demonstrate Good conversation and problem solving skills.

Duration :	2 Weeks [4 hours per Day]
Contact Hours :	40 hours of lecture/tutorial/practical
Pre-requisites:	–
Course Content:	Introduction to Communication: Barriers to Communication, Kind of Communication; Confidence Building, Non-verbal Communication, English Grammar, Sentence Construction, Logical Reasoning, General Aptitude: Verbal Ability and Numerical Ability; Writing: Covering letter, Resume and Email; Presentation Skill, Group Discussion, Interview Skills, Mock Interview.

Fundamentals of Computer and OS Concepts

The students will be learning fundamentals of computer, an overview of operating system and application programs. An explore through operating system concepts and practical approach is provided to the students.

Duration :	1 Week [4 hours per Day]
Contact Hours :	20 hours of lecture/tutorial/practical
Pre-requisites:	–
Course Content:	<p>Computer Fundamentals: Overview and Uses of Computer, Types of Computer, Hardware and Software; Introduction to Windows and Linux Operating Systems: Installing Operating System, Navigation in OS, Interacting with the OS (command-line, GUI), Performing Installation and Uninstalling of Software in Windows and Linux, Setting Up a Printer; Operating System Concepts: Process Management, Threads, Process, Scheduling, Memory Management, Input Output Management, File Management, Deadlocks, Inter-process Communication; Fundamentals of Computer Networking: Types of Communication Networks, IP Address, Communication Protocols.</p> <p>Overview of Software systems, Operating System (Windows, Ubuntu), Audio, Video, Image, Text File Processing / Editing Applications, Common Client Solution Software : Communication and Messaging, Social Media, Productivity and Notekeeping, Document Management, Payment Transaction Software, etc.</p>

Networking Fundamentals

This course aims to provide skills on networking and its maintenance and will help the students to expertise in Network management.

Duration :	2 Weeks [4 hours per Day]
Contact Hours :	40 hours of lecture/tutorial/practical
Pre-requisites:	–
Course Content:	<p>Introduction to Computer Networking: Categories of Networking (LAN,WAN,MAN), Network Classifications (Wired & Wireless), LAN Topologies, Internetworking Devices (Hub, Switch, Modem, Router, Bridge, Repeaters, Firewall, etc); Overview of OSI and TCP/IP Model, Functions/Protocols & Devices at each Layer; IP Addressing: Sub-netting, Super-netting, IPv4 (Private & Public, Static & Dynamic) and IPv6 Address; Architecture of Internet and Intranet: Communication Protocols (HTTP, HTTPS, FTP, SMTP, DHCP, SSH, NAT,DNS, ARP etc), Port Forwarding and Security, Spanning Tree Protocol, Network Troubleshooting, TCP/IP Utilities (ipconfig, ping, netstat, arp, nslookup, traceroute, etc).</p>

Client Software Systems

This course aims to provide practical approach which covers main components of software system and how to perform tasks / functionalities of a client software systems. Students will be able to utilize the gained knowledge to work in common client applications.

Duration :	1 Week [4 hours per Day]
Contact Hours :	8 hours of lecture/tutorial/practical
Pre-requisites:	Course : Fundamentals of Computer and OS Concepts
Course Content:	<p>Overview of Software systems, Operating System (Windows, Ubuntu), Audio, Video , Image, Text File Processing / Editing Applications, Common Client Solution Software : Communication and Messaging, Social Media, Productivity and Notekeeping, Document Management, Payment Transaction Software, etc.</p>

Software Development Life Cycle

This course aims to demonstrate Software Development Life Cycle and Version Control tools. Apply knowledge of Software Project planning, resource management, risk identification and risk mitigation to practical problems using Agile methodologies.

Duration :	1 Week [4 hours per Day]
Contact Hours :	10 hours of lecture/tutorial/practical
Pre-requisites:	–
Course Content:	Software Engineering, Brief concept of Software Life Cycle Models, Various Phases in Software Development, Agile Techniques for Software Development, Software Project Management, Introduction to Coding Standards and Version Control Tool, Software Testing.

Database Concepts

Students will be able to understand concepts of Database and how to store and retrieve data efficiently. Develop an Entity Relationship Model with the appropriate entities, attributes, relationships. Use SQL to create and manipulate databases, tables and insert and query sample data.

Duration :	2 Weeks [4 hours per Day]
Contact Hours :	30 hours of lecture/tutorial/practical
Pre-requisites:	Course : Fundamentals of Computer and OS Concepts
Course Content:	Introduction to DBMS: What is DBMS, Its need, Areas where DBMS are used; Codd's 12 rules for a Relational Database, Relational Model and its Concepts: DBMS Keys, Data Integrity & Integrity Rules, Data Models; Introduction to Entity and ER Diagram, Designing a Database Need for Normalization, Normalization Techniques, Client/Server Architecture , RDBMS Technology (MySQL), DDL Commands, DML & DCL Commands. Inbuilt Functions, Grouping Things Together (Group By, Having Clause), Set Operators (UNION, UNION ALL, INTERSECT, MINUS), Sub-Queries, Joins, Indexes and Views.

Office Automation Tools

This course aims students to become productive by acquiring skills in Microsoft Word, Microsoft Excel, Microsoft PowerPoint, and Microsoft Outlook, Microsoft Project, etc.

Duration :	3 Weeks [4 hours per Day]
Contact Hours :	60 hours of lecture/tutorial/practical
Pre-requisites:	–
Course Content:	<p>MS Word Document Creation, Editing Document, Find and Replace, Font/Character and Paragraph Formatting: Spell Check, Page Borders, Inserting Graphics, Formatting the images, Table of Contents, Data Documents and Mail Merge– Managing Document Security, Comments, and Tracked Changes Desktop publishing concepts.</p> <p>MS Excel Introduction MS Excel Basics, Entering and Editing Worksheet Data, The Spreadsheet and Data sheet; Various Commands for Worksheet and Cell Range Operations, Formatting Data in Excel; Formulas and Functions, Working with Dates and Times, Charts and Graphic– Using Custom Number Formats, Data Validation, Analyzing Data , Printing Worksheets.</p> <p>MS PowerPoint Introduction to Powerpoint: Creating a Presentation, Slides, and Text– Presentation templates and Presentation layouts. Working with Layouts, Themes, Working with Tables and Charts, Using Smart–Art Diagrams, Clip Art, and Pictures; Building Animation Effects, Transitions, and Support Materials, Delivering a Live Presentation– Presentation Tips.</p> <p>MS OneNote Creating a Notebook, Section, Page– Inserting Notes, Inserting an Outlook Task, Inserting a Picture or File, Inserting a Screen Clipping, Writing on a Page, Using Linked Note Taking, Using Send to OneNote, Organizing, Finding, and Sharing, Working with Notes in the Cloud. MS Outlook Fundamentals of E–mail, Processing and Securing E–mail, Working with Contacts– Working with Appointments and Tasks.</p> <p>MS Project Navigating in Microsoft Project, Project Calendars, Tasks and Task Details, Duration, Manual Scheduling and Automatic Scheduling Creating a Milestone: Using Work Breakdown Structure (WBS)– Organizing Tasks into Phases, Entering Task Notes, Establishing Resources, Establishing Individual People Resources, Establishing Group, Equipment, Material, Cost Resources: Entering Resource Cost Information, Resource Working Times, Setting Up a Recurring Task– Applying Task Constraints, FineTuning Tasks, Managing Task Constraints and Relationships, Effects of Constraints and Relationships, Setting Deadline Dates, Establishing Task Priorities, Project Information: Sorting, Grouping, and Filtering Formatting the Gantt Chart,</p> <p>Microsoft Office on the Web Skype, Forms, OneDrive, OneNote, Outlook, Word, Excel, PowerPoint</p>

Database Management using MS Access

This course aims to provide skills on Database Management using the Microsoft Access Tool.

Duration :	1 Week [4 hours per Day]
Contact Hours :	20 hours of lecture/tutorial/practical
Pre-requisites:	Course : Database Concepts
Course Content:	<p>Introduction to Database Management, Difference between Excel and Access, Database Functioning, Designing a Database– Starting MS Access, Access Window, Creating Access Database, Working with form– Creating Database Using Wizards, Discuss Field Properties, Working with tables– Creating Tables, Creating Tables using the Table Wizards Create Table in Data-sheet View, Create Table in Design View, Saving a Table, Adding a Field to Table in Design View– Entering Caption and Default Value for a Field, Setting Field Properties: Size, Format, etc. Viewing a Table– Setting or Changing Primary Key, Entering Data in a Table, Editing Data in a Table, Opening an existing Database– Navigating in Table, Table and Field Specifications, Record Validation Rules, Sorting and Indexing, Discussion on Useful Shortcuts Keys, Sorting and filtering records– Database Queries– Types of Queries, Designing Queries. Relationships, Defining Relationships, Types of Relationships Foreign Key and Referential Integrity, Creating Queries, Creating Select Query through Wizard, Creating Select Query Manually in Design View, Creating Parameter Query, Sorting Records in Queries, Consideration when sorting records in table, query, form, or report– Sort Records by using the Design Grid of a query, Deleting Multiple Records Using Queries, Delete records from one table or tables in a one-to-one relationships, Delete records by using query that includes both in a one-to-one relationships, Reports, Creating reports, Creating report With Report Wizards, Formatting a Report, Creating a Report in Design View, Setting Group Ranges, Mailing Labels, Object Linking and Embedding, Working With Multiple databases, Access Imports and Exports, Printing the Records of database.</p>

Database Technologies

Students will be able to understand concepts of Database and how to store and retrieve data efficiently. Develop an Entity Relationship Model with the appropriate entities, attributes, relationships. Students will be trained on SQL and NoSQL Database Technologies. Use SQL to create and manipulate databases, tables and insert and query sample data.

Duration :	4 Weeks [4 hours per Day]
Contact Hours :	80 hours of lecture/tutorial/practical
Pre-requisites:	Course : Fundamentals of Computer and OS Concepts
Course Content:	<p>Introduction to DBMS: What is DBMS, Its need, Areas where DBMS are used; Codd's 12 rules for a Relational Database, Relational Model and its Concepts: DBMS Keys, Data Integrity & Integrity Rules, Data Models; Introduction to Entity and ER Diagram, Designing a Database Need for Normalization, Normalization Techniques; DBMS Technologies : Client/Server Architecture, Overview of Oracle Database, Introduction SQL*Plus, DDL, DML and DCL, Inbuilt Functions, Grouping Things Together (Group By, Having Clause), Set Operators (UNION, UNION ALL, INTERSECT, MINUS), Sub-Queries, Joins, Indexes and Views, Clusters, Sequences and Snapshots, Cursors, Stored Procedures, Triggers, Packages, Introduction to No SQL, MongoDB</p>

Database Administration

This course aims to provide skills in database administration and will help the students to expertise in Database management.

Duration :	4 Week [4 hours per Day]
Contact Hours :	70 hours of lecture/tutorial/practical
Pre-requisites:	Course : Database Technologies
Course Content:	<p>Exploring the Oracle Database Architecture: Oracle Database Architecture Overview, Process Architecture, Memory structures, Logical and physical storage structures, Tasks of an Oracle Database Administrator, Tools for Administering the Database, Oracle Database Installation: System Requirements, Oracle Universal Installer (OUI); Creating an Oracle Database, Managing the Oracle Database Instance, Configuring the Oracle Network Environment, Managing Database Storage Structures Administering User Security: Database User Accounts and Predefined Administrative Accounts; Benefits of Roles, Predefined Roles, Implementing Profiles Database Maintenance, Manage optimizer statistics, Manage the Automatic Workload Repository (AWR).</p>

C Programming

This course aims to provide basic programming skills in C Language to solve real world computational problems. Students can gain good programming practices.

Table 11: C Programming [CIT11]

Duration :	2 Weeks [4 hours per Day]
Contact Hours :	40 hours of lecture/tutorial/practical
Pre-requisites:	Course : Fundamentals of Computer and OS Concepts
Course Content:	Programming Concepts, Introduction to Algorithms, Flowchart, Introduction to Programming Language, C Fundamentals, Operators and Expressions, Data Input and Output, Control Statement, Functions, Arrays, Pointers, Structures and Unions, File Handling

IT for Management

This course aims to provide knowledge of emerging trends in Mobile Computing and Commerce, IT virtualization, Social Media, Cloud Computing and the Management and Analysis of Big Data along with advances in more established areas of Information Technology.

Duration :	3 Weeks [4 hours per Day]
Contact Hours :	50 hours of lecture/tutorial/practical
Pre-requisites:	-
Course Content:	Digital Technologies, Data Governance, IT Architecture and Cloud strategies, Data Management, Big data and Business Intelligence, Digital Networks, Cybersecurity, Risk Management and Financial Crime: Internet Technologies and Search Strategies, Social Media Strategies and Metrics Retail, Mobile and E-Commerce : Tactical and Operational Support systems, Strategic Enterprise Systems : Data Visualization and Geographic Systems, IT Strategy and Balanced Scorecard, Project Management and SDLC

Configuration of Routers and Switches using Simulation Tool

This course aims to provide skills on networking and its maintenance and will help the students to expertise in Network management.

Duration :	1 Week [4 hours per Day]
Contact Hours :	20 hours of lecture/tutorial/practical
Pre-requisites:	Course : Networking Fundamentals
Course Content:	Introduction to Routers, Switches Hands on BOSON Router Simulation Hands on Cisco ConfigMaker tool.

Client Side Web Technologies

Students will be able to design and implement dynamic websites with good aesthetic sense of designing using latest technologies. Apply knowledge of Web servers, HTML5, JavaScript, AJAX for website designing. Have a good grounding of Web Application Terminologies and Internet Tools. Learn and apply CSS, Create forms for web pages, etc.

Duration :	2 Weeks [4 hours per Day]
Contact Hours :	40 hours of lecture/tutorial/practical
Pre-requisites:	Course : Fundamentals of Computer and OS Concepts
Course Content:	HTML 5.0 programming, Overview of Internet and Web Pages, Introduction to HTML Tags, Introduction to Web Browser / Composer, Introduction to HTML Editor, CSS Introduction, CSS Syntax, CSS Id & Class, CSS How To, CSS Styling, CSS Box Model, CSS Summary; JavaScript Programming: JS Introduction, JS Statements, JS Comments, JS Variables, JS Operators, JS Comparisons, JS Popup Boxes, JS Functions, JS Events, JS Special Text, JS Objects, JS Reg Exp; Purpose and Nature of XML and JSON : XML and JSON Syntax and Structure rules; Introduction to Ajax, Web services and Ajax, Ajax using HTML. Introducing to jQuery: Selecting the elements, Bringing pages to life with jQuery, JQuery Events, Energizing pages with animations and effects, DOM with jQuery utility functions

Java Programming

This course aims to expertise in implementation of Object Oriented Programming Concepts and covers the core Java (J2SE) programming.

Duration :	3 Weeks [4 hours per Day]
Contact Hours :	50 hours of lecture/tutorial/practical
Pre-requisites:	Course : Fundamentals of Computer and OS Concepts
Course Content:	Object Oriented concepts: Classes and Objects Access Specifiers, Overloading, Inheritance, Polymorphism; Introduction to Java: Data Types, Operators and Language, Constructs, Classes and Objects, Constructor and Destructor, Static Methods and Properties, Inner Classes and Inheritance, Interface and Package, Exceptions, Threads, Common JDK Libraries : Java.lang, Java.util, Java.io, Java.swing, java.sql etc

Enterprise Java

This course aims to provide skills to create static and dynamic web application using Java EE. Demonstrate Java Database connectivity using ODBC/JDBC, session management, session tracking using cookies / HTTP session and request handling for client/server side applications. Create JSP pages for data movement between client and servlets. Develop web applications using hibernate API. MVC Architecture, Handling Struts Validations. Understanding life-cycle of Stateless Session Bean and Deployment of the same on Application Server using JSP client.

Duration :	4 Weeks [4 hours per Day]
Contact Hours :	70 hours of lecture/tutorial/practical
Pre-requisites:	Courses: Java Programming, Database Concepts, Client Side Web Technologies
Course Content:	Introduction to Java EE, Servlets, Java Server Pages, MVC Architecture, ODBC, JDBC, JDBC Architecture, Database Access Methods, Session Management, Stateful Session Bean, Java Beans, Enterprise Java Beans, Java Security, Naming Services, Java Mail, Java Messaging Services, Transactions, Introduction to Struts Framework, Introduction to Hibernate, HQL, J2EE (struts), Introduction to JSF, Deployment tools.

Server Side Web Technologies (PHP, Laravel)

This course aims to expertise in Server Side application development using PHP and Framework. This course is all about understanding server-side concepts, CRUD and REST. Build and Configure a backend server using PHP framework.

Duration :	5 Weeks [4 hours per Day]
Contact Hours :	100 hours of lecture/tutorial/practical
Pre-requisites:	Courses : Client Side Web Technologies, Database Concepts
Course Content:	Introduction to PHP, Data types, Constructs, Working with Arrays, Functions, Forms, Handling Date and Times, Working with Files, Working with Database, Object Oriented Programming using PHP, CRUD operations, REST Concepts and building a RESTful API, Data Exchange using JSON, Working with PHP Framework (Laravel).

Internet Terminologies and Application Deployment

Students will be able to gain skills in application deployment and understanding of Internet Terminologies and cloud computing.

Table 18: Internet Terminologies and Application Deployment [CIT18]

Duration :	2 Week [4 hours per Day]
Contact Hours :	30 hours of lecture/tutorial/practical
Pre-requisites:	Course: Server Side Web Technologies (PHP, Laravel)
Course Content:	Web services, Deployments of application on Internet, Maintenance of Application, Overview of Cloud Computing.

OOPs, Data Structures and Algorithm using C++

This course aims to provide knowledge in implementation of Object Oriented programming concepts. Practicing problem solving using data structure and algorithms using C++.

Duration :	4 Week [4 hours per Day]
Contact Hours :	80 hours of lecture/tutorial/practical
Pre-requisites:	Course: C Programming
Course Content:	<p>Difference between C and C++, Introduction to C++: Identifier, Keywords, Constants, Operators: Arithmetic, relational, logical, conditional and assignment, Sizeof operator, Operator precedence and associativity, Type conversion, Variable declaration, Expressions, Statements, Manipulators, Input and Output statements, stream I/O; Conditional and Iterative statements, Breaking control statements. OOP Concepts- Class and Objects, Executing sample C++ programs, Static Member, Inline Function, Access specifiers, String & Streams, Constructors and Destructors, Properties, Types of Constructors & Destructors, Inheritance, Types of inheritance, Friend functions, Friend Classes, Polymorphism, Types of polymorphism, Overloading functions, Overloading Operators, Copy Constructors, Run Time Polymorphism, Virtual Functions, Exception Handling, Namespaces; File Handling: Classes for file stream operations, opening and closing a file, detecting end of file, file modes, file pointers and their manipulations, Sequential input and output operations, Random access, File operations error handling, Command line argument, Class and Function Templates, subclass templates, passing template classes to template parameters, Dynamic memory allocation using MALLOC, REALLOC and CALLOC;</p> <p>Introduction to Data Structures: Array, Linked List, Stack and Queue Implementation, Lists (Singly, Doubly and Circular), Binary Tree; Introduction to Algorithm, Analysis of Algorithm, Space Complexity of Algorithm, Time Complexity of Algorithm, Searching (Sequential & Binary), Analysis of Sorting & searching algorithms, Sorting (Selection, Insertion, Bubble sort), Sorting (Merge, Heap & Quick).</p>

MS .Net using C#

This course aims to provide expertise in C# programs and .NET Framework.

Duration :	2 Week [4 hours per Day]
Contact Hours :	40 hours of lecture/tutorial/practical
Pre-requisites:	Courses: Database Concepts, OOPs, Data Structures and Algorithms using C++
Course Content:	Introduction to .NET Frameworks, Application Domain, Language Interoperability, .NET Framework Class Library, Assemblies, Introduction of Windows Presentation Foundation, Introduction of Windows Workflow Foundation, Introduction of Windows Communication Foundation, C# .NET – Need of C#, Operators, Namespaces & Assemblies, Arrays, Preprocessors, Delegates and Events, Boxing and Unboxing, Regular Expression, Collections, Exceptions Handling, Introduction to Win Forms, Working with database, Windows Communication Foundation.

Mobile and Wireless Technologies

Students will be able to develop the concept of systems, thinking in the context of mobile and wireless systems and learn basics of wireless communication. Understand mobile computing and networking concepts. Develop knowledge of the interplay of concepts and multiple sub-disciplines in mobile and wireless systems.

Duration :	1 Week [4 hours per Day]
Contact Hours :	20 hours of lecture/tutorial/practical
Pre-requisites:	–
Course Content:	Basics of Wireless Technologies, Cellular Communication: Single Cell Systems, Multi-Cell Systems, Frequency Reuse, Analog Cellular Systems, Digital Cellular Systems, GSM Standard: Mobile Station, BTS, BSC, MSC, SMS Sever, Call Processing and Protocols, CDMA Standard: Spread Spectrum Technologies, 2G, 3G and 4G Systems: HSCSD, GPRS, W-CDMA/UMTS, 3GPP and International Roaming, Multimedia Services, CDMA Based Cellular Mobile Communication Systems, Wireless Personal Area Networks: Bluetooth, IEEE 802.11a/b/g Standards, Mobile Handset Device Interfacing: Data Cables, IrDA, Bluetooth, Touch- Screen Interfacing, Wireless Security, Telemetry, Introduction to WAP, WML Script and XHTML, Introduction to Multimedia Messaging Services (MMS), NFC (Near Field Communication).

Android Programming

This course aims to provide expertise in Android development using java. Students can learn how to design application and design UIs that work seamlessly for range of phone and tablets.

Duration :	5 Week [4 hours per Day]
Contact Hours :	100 hours of lecture/tutorial/practical
Pre-requisites:	Course: Java Programming, Database Concepts
Course Content:	Introduction of Android, Android SDK features, Android Activities, Android UI design, Intents, User Interface: Dialog and Toasts; Navigation, Android Technique for Saving data, Database in Androids, Background tasks, Connectivity in Android, Android Development Best Practices, Linux Kernel Security, Push Notification in Android.

Basic of Linux Administration

This course aims to provide skills in Linux Administration activities such as Application, User, Network Management, etc and Shell Programming.

Duration :	3 Weeks [4 hours per Day]
Contact Hours :	50 hours of lecture/tutorial/practical
Pre-requisites:	–
Course Content:	Introduction of Linux, Overview of Linux Architecture, Using Linux (commands and utilities), Linux Installation, Components: Kernel, Distribution, Distributions, Navigation in Linux, Productivity tools, Devices and Drives in Linux, File system Hierarchy, Network Management, User Management, Process Management, Shell programming, Backup and Recovery, Troubleshooting, Security.

System Administration

This course aims to teach the principles, theory and practice of system management, including operating system, network and system design, analysis, efficiency and security. Demonstrate essential IT support skills including installing, configuring, securing and troubleshooting operating systems and hardware. Demonstrate essential systems administration skills related to server operating systems, system and network service administration, and directory services administration.

Duration :	7 Weeks [4 hours per Day]
Contact Hours :	130 hours of lecture/tutorial/practical
Pre-requisites:	Course : Basic of Linux Administration
Course Content:	Introduction of System Administration, Common Administration Command Line Tools (kill, ping, tail, head, sed, cut, sort, crontab, wget, etc.), File Permissions, Managing Services, Networking Tools, NTP, Setting DNS, Configuring XFree86. Apache and MySQL Administration: Introduction of Apache web server and MySQL Database Engine, PHP scripting language, Managing Apache with PHP and MySQL services, Using MySQL Administrator, PHPMyAdmin : MySQL User Management, etc. Exploring WordPress and Coppermine. Firewall in Linux, Local Security, DNS Installation and Configuration Remote Connection using SSH, PuTTY and WinSCP, Samba Administration, Windows Integration, Automation Scripting using Shell Programming. Compiling Software, Customizing User Environment

Network Defense and Counter Measures

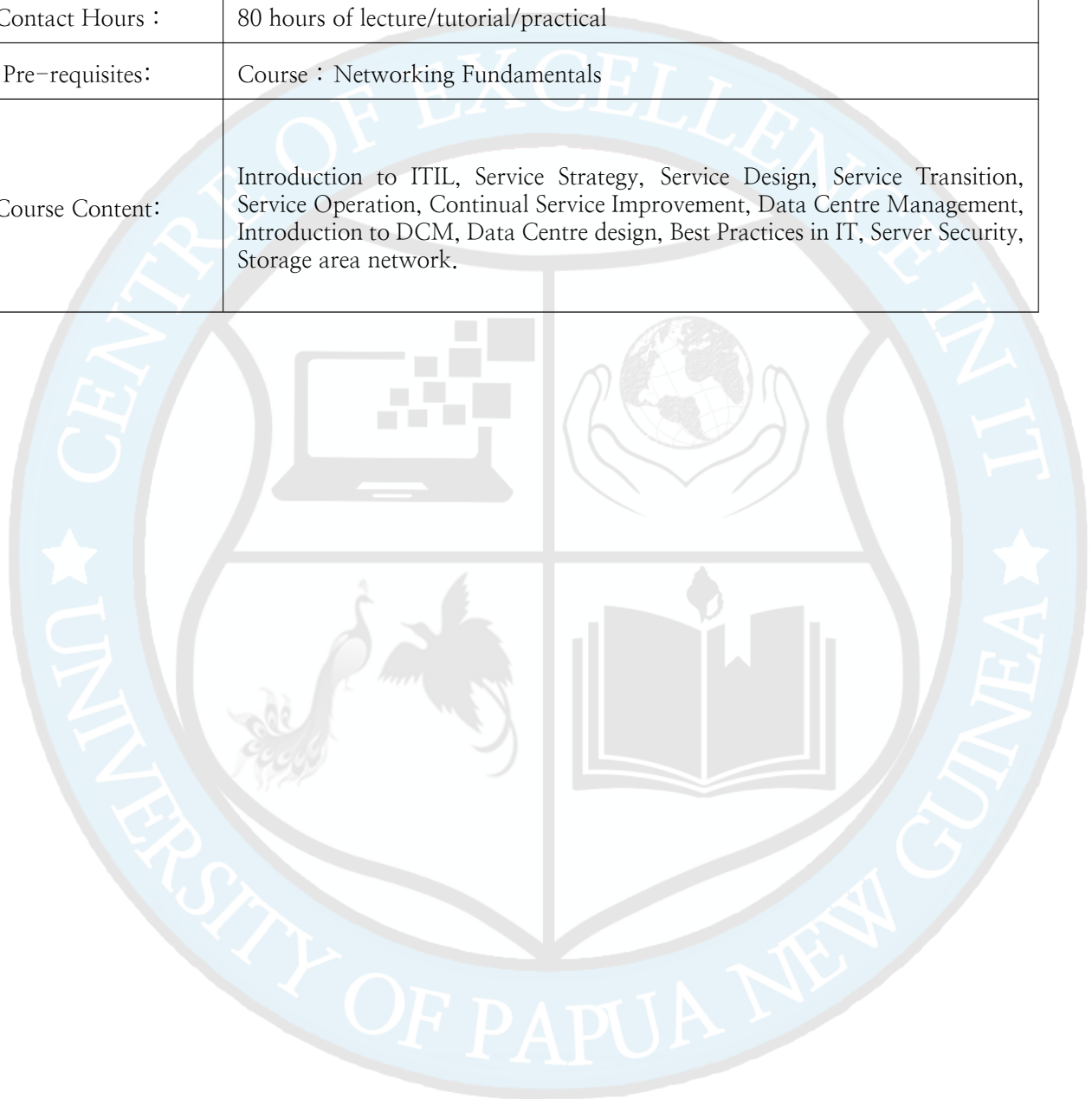
This course aims to provide expertise in design a network security defense. Develop a network security policy. Set up and maintain a virtual private network.

Duration :	5 Weeks [4 hours per Day]
Contact Hours :	100 hours of lecture/tutorial/practical
Pre-requisites:	Course : Networking Fundamentals
Course Content:	Security Fundamentals, Firewalls, Define the Types of Firewalls, Application Layer Firewalls, Packet Filtering Firewalls, Hybrids, Intrusion Detection and Prevention, Intrusion risks, Security Policy, Monitoring traffic and open ports, Detecting modified files, Investigating and Verifying Detected Intrusions, Recovering, Reporting and Documenting Intrusions, Define the Types of Intrusion Prevention Systems, Setup an IPS, Manage an IPS, Understand Intrusion Prevention, Issues with Intrusion Prevention, IP Signature and Analysis, Risk Analysis, Virtual Private Networks, Define Virtual Private Networks, Deploy User VPNs, Benefits of User VPNs, Managing User VPNs, Issues with User VPNs, Deploy Site VPNs, Benefits of Site VPNs, Managing Site VPNs, Issues with Site VPNs.

IT Infrastructure Management

This course aims to learn about IT Service Management best practices, generic concepts, key principles. Manage physical security of data centre taking into account requirements of standards.

Duration :	4 Week [4 hours per Day]
Contact Hours :	80 hours of lecture/tutorial/practical
Pre-requisites:	Course : Networking Fundamentals
Course Content:	Introduction to ITIL, Service Strategy, Service Design, Service Transition, Service Operation, Continual Service Improvement, Data Centre Management, Introduction to DCM, Data Centre design, Best Practices in IT, Server Security, Storage area network.



Windows Server

This course aims to provide skills on administration in Windows Server.

Table 27: Windows Server [CIT27]

Duration :	3 Weeks [4 hours per Day]
Contact Hours :	60 hours of lecture/tutorial/practical
Pre-requisites:	–
Course Content:	<p>Part 1: Deploying Windows Server, Preparing for Installation, Installing Windows Server, Introduction to Administering Accounts and Resources, Windows Server Family, Logging on to Windows Server, Installing and Configuring Administrative Tools, Creating User Accounts, Creating Computer Accounts, Creating an Organizational Unit. Managing User and Computer Accounts Modifying Users and Computer Account Properties, Enabling and Unlocking User and Computer Accounts, Creating a User Account Template, Locating User and Computer Accounts in Active Directory, Saving Queries, Resetting User and Computer Accounts, Moving Domain Objects. Managing Groups Creating Groups, Managing Group Membership, Strategies for Using Groups, Modifying Groups, Using Default Groups, Best Practices for Managing Groups.</p> <p>Part 2: Implementing & Managing Printing, File, Mail Installing and Sharing Printers, Managing Access to Printers Using Shared Printer Permissions, Managing Printer Drivers, Implementing Printer Locations, Changing the Location of the Print Spooler, Setting Printer Priorities, Scheduling Printer Availability, Configuring a Printing Pool, Sharing files, folders etc</p> <p>Part 3: Networking Windows Server, Networking Environment, Setting up and managing a Network, The Architecture of Active Directory, Using Active directories and domains, How Active Directory Works, Examining Active Directory, The Active Directory Design, Planning, and Implementation Processes, Managing Virtual Private Networks, Managing Advanced Network Services, Using Network Monitor, Managing Routing and Remote Access Services, Managing the Internet Authentication Service.</p> <p>Part 4: Communication and the Internet, Networking with TCP/IP, Managing the Domain Name System Service, Managing the Windows Internet Name System Service, Managing Internet Information Services, Managing Web Sites, Managing Routing and Remote Access Services, Managing the Internet Authentication Service, Managing the Dynamic Host Configuration Protocol, Communication and Internet Service.</p> <p>Part 5: Administrating Windows Server, Managing Windows Server, Controlling Windows Server 2016 security, Overview of Security in Windows Server, Monitoring Server Memory, Preparing for Disaster Recovery, Backing up Data, Using Security Templates to Secure Computers, Testing Computer Security Policy, Configuring Auditing, Managing Security Logs.</p>

Big Data Fundamentals

Student can gain exposure to concepts of Big Data, Big Data Skills and Sources of Big Data, Big Data Adoption, Characteristics of Big Data – The Four V’s, Understanding Big Data with Examples, The Big Data Platform, Technical Details of Big Data Components, Text Analytics and Streams, Cloud and Big Data.

Duration :	2 Weeks [4 hours per Day]
Contact Hours :	30 hours of lecture/tutorial/practical
Pre-requisites:	Course : Database Concepts / Database Technologies
Course Content:	Big Data – Beyond the Hype, Big Data Skills and Sources of Big Data, Big Data Adoption, What is Big Data?, Characteristics of Big Data – The Four V’s, Understanding Big Data with Examples, The Big Data Platform, Technical Details of Big Data Components, Text Analytics and Streams, Cloud and Big Data.

Statistical Analysis with R

Student can gain exposure to concepts in statistics to make sense out of data. Students can acquire practical skills to find, import, analyze and visualize data. This course explores statistics and equip with broad tools for understanding statistical inference and statistical methods. Students can also perform some really complex calculations and visualizations.

Duration :	5 Weeks [4 hours per Day]
Contact Hours :	90 hours of lecture/tutorial/practical
Pre-requisites:	Course: Big Data Fundamentals
Course Content:	<p>Probability & Statistics: Introduction to Statistics– Descriptive Statistics, Summary Statistics Basic probability theory, Statistical Concepts (uni-variate and bi-variate sampling, distributions, re-sampling, statistical Inference, prediction error), Probability Distribution (Continuous and discrete– Normal, Bernoulli, Binomial, Negative Binomial, Geometric and Poisson distribution), Bayes’ Theorem, Central Limit theorem, Data Exploration & preparation, Concepts of Correlation, Regression, Covariance, Outliers etc. R Programming : Introduction & Installation of R, R Basics, Finding Help, Code Editors for R, Command Packages, Manipulating and Processing Data in R, Reading and Getting Data into R, Exporting Data from R, Data Objects–Data Types & Data Structure. Viewing Named Objects, Structure of Data Items, Manipulating and Processing Data in R (Creating, Accessing, Sorting data frames, Extracting, Combining, Merging, reshaping data frames), Control Structures, Functions in R (numeric, character, statistical), working with objects, Viewing Objects within Objects, Constructing Data Objects, Building R Packages, Running and Manipulating Packages, Non parametric Tests– ANOVA, chi-Square, t-Test, U-Test, Introduction to Graphical Analysis, Using Plots(Box Plots, Scatter plot, Pie Charts, Bar charts, Line Chart), Plotting variables, Designing Special Plots, Simple Liner Regression, Multiple Regression.</p>

Data Visualization – Analysis and Reporting

This course aims to understand and apply principles of data visualization, acquire, parse, and analyze abstract data sets, design and implement standard visualization techniques.

Duration :	2 Weeks [4 hours per Day]
Contact Hours :	40 hours of lecture/tutorial/practical
Pre-requisites:	Course: Statistical Analysis with R
Course Content:	Information Visualization, Data Analytics Life Cycle, Analytic Processes and Tools, Analysis vs. Reporting, Modern Data Analytic Tools, Visualization Techniques, Visual Encodings, Visualization Algorithms, Data Collection and Binding, Cognitive Issues, Interactive Visualization, Visualizing Big Data – Structured vs Unstructured, Visual Analytics, Geomapping.

Business Analytics

Students will be able to understand the role of business analytics. Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization. Use decision-making tools/Operations Research techniques. Use advanced analytical tools to analyze complex problems under uncertainty. Manage business processes using analytical and management tools. Use analytics in customer requirement analysis, general management, marketing, finance, operations and supply chain management. Analyze and solve problems from different industries such as manufacturing, service, retail, software, banking and finance, sports, pharmaceutical, aerospace etc.

Duration :	3 Weeks [4 hours per Day]
Contact Hours :	60 hours of lecture/tutorial/practical
Pre-requisites:	Course: Data Visualization – Analysis and Reporting
Course Content:	Introduction to Business Analytics Using Some Case Studies, Making Right Business Decisions Based on Data, Exploratory Data Analysis – Visualization and Exploring Data, Descriptive Statistical Measures, Probability Distribution and Data, Sampling and Estimation, Statistical Interfaces, Predictive Modeling and Analysis, Regression Analysis, Forecasting Techniques, Simulation and Risk Analysis, Optimization, Linear, Non Linear, Integer, Decision Analysis, Strategy and Analytics, Overview of Factor Analysis, Directional Data Analytics, Functional Data Analysis.

Fundamentals of IoT

This course aims to provide knowledge in the concept of IoT and gives an introduction to a variety of IoT Terminologies.

Duration :	2 Week [4 hours per Day]
Contact Hours :	30 hours of lecture/tutorial/practical
Pre-requisites:	Course : Networking Fundamentals
Course Content:	IoT Architecture, Building Blocks, Things in IoT, Terminology – End Nodes/Sensor Nodes – Gateways – Servers/Cloud Platforms Applications of IoT Standards, History, IoT-a Reference Model, Architecture Enabling Technologies Talking to Environments – Available Sensors, Actuators, Sensor Nodes, Connectivity Solutions, Gateway Solutions Cloud Platforms, Challenges in IoT – Power Optimization, Mobility, Connectivity, Security.

IoT Prototyping using NodeJS

This course aims to provide skill in IoT by prototyping smart device using NodeJS Technology.

Duration :	2 Weeks [4 hours per Day]
Contact Hours :	30 hours of lecture/tutorial/practical
Pre-requisites:	Course : Fundamentals of IoT
Course Content:	NodeJS:–Setting Up NodeJS, Simple Scripts, Console Operations, Variables, Data Types, Operators, Control Structures, Functions, Arrays, String Handling, Classes & Objects, Event Handling, Error Handling, Package Management, Importing Libraries. NodeRED:– Setting Up NodeRED on Target Machine, Available Nodes, Inject, Debug, Significant Function Nodes, Creating Simple Flows, Sub Flows, Writing Functions, Importing, Exporting Flows, Context Management, Storing Data, Adding Additional Nodes, UI Development Using NodeRED.

Python Programming

This course aims to provide skill in high-level programming language, Python and how communication between different devices can be accomplished using web APIs.

Duration :	2 Week [4 hours per Day]
Contact Hours :	30 hours of lecture/tutorial/practical
Pre-requisites:	Course : Fundamentals of Computer and OS Concepts
Course Content:	Introduction to Python, Setting Up Python Interpreter, Data Types, Variables, Literals, Operators, Conditional Branching, Loops Arrays & Strings, Functions, Simple Programs, Console I/O Operations, Modules, Package Management, Regular Expressions, Pattern Matching, Error Handling, Standard Library, Overview of Python frameworks.

Embedded Linux

This course aims to provide an understanding of essentials of embedded Linux. Explain the components- tool chain, kernel, boot loader and root file system, etc.

Duration :	2 Weeks [4 hours per Day]
Contact Hours :	35 hours of lecture/tutorial/practical
Pre-requisites:	Course : Fundamentals of Computer and OS Concepts
Course Content:	Architecture of Embedded Linux: Kernel, System Calls, Libraries, Internals ; Process, Thread, File Handling, Getting Familiar with Linux Command Line, Environment Variables, Basic Administration, Deploying Linux on Target Board, Rootfs Image, File System Hierarchy, Understanding Boot Loaders for Target Boards. System Monitoring & Tracing Techniques: procfs, sysfs. Package Management on Linux, Understanding Cross Tools, Cross Compiling Applications, Peripheral Interfacing using Libraries: ADC, GPIO, PWM, UART

Wireless Network

Students will be introduced to some existing applications of wireless sensor actuator networks. Students will understand what research problems sensor networks pose in disciplines such as signal processing, wireless communications and even control systems

Duration :	2 Weeks [4 hours per Day]
Contact Hours :	30 hours of lecture/tutorial/practical
Pre-requisites:	Course : Fundamentals of IoT
Course Content:	Network Layer Model for IoT, Physical Channels for Communication (wired/wireless), IPv4 Concepts, TCP, UDP Protocols, Socket Programming, IEEE 802.11(WLAN), Bluetooth, Bluetooth Low Energy (BLE) – Protocols, Profiles, RFID Concepts.

Communication models and IoT Protocols

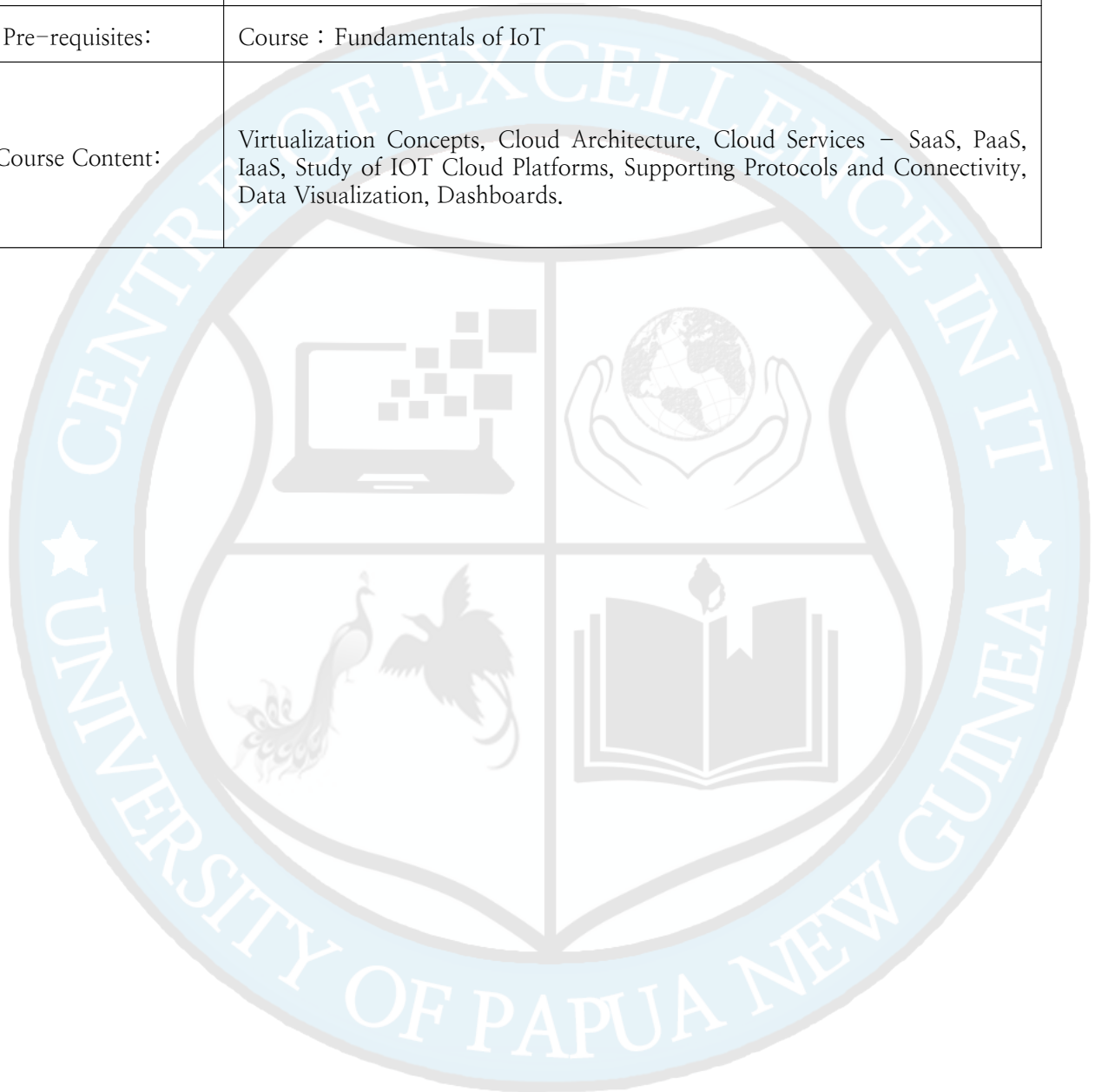
This course aims to provide expertise in effective communication between various layers of IoT Architecture, and Cloud Connectivity.

Duration :	2 Week [4 hours per Day]
Contact Hours :	35 hours of lecture/tutorial/practical
Pre-requisites:	Course: Fundamentals of IoT
Course Content:	M2M vs IOT, Communication Models, Request Response, Publish Subscribe, Push Pull, Exclusive Pair, Communication Protocols: MQTT, CoAP, Websockets, HTTP REST (GET, POST, PUT, DELETE) – Available Tools & Libraries for Above Protocols, Protocol Bridging, Interoperability.

Cloud Platforms for IoT

Student can gain exposure to concepts and internals of cloud computing.

Duration :	2 Weeks [4 hours per Day]
Contact Hours :	30 hours of lecture/tutorial/practical
Pre-requisites:	Course : Fundamentals of IoT
Course Content:	Virtualization Concepts, Cloud Architecture, Cloud Services – SaaS, PaaS, IaaS, Study of IOT Cloud Platforms, Supporting Protocols and Connectivity, Data Visualization, Dashboards.



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UPNG:

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PO Box 320, University 134
National Capital District
Papua New Guinea
Tel : (675) 326 0900/7200/7201
Web : www.upng.ac.pg

CEIT:

Centre of Excellence in IT
First Floor, Student Union Building,
Waigani Campus, The University of Papua New Guinea,
P.O. Box 320, Port Moresby Papua New Guinea
Tel : +675 3267424
Email : ceit@upng.ac.pg
Web : www.ceit.upng.ac.pg

CDAC:

Centre for Development of Advanced Computing
H.O.: Pune University Campus, Ganesh Khind,
Pune – 411 001 INDIA
Tel : +(91) 20 25704100
Web : www.cdac.in