John Wilson Education Society's

Wilson College (Autonomous)

Chowpatty, Mumbai-400007
RE-ACCREDITED 'A' grade by NAAC

Affiliated to the

UNIVERSITY OF MUMBAI

Syllabus for T.Y

Program: B.Sc. I.T

Program Code: WUSITC

Choice Based Credit System (CBCS) with effect from Academic year 2024–2025

PROGRAM OUTLINE 2024-2025

YEAR	SEM	COURSE CODE	COURSE TITLE	CREDITS
TY	V	WUSITC501	Introduction to Data Science	2
		WUSITC502	Linux System Administration	2
		WUSITC503	Android Mobile Programming	2
		WUSITC504	Dot .Net core programming	2
		WUSITC505	Enterprise Java	2
		WUSITC5P1	Introduction to Data Science (Practical)	2
		WUSITC5P2	Linux System Administration (Practical)	2
		WUSITC5P3	Android Mobile Programming (Practical)	2
		WUSITC5P4	Micro services practical	2
		WUSITC5P5	Enterprise Java (Practical)	2
	VI	WUSITC601	Software Quality Assurance	2
		WUSITC602	Security in Computing	2
		WUSITC603	Business Intelligence	2
		WUSITC604	Principles of Geographic Information Systems	2

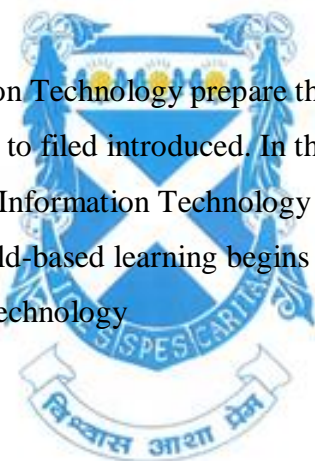|		WUSITC605	**Cyber Laws**	**2**
		WUSITC6P1	**Project Implementation(Practical)**	**2**
		WUSITC6P2	**Security in Computing(Practical)**	**2**
		WUSITC6P3	**Business Intelligence(Practical)**	**2**
		WUSITC6P4	**Principles of Geographic Information Systems(Practical)**	**2**
		WUSITC6P5	**Cyber Laws related to case study**	**2**

PROGRAMME SPECIFIC OUTCOME (PSOs)

After completing three years course of in Information Technology, the learner will be able to:

1. Equip with the professional & technical skills essential for making a career in the Front-end Developer, Back-end Developer, Software Tester, Programmer, Network Administrator, Security Expert etc.
2. Students would demonstrate the ability to apply research principles in a variety of creative, organizational, professional venues.
3. Apply the knowledge of engineering and management principles to manage projects effectively in diverse environments as a member or a leader in the team
4. Learners will understand technology as a system of interrelated forces, including automation, Robotics, Big data analytics, Advance Programming, Networking, Security, Cyber law, Regulatory constraints, and ethical concerns.
5. Learners will be able to create and design technological products, including website, software, robots, RFID, Hardware Automation, Also, will be able to become Software Engineer, Tester and Pen tester
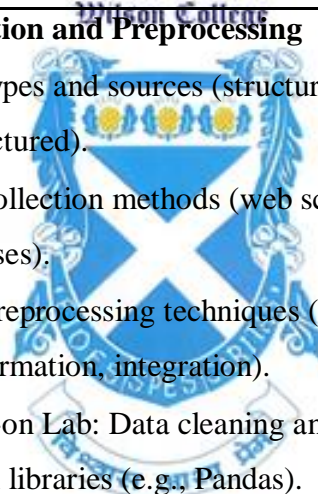
PREAMBLE:

1. With the introduction of Choice Based Credit System (CBCS) by the esteemed University of Mumbai from academic year 2016-17, the existing syllabus of **TYBSCIT** is restructured according to the CBCS pattern.

2. In the last two decades, the technology has made a paradigm shift in the way society functions. Media, being the important segment of the society plays a pivotal role in the political, sociological, psychological, and economical aspects in society. In addition to the knowledge of the technical skills of mass media, the current syllabus orients to the theoretical framework relating to media-audience relationship.

3. The first year of BSCIT course introduces the students to various fields available under the umbrella of mass Programming, Mathematics, Communication Skills, Software's, Database, Website Design.

4. The fundamentals of Information Technology prepare the students for advanced theoretical and practical related to filed introduced. In the second year of BSCIT, followed by the elaboration on Information Technology research concepts and methodologies. Inclusion of field-based learning begins in the third year of BSCIT, with specialization in Information Technology

PROGRAM(s): TYBSCIT		SEMESTER: V				
Course: **Introduction to Data science**		**Course Code: WUSITC501**				
Teaching Scheme						**Evaluation Scheme**
Lectures (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Continuous Internal Assessment (CIA) (Marks- 40)**		**Semester End Examination (Marks- 60)**
3	2	-	2	40		60

Learning Objectives:

1. Explain the importance of and be able to formulate a data analysis problem statement that is clear, concise, and measurable.
2. Identify and appropriately acknowledge sources of data.
3. Be able to apply basic data cleaning techniques to prepare data for analysis.
4. Be able to identify the categorical and/or numerical data types in a given data set.
5. Apply appropriate descriptive and inferential methods to summarize data and identify associations and relationships.

Course Outcomes:
After the end of the course, the learner will be able to:

1. Identify goals and methods of testing hypotheses.
2. Explain the bootstrap methods.
3. Identify legal issues surrounding the use of data.
4. Mine data to develop predictive models and evaluation.

DETAILED SYLLABUS

Course Code/ Unit	Sub unit	Course/ Unit Title	Credits/ Lectures
I		**Introduction to Data Science**	6L
	1.1	• Definition and scope of Data Science. • Evolution and significance of Data Science in various industries. • Data Science workflow and lifecycle.	
	1.2	**Data Acquisition and Preprocessing** • Data types and sources (structured, semi-structured, unstructured). • Data collection methods (web scraping, APIs, databases). • Data preprocessing techniques (cleaning, transformation, integration). • Hands-on Lab: Data cleaning and preprocessing using Python libraries (e.g., Pandas).	
II		**Exploratory Data Analysis (EDA) and Data Visualization**	6L
	2.1	**Exploratory Data Analysis (EDA)** • Descriptive statistics (mean, median, mode, variance, etc.). • Data summarization and visualization techniques. • Data distribution and correlation analysis.	

	2.2	**Data Visualization**	
		• Principles of effective data visualization.	
		• Introduction to visualization tools (Matplotlib, Seaborn).	
		• Hands-on Lab: Creating various types of visualizations and interpreting data using Python libraries.	
III		**Machine Learning Fundamentals**	6L
	3.1	**Introduction to Machine Learning**	
		• Basic concepts and types of machine learning (supervised, unsupervised, reinforcement learning).	
		• Model training, evaluation, and validation.	
	3.2	**Supervised Learning**	
		• Regression and classification algorithms (linear regression, logistic regression, decision trees, etc.).	
		• Model evaluation metrics (accuracy, precision, recall, F1-score).	
		• Hands-on Lab: Implementing supervised learning algorithms for regression and classification tasks.	
IV		**Unsupervised Learning and Dimensionality Reduction**	6L
	4.1	**Unsupervised Learning**	
		• Clustering algorithms (K-means, hierarchical clustering, DBSCAN).	
		• Dimensionality reduction techniques (PCA, t-SNE).	
		• Feature Engineering	

	4.2	**Feature selection and extraction techniques.** ● Handling categorical data and feature scaling. ● Hands-on Lab: Applying clustering and dimensionality reduction techniques on real-world datasets.	
V		**Advanced Topics in Data Science**	6L
	5.1	**Big Data and Distributed Computing** ● Introduction to big data technologies (Hadoop, Spark). ● Distributed computing frameworks for processing large datasets. ● Deep Learning	
	5.2	**Introduction to neural networks and deep learning.** ● Deep learning frameworks (TensorFlow, Keras). ● Hands-on Lab: Building and training deep learning models for image classification or natural language processing tasks.	

References:

Books and References:

1. Practical Data Science Andreas François Vermeulen APress 2018

2. Principles of Data Science Sinan Ozdemir PACKT 2016

3. Data Science from Scratch Joel Grus O'Reilly 2015

PRACTICAL

Course code WUSITC5P1	Introduction to Data Science PRACTICAL	CREDITS (2 credits)
1	Perform data cleaning and pre-processing on a dataset containing missing values and outliers.	
2	Conduct Exploratory Data Analysis (EDA) on a dataset and visualize the key findings.	
3	Implement linear regression to predict housing prices based on various features.	
4	Use classification algorithms to classify emails as spam or non-spam.	
5	Apply clustering techniques to segment customers based on their purchase history.	
6	Perform dimensionality reduction on a high-dimensional dataset and visualize the reduced dimensions.	
7	Implement a recommendation system using collaborative filtering techniques.	
8	Use Spark to process and analyze a large dataset stored in HDFS.	
9	Build a convolutional neural network (CNN) for image recognition tasks.	
10	Develop a natural language processing (NLP) model for sentiment analysis using recurrent neural networks (RNNs).	

PROGRAM: TYBSCIT	SEMESTER: V
Course: Linux System Administration	Course Code: WUSITC1502

Teaching Scheme					Evaluation Scheme
Lectures (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Continuous Internal Assessment (CIA) (Marks- 40)**	**Semester End Examination (Marks- 60)**
3	2	-	2	40	60

Learning Objectives:

  Install linux platform and gain familiarity with the installation process for a Linux distribution.

1. Navigate the command line interface (CLI) and execute basic Linux commands for system management.

2. Manage files and directories using command-line tools, understanding the file hierarchy and path navigation.

3. Utilize different methods to get help within the Linux environment, including main pages and online resources.

4. Edit text files using command-line editors (such as vi or nano) and process text files with command-line tools. Create, manage, and understand the importance of Linux users and groups, along with implementing password policies.

5. Set and interpret file system permissions, ensuring the security and proper access control of files and directories.

6. Manage processes, services, and daemons, particularly through the use of systemd and systemctl.

7. Configure and use OpenSSH for secure remote access, and analyze system logs for troubleshooting and understanding system events.

8. Perform basic network configurations, handle file archiving and transfers, manage software packages, and understand the essentials of system virtualization.

Course Outcomes:
At the end of the course, the learner will be able to:
1. Learner will able to work on complete another operating system
2. Learner will be able to work and have client and server communication on linux platform
3. learner will be able to communicate between linux and Window OS

DETAILED SYLLABUS

Course Code/ Unit	Subunit	Course/ Unit Title	Lectures
I		**Introduction to Red Hat Enterprise Linux:**	6L
	1.1	Linux, Open Source and Red Hat, Origins of Linux, Distributions, Duties of Linux System Administrator.	
	1.2	**Managing Software:** Understanding RPM, Understanding Meta Package Handlers, Creating Your Own Repositories, Managing Repositories, Installing Software with Yum, Querying Software, Extracting Files from RPM Packages	
	1.3	**Command Line:** Working with the Bash Shell, Getting the Best of Bash, Useful Bash Key Sequences, Working with Bash History, Performing Basic File System Management Tasks, Working with Directories, Piping and Redirection, Finding Files	
	1.4	**System Administration Tasks:** Performing Job Management Tasks, System and Process Monitoring and Management, Managing Processes with ps, Sending Signals to Processes with the kill Command, using top to Show Current System Activity, Managing Process Niceness, Scheduling Jobs, Mounting Devices, Working with Links, Creating Backups, Managing Printers, Setting Up System Logging, Setting Up Rsyslog, Common Log Files, Setting Up Logrotate	
II		**Configuring and Managing Storage:**	6L
	2.1	**Configuring and Managing Storage:** Understanding Partitions and Logical Volumes, Creating Partitions, Creating File Systems,	

Course Code/ Unit	Subu nit	Course/ Unit Title	Lectures
		File Systems Overview, Creating File Systems, Changing File System Properties, Checking the File System Integrity, Mounting File Systems Automatically Through fstab, Working with Logical Volumes, Creating Logical Volumes, Resizing Logical Volumes, Working with Snapshots, Replacing Failing Storage Devices, Creating Swap Space, Working with Encrypted Volumes	
	2.2	**Connecting to the Network:** Understanding NetworkManager, Working with Services and Runlevels, Configuring the Network with NetworkManager, Working with system-config-network, NetworkManager Configuration Files, Network Service Scripts, Networking from the Command Line, Troubleshooting Networking, Setting Up IPv6, Configuring SSH, Enabling the SSH Server, Using the SSH Client, Using PuTTY on Windows Machines, Configuring Key- Based SSH Authentication, Using Graphical Applications with SSH, Using SSH Port Forwarding, Configuring VNC Server Access	
	2.3	**Working with Users, Groups, and Permissions:** Managing Users and Groups, Commands for User Management, Managing Passwords, Modifying and Deleting User Accounts, Configuration Files, Creating Groups, Using Graphical Tools for User, and Group Management, Using External Authentication Sources, the Authentication Process, sssd, nsswitch, Pluggable Authentication Modules, Managing Permissions, the Role of Ownership, Basic Permissions: Read, Write, and Execute, Advanced Permissions, Working with Access Control	
	2.4	Lists, Setting Default Permissions with umask, Working with Attributes	

Course Code/ Unit	Subunit	Course/ Unit Title	Lectures
III		**Securing Server with iptables:**	6L
	3.1	**Securing Server with iptables:** Understanding Firewalls, Setting Up a Firewall with system-config-firewall, Allowing Services, Trusted Interfaces, Masquerading, Configuration Files, Setting Up a Firewall with iptables, Tables, Chains, and Rules, Composition of Rule, Configuration Example, Advanced iptables Configuration, Configuring Logging, The Limit Module, Configuring NAT	
	3.2	Setting Up Cryptographic Services: Introducing SSL, Proof of Authenticity: The Certificate Authority, Managing Certificates with openssl, Creating a Signing Request, Working with GNU Privacy Guard, Creating GPG Keys, Key Transfer, Managing GPG Keys, Encrypting Files with GPG, GPG Signing, Signing RPM Files	
	3.3	Configuring Server for File Sharing: What is NFS? Advantages and Disadvantages of NFS, Configuring NFS4, Setting Up NFSv4, Mounting an NFS Share, Making NFS Mounts Persistent, Configuring Automount, Configuring Samba, Setting Up a Samba File Server, Samba Advanced Authentication Options, Accessing Samba Shares, Offering FTP Services.	
IV		**Configuring DNS and DHCP:**	6L
	4.1	**Configuring DNS and DHCP:** Introduction to DNS, The DNS Hierarchy, DNS Server Types, The DNS Lookup Process, DNS Zone Types, Setting Up a DNS Server, Setting Up a Cache-Only Name Server, Setting Up a Primary Name Server, Setting Up a Secondary Name Server, Understanding DHCP, Setting Up a DHCP Server	

Course Code/ Unit	Subunit	Course/ Unit Title	Lectures
	4.2	Setting Up a Mail Server: Using the Message Transfer Agent, the Mail Delivery Agent, the Mail User Agent, Setting Up Postfix as an SMTP Server, Working with Mutt, Basic Configuration, Internet Configuration, Configuring Dovecot for POP and IMAP	
	4.3	Configuring Apache on Red Hat Enterprise Linux: Configuring the Apache Web Server, creating a Basic Website, Understanding the Apache Configuration Files, Apache Log Files, Working with Virtual Hosts, Securing the Web Server with TLS Certificates, Configuring Authentication, Setting Up Authentication with .htpasswd, Configuring LDAP Authentication, Setting Up MySQL	
V		**Introducing Bash Shell Scripting:**	6L
	5.1	**Introducing Bash Shell Scripting:** Introduction, Elements of a Good Shell Script, Executing the Script, Working with Variables and Input, Understanding Variables, Variables, Subshells, and Sourcing, Working with Script Arguments, Asking for Input, Using Command Substitution, Substitution Operators, Changing Variable Content with Pattern Matching, Performing Calculations, Using Control Structures, Using if...then...else, Using case, Using while, Using until, Using for, Configuring booting with GRUB.	
	5.2	**High-Availability Clustering**: High-Availability Clustering, The Workings of High Availability, High-Availability Requirements, Red Hat High-Availability Add-on Software, Components, Configuring Cluster-Based Services, Setting Up Bonding, Setting Up Shared Storage, Installing the Red Hat High Availability Add-On, Building the Initial State of the Cluster,	

Course Code/ Unit	Subunit	Course/ Unit Title	Lectures
		Configuring Additional Cluster Properties, Configuring a Quorum Disk, Setting Up Fencing, Creating Resources and Services, Troubleshooting a Nonoperational Cluster, Configuring GFS2 File Systems	
		Setting Up an Installation Server: Configuring a Network Server as an Installation Server, Setting Up a TFTP and DHCP Server for PXE Boot, Installing the TFTP Server, Configuring DHCP for PXE Boot, Creating the TFTP PXE Server Content, creating a Kickstart File, Using a Kickstart File to Perform an Automated, Installation, Modifying the Kickstart File with, system-config-kickstart, Making Manual Modifications to the Kickstart File	

References:

Books and References:

1. Red Hat Enterprise Linux 6 Administration by Sander van Vugt
2. Red hat Linux Networking and System Administration by Terry Collings and Kurt Wall
3. Linux Administration: A Beginner's Guideb by Wale Soyinka

PRACTICAL

Practical No WUSITC5P2	Linux System Administration Practical	CREDITS (2 CREDITS)
1	**Installation of RHEL &** **Graphical User Interface and Command Line Interface and Processes**	
a	Exploring the Graphical Desktop	
b	The Command Line Interface	
c	Managing Processes	
2	**Storage Devices and Links, Backup and Repository**	
a	Working with Storage Devices and Links	
b	Making a Backup	
c	Creating a Repository	
3	**Working with RPMsm Storage and Networking**	
a	Using Query Options	

b	Extracting Files From RPMs	
c	Configuring and Managing Storage	
d	Connecting to the Network	
4	Working with Users, Groups, and Permissions	
5	**Firewall and Cryptographic services**	
a	Securing Server with iptables	
b	Setting Up Cryptographic Services	
6	**Configuring Server for File Sharing**	
a	Configuring NFS Server and Client	
b	Configuring Samba	
c	Configuring FTP	
7	**DNS, DHCP and Mail Server**	
a	Configuring DNS	
b	Configuring DHCP	
c	Setting Up a Mail Server	

8	**Web Server**	
a	Configuring Apache on Red Hat Enterprise Linux	
b	Writing a Script to Monitor Activity on the Apache Web Server	
c	Using the select Command	
9	**Shell Scripts and High-Availability Clustering**	
a	Writing Shell Scripts	
b	Configuring Booting with GRUB	
c	Configuring High Availability Clustering	
10	**Setting Up an Installation Server**	
a	Configuring Network Server as an Installation Server	
b	Setting Up a TFTP and DHCP Server for PXE Boot	

PROGRAM: TYBSCIT	SEMESTER: V
Course: Android Mobile Programming	**Course Code: WUSITC503**

Teaching Scheme					Evaluation Scheme
Lectures (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Continuous Internal Assessment (CIA) (Marks- 40)**	**Semester End Examination (Marks- 60)**
3	**2**	**-**	**2**	**40**	**60**

Learning Objectives:

1. Covers introductory mobile application development for the Android Operating System using XML and Java.
2. Includes developing simple applications that could run on Android phones and tablets.
3. Covers Android application development phases, terminologies, application design, and coding. Recommended: prior completion of or concurrent enrolment in CIS 133J.

Course Outcomes:
After the end of the course, the learner will be able to:
1. Install and configure Android application development tools.
2. Design and develop user Interfaces for the Android platform.
3. Save state information across important operating system events.
4. Apply Java programming concepts to Android application development.

DETAILED SYLLABUS

Course Code/ Unit	Subunit	Course/ Unit Title	Credits/ Lectures
I		**Introduction to Kotlin:**	6L

	1.1	Basics of Kotlin, type conversions, comments, Kotlin operators, variables in Kotlin, packages, visibility modifiers, control flow statements, Concept of OOPS in Kotlin, classes in Kotlin, delegation and extension functions, the companion object, Advanced Concepts in Kotlin: declaring and calling functions, parameters, and arguments in Kotlin, default argument, variable number of arguments, unit-returning function, explicit return type, lambda expression, coroutines, Collections in Kotlin, Mutable and Immutable Collections, Ranges, type Checks, casting concept, this expression, Null safety, exception handling, annotations		
	1.2	App Development with Android Studio: Android Architecture, Android Application Framework, Android Virtual Device, Creating and running First Android Application, working with Physical Android Device, Adding Kotlin Files in Android Studio		
	1.3	Basics Of Android- Application Components: Activities, Intent, and Broadcast Receiver, Services, Fragment, Activity Life Cycle, Content Provider, Widgets, and Notifications		
II		**Designing Android UI:**	6L	
	2.1	User Interface (UI), Layout and Its Types, Layout Attribute, working with Views, Android UI Controls, Styles and Themes, Event Handler, setting up themes in Manifest and from the application, dialog in activity, using intents, fragme		
	2.2	Handle Images, Listview And Menu: ImageView, ImageSwitcher, ListView, Menu, and its types, Designing menu in XML, Option menu, Context menu, popup menu, Screen Navigation, RecyclerView, Interaction of Views Data binding in Android-AdapterView, Spinner, Gallery view,		

		AutotextCompleteView, screen orientation, Design the view dynamically	
III		**Data binding in Android**	6L
	3.1	AdapterView, Spinner, Gallery view, AutotextCompleteView, screen orientation, Design the view dynamically	
	3.2	Implementing Data Persistence: Data Storage-Shared Preference, Internal And External Storage Storing Data Using SQLite Databases, Content Provider, Firebase Real-Time Data	
IV		**Graphics, Animations, and Integrating Media in Android:**	6L
	4.1	Drawable Class, Animation in Android, MediaPlayer API	
	4.2	Android, Mediaplayer and AudioManger Class,	
	4.3	Interacting With Camera and input gestures: Android Camera, Input gestures-multiple touch, swipe, drag, scroll, zoom, Recording	
V		**Gathering Location Data: Managing Background Tasks:**	6L
	5.1	Broadcaset Receivers, Services, Threads and Process, AsyncTask, JobScheduler, Manage device Awake State Deploying Android applications on Google Play-Publishing/Deploy the application, Versioning, signing Application	

Textbooks:

1. How to Build Android Apps with Kotlin: A hands-on guide to developing, testing, and publishing your first apps with Android, Alex Forrester, Packt Publishing, 2021
2. Android Programming: Crafting UI/UX using Kotlin, SYBGEN Learning, 2020

PRACTICAL

Course code WUSITC5P3	Android Mobile Programming PRACTICAL	CREDITS (2 Credits)
1	Write a program using Kotlin to implement control structures and loops	
2	Write an android application demonstrating response to event/user interaction for a. Checkbox b. Radio button c. Button d. Spinne	
3	i. Create an application to create Image Flipper and Image Gallery. On click on the image display the information about the image. ii. Create an application to use Gridview for shopping cart application.	
4	i. Create an Android application to demonstrate implicit and explicit intents ii. Create an application to demonstrate shared preferences	
5	i. Create an Android application to demonstrate the use of Broadcast listeners. ii. Create an Android application to create and use services.	
6	i. Create an Android application to demonstrate XML based animation ii. Create an Android application to display canvas and allow the user to draw on it.	
7	i. Create a media player application in android that plays audio. Implement play, pause, and loop features.	

	ii. Create an Android application to use a camera and capture image/video and display them on the screen	
8	i. Create an android application to implement Asynctask and threading concepts. ii. Create an Android application to demonstrate the different types of menus. a. Pop-up Menu b. Context Menu c. Option Menu	
9	Create an Android application to record the current location. Based on the current location allow the user to use some useful services/applications	
10	Create a suitable Android application to store and retrieve data in the SQLite database.	

PROGRAM: TYBSCIT	SEMESTER: V
Course: Dot .Net core programming	**Course Code: WUSITC504**

Teaching Scheme					Evaluation Scheme
Lectures (Hours per week)	**Practical (Hours per week)**	**Tutoria l (Hours per week)**	**Credit**	**Continuous Internal Assessment (CIA) (Marks- 40)**	**Semester End Examination (Marks- 60)**
3	2	-	2	40	60

Learning Objectives:
1. To learn about basic features of ASP.NET and its controls
2. To create an ASP.NET application using standard .NET Controls
3. To learn about connecting data sources using ADO.NET and managing them

Course Outcomes:
After the end of the course, the learner will be able to:
1. Learners will be able to design web applications using ASP.NET
2. Learners will be able to use ASP.NET controls in web applications
3. Learners will be able to create database driven ASP.NET web applications and web services

DETAILED SYLLABUS

Course Code/ Unit	Subu nit	Course/ Unit Title	Credits/ Lectures
I		**Introduction to Dot Net Framework:**	6L
	1.1	**Introduction to Dot Net Framework:**	
	1.2	Understanding the fundamentals of the Dot Net framework and its architecture.	
	1.3	Exploring the advantages and applications of Dot Net in software development.	

II		**C# Programming Language:**	6L
	2.1	C# Programming Language:	
	2.2	Mastering the C# programming language, including syntax, data types, control structures, and object-oriented programming principles. Hands-on exercises and projects to reinforce learning and practical application of concepts.	
III		**ASP.Net Web Development:**	6L
	3.1	ASP.Net Web Development:	
	3.2	Building dynamic web applications using **ASP.Net**, including web forms, MVC (Model-View-Controller), and Web API. Exploring advanced topics such as authentication, authorization, and session management in **ASP.Net**.	
IV		**Database Integration with ADO.Net:**	6L
	4.1	Database Integration with ADO.Net	
	4.2	Integrating databases with Dot Net applications using **ADO.Net**.	
	4.3	Understanding database connectivity, data retrieval, manipulation, and error handling techniques.	
V		**Dot Net Framework Tools and Libraries:**	6L
	5.1	Dot Net Framework Tools and Libraries:	
		Exploring the extensive set of tools and libraries available in the Dot Net framework for application development. Leveraging frameworks such as Entity Framework for data access and LINQ for querying data.	

		Deployment and Hosting:	
		Understanding the deployment process for Dot Net applications, including configuration, optimization, and troubleshooting. Exploring hosting options, including on-premises servers and cloud platforms like Azure.	

PRACTICAL

Course code WUSITC5P4	Micro Service Practical	CREDITS (2 credits)
1	Write a console application that obtains four int values from the user and displays the product Wilson College	
2	If you have two integers stored in variables var1 and var2, what Boolean test can you perform to see if one or the other (but not both) is greater than 10?	
3	Write programs using conditional statements and loops: Generate various patterns (triangles, diamond and other patterns) with numbers.	
4	Write a program to declare a class „staff" having data members as name and post.accept this data 5for 5 staffs and display names of staff who are HOD.	
5	Write a program to declare class „Distance" have data members dist1,dist2 ,dist3. Initialize the two data members using constructor and store their addition in third data member using function and display addition.	
6	Write a program to implement single inheritance from following figure. Accept and display data for one table.	
7	Define a class „salary" which will contain member variable Basic, TA, DA, HRA. Write a program using Constructor with default values for DA and HRA and calculate the salary of employee.	

8	Create an application that allows the user to enter a number in the textbox named „getnum". Check whether the number in the textbox „getnum" is palindrome or not. Print the message accordingly in the label control named lbldisplay when the user clicks on the button „check"	
9	Design the same webpages for BMS, BAF, BscIT students and apply same background color for all the pages using css	
10	Change the font family and color of all heading of above webpage using css.	

PROGRAM: TYBSCIT			SEMESTER: V			
Course: Enterprise Java			Course Code: WUSITC505			
Teaching Scheme						**Evaluation Scheme**
Lectures (Hours per week)	**Practical (Hours per week)**	**Tutoria l (Hours per week)**	**Credit**	**Continuous Internal Assessment (CIA) (Marks- 40)**		**Semester End Examination (Marks- 60)**
3	2	-	2	40		60

Learning Objectives:
1. Explore advanced topic of Java programming for solving problems
2. Be able to put into use the advanced features of the Java language to build and compile robust enterprise grade applications
3. Provide a sound foundation to the students on the concepts, precepts and practices, in a field that is of immense concern to the industry and business

Course Outcomes:
After the end of the course, the learner will be able to:
1. Understand the concepts related to Java Technology
2. Explore and understand use of Java Server Programming
3. Create dynamic web pages, using Servlets and JSP Make a resusable software component, using Java Bean

DETAILED SYLLABUS

Course Code/ Unit	Subu nit	Course/ Unit Title	Credits/ Lectures
I		**Understanding Java EE:**	6L

	1.1	Understanding Java EE: What is an Enterprise Application? What is java enterprise edition? Java EE Technologies, Java EE evolution, Glassfish server	
	1.2	Java EE Architecture, Server and Containers: Types of System Architecture, Java EE Server, Java EE Containers. Introduction to Java Servlets: The Need for Dynamic Content, Java Servlet Technology, Why Servlets? What can Servlets do? Servlet API and Lifecycle: Java Servlet API, The Servlet Skeleton, The Servlet Life Cycle, A Simple Welcome Servlet Working with Servlets: Getting Started, Using Annotations Instead of Deployment Descriptor. Working with Databases: What Is JDBC? JDBC Architecture, Accessing Database, The Servlet GUI and Database Example.	
II		**Request Dispatcher:**	6L
	2.1	Resquestdispatcher Interface, Methods of Requestdispatcher, Requestdispatcher Application. COOKIES: Kinds of Cookies, Where Cookies Are Used? Creating Cookies Using Servlet, Dynamically Changing the Colors of A Page SESSION: What Are Sessions? Lifecycle of Http Session, Session Tracking With Servlet API, A Servlet Session Example	
		Working with Files: Uploading Files, Creating an Upload File Application, Downloading Files, Creating a Download File Application. Working with Non-Blocking I/O: Creating a Non-Blocking Read Application, Creating The Web Application, Creating Java Class, Creating Servlets, Retrieving The File, Creating index.jsp	
III		**Introduction To Java Server Pages:**	6L
	3.1	Why use Java Server Pages? Disadvantages Of JSP, JSP v\s Servlets, Life Cycle of a JSP Page, How does a JSP function? How doesJSP execute? AboutJava	

		Server Pages Getting Started With Java Server Pages: Comments, JSP Document, JSP Elements, JSP GUI Example. Action Elements: Including other Files, Forwarding JSP Page to Another Page, Passing Parameters for other Actions, Loading a Javabean.	
	3.2	Java Server Pages Standard Tag Libraries: What is wrong in using JSP Scriptlet Tags? How JSTL Fixes JSP Scriptlet's Shortcomings? Disadvantages OfJSTL, Tag Libraries.	
IV		**Introduction To Enterprise Javabeans:**	6L
	4.1	Enterprise Bean Architecture, Benefits of Enterprise Bean, Types of Enterprise Bean, Accessing Enterprise Beans, Enterprise Bean Application, Packaging Enterprise Beans Working with Session Beans: When to use Session Beans? Types of Session Beans, Remote and Local Interfaces, Accessing Interfaces, Lifecycle of Enterprise Beans, Packaging Enterprise Beans, Example of Stateful Session Bean, Example of Stateless Session Bean, Example of Singleton Session Beans.	
	4.2	Working with Message Driven Beans: Lifecycle of a Message Driven Bean, Uses of Message Driven Beans, The Message Driven Beans Example. Interceptors: Request and Interceptor, Defining An Interceptor, AroundInvoke Method, Applying Interceptor, Adding An Interceptor To An Enterprise Bean, Build and Run the Web Application. Java Naming and Directory Interface: What is Naming Service? What is Directory Service? What is Java Naming and Directory interface? Basic Lookup, JNDI Namespace in Java EE, Resources and JNDI, Datasource Resource Definition in Java EE.	
V		**Persistence, Object/Relational Mapping And JPA:**	6L

5.1	What is Persistence? Persistence in Java, Current Persistence Standards in Java, Why another Persistence Standards? Object/Relational Mapping, Introduction to Java Persistence API: The Java Persistence API, JPA, ORM, Database and the Application, Architecture of JPA, How JPA Works? JPA Specifications. Writing JPA Application: Application Requirement Specifications, Software Requirements, The Application Development Approach, Creating Database and Tables in Mysql, creating a Web Application, Adding the Required Library Files, creating a Javabean Class, Creating Persistence Unit [Persistence.Xml], Creating JSPS, The JPA Application Structure, Running the JPA Application.	
5.2	Introduction to Hibernate: What is Hibernate? Why Hibernate? Hibernate, Database and The Application, Components of Hibernate, Architecture of Hibernate, How Hibernate Works? Writing Hibernate Application: Application Requirement Specifications, Software Requirements, The Application Development Approach, Creating Database and Tables in Mysql, creating a Web Application, Adding the Required Library Files, creating a Javabean Class, Creating Hibernate Configuration File, Adding a Mapping Class, Creating JSPS, Running The Hibernate Application.	

Books and References:

1. Java EE 7 For Beginners by Sharanam Shah, Vaishali Shah 2017
2. Java EE 8 Cookbook: Build reliable applicationswith the most robust and mature technology for enterprise development by Elder Moraes 2018
3. Advanced JavaProgramming by Uttam Kumar Roy 2015

PRACTICAL

Course code WUSITC5P5	Enterprise Java PRACTICAL	CREDITS (2 credits)
1	Implement the following Simple Servlet applications.	
2	Implement the following Servlet applications with Cookies and Sessions.	
3	Implement the Servlet IO and File applications.	
4	Implement the following JSP applications.	
5	Implement the following JSP JSTL and EL Applications.	
6	Implement the following EJB Applications.	
7	Implement the following EJB applications with different types of Beans.	
8	Implement the following JPA applications.	

TYIT 2024-2025(Autonomous)

Modality of Assessment:-

Internal Assessment- 40%- 40 Marks per paper(CIA-I and CIA-II)

Sr.No.	Evaluation Type	Marks
1	**Written Objective Examination(CIA-I)**	**20**
2	**Assignment/ Case study/ field visit report/ presentation/ project/Industrial visit(CIA-II)**	**20**
	Total-(Marks)	**40**

External Examination- 60 Marks per

Paper Pattern for Semester End Theory **Regular**

External Examination:
1. Duration - These examinations shall be of **two hours** duration.
2. **Theory question paper pattern:**
3. There shall be --------- questions each of marks one on each unit.
4. All questions shall be compulsory with internal choice within the questions.

Q.1 Attempt any THREE of the following?   [12 Marks]
1. **Q**
2. **Q**
3. **Q**
4. **Q**
5. **Q**
6. **Q**

Q.2 Attempt any THREE of the following?   [12 Marks]
1. **Q**
2. **Q**
3. **Q**
4. **Q**
5. **Q**

    6. **Q**

Q.3Attempt any THREE of the following?   [12 Marks]

    1. **Q**
    2. **Q**
    3. **Q**
    4. **Q**
    5. **Q**
    6. **Q**

Q.4 Attempt any THREE of the following?   [12Marks]

    1. **Q**
    2. **Q**
    3. **Q**
    4. **Q**
    5. **Q**
    6. **Q**

Q.5 Attempt any THREE of the following?   [12Marks]

    1. **Q**
    2. **Q**
    3. **Q**
    4. **Q**
    5. **Q**
    6. **Q**

-

Practical Examination Pattern:

Course	501		601	Marks
Practicals	50(External Practical Examination)	50	50(External Practical Examination)	50

PRACTICAL BOOK/JOURNAL

    1. The students are required to perform 75% of the Practical for the journal to be duly certified.

    2. The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.

Overall Examination & Marks Distribution Pattern

Semester V & VI

Course	501 (SEMESTER V)		601 (SEMESTER VI)	

	Internal	External	Total	Internal	External	Total
Theory	40	60	100	40	60	100
Practicals	50(External Practical Examination)		50	50(External Practical Examination)		50

PRACTICAL BOOK/JOURNAL

The students are required to perform 75% of the Practical for the journal to be duly certified. The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.

Overall Examination & Marks Distribution Pattern

Semester V & VI

Course	501			601			Grand Total
	Internal	External	Total	Internal	External	Total	
Theory	40	60	100	40	60	100	200
Practicals	20	30	50	20	30	50	100

SEMESTER VI

PROGRAM: TYBSCIT	SEMESTER: VI	
Course: Software Quality Assurance	Course Code: WUSITC601	

Teaching Scheme					Evaluation Scheme
Lectures (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Continuous Internal Assessment (CA) (Marks- 40)	Semester End Examination (Marks-60)
3	2	-	2	40	60

Learning Objectives:

1. To explore the effective testing techniques (both black-box and white box) for ensuring high quality software

2. To learn metrics for managing quality assurance and understand capabilities of test tools

3. To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report

4. To understand software test automation problems and solutions

Course Outcomes:

After the end of the course, the learner will be able to:

1. Students learn to apply software testing knowledge and engineering methods

2. Students understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods

3. Students analyze and understand the use of software testing methods and modern software testing tools for their testing projects

4. Students identify defects and manage those defects for improvement in quality for given Software

DETAILED SYLLABUS

Course Code/ Unit	Subu nit	Course/ Unit Title	Credits/ Lectures
I		**Introduction to Quality:** Wilson College	6L
	1.1	Historical Perspective of Quality, What is Quality? (Is it a fact or perception?), Definitions of Quality, Core Components of Quality, Quality View, Financial Aspect of Quality, Customers, Suppliers and Processes, Total Quality Management (TQM), Quality Principles of Total Quality Management, Quality Management Through Statistical Process Control, Quality Management Through Cultural Changes, Continual (Continuous) Improvement Cycle, Quality in Different Areas, Benchmarking and Metrics, Problem Solving Techniques, Problem Solving Software Tools.	
	1.2	Software Quality: Introduction, Constraints of Software Product Quality Assessment, Customer is a King, Quality and Productivity Relationship, Requirements of a Product, Organisation Culture, Characteristics of Software, Software Development Process, Types of Products, Schemes of Criticality Definitions, Problematic Areas of Software	

		Development Life Cycle, Software Quality Management, Why Software Has Defects? Processes Related to Software Quality, Quality Management System Structure, Pillars of Quality Management System, Important Aspects of Quality Management.	
II		**Fundamentals of testing:**	6L
	2.1	Introduction, Necessity of testing, What is testing? Fundamental test process, The psychology of testing, Historical Perspective of Testing, Definitions of Testing, Approaches to Testing, Testing During Development Life Cycle, Requirement Traceability Matrix, Essentials of Software Testing, Workbench, Important Features of Testing Process, Misconceptions About Testing, Principles of Software Testing, Salient Features of Good Testing, Test Policy, Test Strategy or Test Approach, Test Planning, Testing Process and Number of Defects Found in Testing, Test Team Efficiency, Mutation Testing, Challenges in Testing, Test Team Approach, Process Problems Faced by Testing, Cost Aspect of Testing, Establishing Testing Policy, Methods, Structured Approach to Testing, Categories of Defect, Defect, Error, or Mistake in Software, Developing Test Strategy, Developing Testing Methodologies (Test Plan), Testing Process, Attitude Towards Testing (Common People Issues)	
	2.2	Test Methodologies/Approaches, People Challenges in Software Testing, Raising Management Awareness for Testing, Skills Required by Tester, Testing throughout the software life cycle, Software development models, Test levels, Test types, the targets of testing, Maintenance testing	

III		**Unit Testing: Boundary Value Testing:**	6L
	3.1	Normal Boundary Value Testing, Robust Boundary Value Testing, Worst-Case Boundary Value Testing, Special Value Testing, Examples, Random Testing, Guidelines for Boundary Value Testing	
	3.2	Equivalence Class Testing: Equivalence Classes, Traditional Equivalence Class Testing, Improved Equivalence Class Testing, Edge Testing, Guidelines and Observations. Decision Table–Based Testing: Decision Tables, Decision Table Techniques, Cause-and-Effect Graphing, Guidelines and Observations, Path Testing: Program Graphs, DD-Paths, Test Coverage Metrics, Basis Path Testing, Guidelines and Observations, Data Flow Testing: Define/Use Testing, Slice-Based Testing, Program Slicing Tools.	
IV		**Software Verification and Validation:**	6L
	4.1	Introduction, Verification, Verification Workbench, Methods of Verification, Types of reviews on the basis od Stage Phase, Entities involved in verification, Reviews in testing lifecycle, Coverage in Verification, Concerns of Verification, Validation, Validation Workbench, Levels of Validation, Coverage in Validation, Acceptance Testing, Management of Verification and Validation, Software development verification and validation activities. V-test Model: Introduction, V-model for software, testing during Proposal stage, Testing during requirement stage, Testing during test planning phase, Testing during	

		design phase, Testing during coding, VV Model, Critical Roles and Responsibilities.	
V		**Levels of Testing:**	6L
		Introduction, Proposal Testing, Requirement Testing, Design Testing, Code Review, Unit Testing, Module Testing, Integration Testing, Big-Bang Testing, Sandwich Testing, Critical Path First, Sub System Testing, System Testing, Testing Stages.	
		Special Tests: Introduction, GUI testing, Compatibility Testing, Security Testing, Performance Testing, Volume Testing, Stress Testing, Recovery Testing, Installation Testing, Requirement Testing, Regression Testing, Error Handling Testing, Manual Support Testing, Intersystem Testing, Control Testing, Smoke Testing, Adhoc Testing, Parallel Testing, Execution Testing, Operations Testing, Compliance Testing, Usability Testing, Decision Table Testing, Documentation Testing, Training testing, Rapid Testing, Control flow graph, Generating tests on the basis of Combinatorial Designs, State Graph, Risk Associated with New Technologies, Process maturity level of Technology, Testing Adequacy of Control in New technology usage, Object Oriented Application Testing, Testing of Internal Controls, COTS Testing, Client Server Testing, Web Application Testing, Mobile Application Testing, eBusiness eCommerce Testing, Agile Development Testing, Data Warehousing Testing.	

Books and References:

1. Software Testing and Continuous Quality Improvement by William E. Lewis 2016
2. Software Testing: Principles, Techniques and Tools by M. G. Limaye 2017

3. Foundations of Software Testing by Dorothy Graham, Erik van Veenendaal, Isabel Evans, Rex Black

PRACTICAL

Course code WUSITC6P1	Software Quality Assurance PRACTICAL	CREDITS (2 credits)
	PRACTICAL (Project Implementation)	

PROGRAM: TYBSCIT	SEMESTER: VI
Course: Security In Computing	**Course Code: WUSITC602**

Teaching Scheme						Evaluation Scheme
Lectures (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**		**Credit**	**Continuous Internal Assessment (CA) (Marks- 40)**	**Semester End Examination (Marks- 60)**
3	2	-		2	40	60

Learning Objectives:

1. To prepare students with the technical knowledge and skills needed to protect and defend computer systems and networks.
2. To develop graduates that can plan, implement, and monitor cyber security mechanisms to help ensure the protection of information technology assets.
3. To develop graduates that can identify, analyze, and remediate computer security breaches.

Course Outcomes:

After the end of the course, the learner will be able to:

1. Analyze and evaluate the cyber security needs of an organization.
2. Conduct a cyber-security risk assessment.
3. Measure the performance and troubleshoot cyber security systems.
4. Implement cyber security solutions.
5. Be able to use cyber security, information assurance, and cyber/computer forensics software/tools.
6. Identify the key cyber security vendors in the marketplace.

7. Design and develop a security architecture for an organization.

8. Design operational and strategic cyber security strategies and policies.

DETAILED SYLLABUS

Course Code/ Unit	Subu nit	Course/ Unit Title	Credits/ Lectures
I		**Information Security Overview**: The Importance of Information Protection, The Evolution of Information Security, Justifying Security Investment, Security Methodology, How to Build a Security Program, The Impossible Job, The Weakest Link, Strategy and Tactics, BusinessProcesses vs. Technical Controls. **Risk Analysis**: Threat Definition, Types of Attacks, Risk Analysis. **Secure Design Principles**: The CIA Triad and Other Models, DefenseModels, Zones of Trust, Best Practices for Network Defense	6L
II		**Authentication and Authorization**: Authentication, Authorization **Encryption**: A Brief History of Encryption, Symmetric-KeyCryptography, Public Key Cryptography, Public Key Infrastructure. **Storage Security**: Storage Security Evolution, Modern Storage Security, Risk Remediation, Best Practices. **Database Security**: General Database Security Concepts, Understanding Database Security Layers, Understanding Database- Level Security, Using Application Security, Database Backup andRecovery, Keeping Your Servers Up to Date, Database Auditing and Monitoring.	6L
III		**Secure Network Design**: Introduction to Secure Network Design,Performance, Availability, Security. **Network Device Security**: Switch and Router Basics, Network Hardening. **Firewalls**: Overview, The Evolution of Firewalls, Core Firewall Functions, Additional Firewall Capabilities,	6L

		Firewall Design. **Wireless Network Security**: Radio Frequency Security Basics, Data- Link Layer Wireless Security Features, Flaws, and Threats, Wireless Vulnerabilities and Mitigations, Wireless Network Hardening Practices and Recommendations, Wireless Intrusion Detection and Prevention, Wireless Network Positioning and Secure Gateways.	
IV		**Intrusion Detection and Prevention Systems**: IDS Concepts, IDS Types and Detection Models, IDS Features, IDS Deployment Considerations, Security Information and Event Management (SIEM). **Voice over IP (VoIP) and PBX Security**: Background, VoIP Components, VoIP Vulnerabilities and Countermeasures, PBX, TEM: Telecom Expense Management. **Operating System Security Models**: Operating System Models, Classic Security Models, Reference Monitor, Trustworthy Computing, International Standards for Operating System Security.	6L
V		Virtual Machines and Cloud Computing: Virtual Machines, Cloud Computing. Secure Application Design: Secure Development Lifecycle, Application Security Practices, Web Application Security, Client Application Security, Remote Administration Security. Physical Security: Classification of Assets, Physical Vulnerability Assessment, Choosing Site Location for Security, Securing Assets: Locks and Entry Controls, Physical Intrusion Detection.	6L

Books and References:

1. The Complete Reference: Information Security by Mark Rhodes- Ousley Essential Cybersecurity 2013
2. Science by Josiah Dykstra 2017
3. Principles of ComputerSecurity: CompTIA Security+ and Beyond by Wm.Arthur Conklin, GregWhite 2010

SIC PRACTICALS

WUSITC6P2	**Practical No**	CREDITS (2 credits)
1	**Configure Routers**	
a	OSPF MD5 authentication.	
b	NTP.	
c	To log messages to the syslog server.	
d	To support SSH connections.	
2	**Configure AAA Authentication**	
a	Configure a local user account on Router and configure authenticate on the console and vty lines using local AAA	
b	Verify local AAA authentication from the Router console and the PC-A client	
3	**Configuring Extended ACLs**	

a	Configure, Apply and Verify an Extended Numbered ACL	
4	**Configure IP ACLs to Mitigate Attacks and IPV6 ACLs**	
a	Verify connectivity among devices before firewall configuration.	
b	Use ACLs to ensure remote access to the routers is available only from management station PC-C.	
c	Configure ACLs on to mitigate attacks.	
d	Configuring IPv6 ACLs	
5	**Configuring a Zone-Based Policy Firewall**	
6	**Configure IOS Intrusion Prevention System (IPS) Using the CLI**	
a	Enable IOS IPS.	
b	Modify an IPS signature.	
7	**Layer 2 Security**	
a	Assign the Central switch as the root bridge.	
b	Secure spanning-tree parameters to prevent STP manipulation attacks.	
c	Enable port security to prevent CAM table overflow attacks.	
8	**Layer 2 VLAN Security**	
9	**Configure and Verify a Site-to-Site IPsec VPN Using CLI**	
10	**Configuring ASA Basic Settings and Firewall Using CLI**	

a	Configure basic ASA settings and interface security levels using CLI	
b	Configure routing, address translation, and inspection policy using CLI	
c	Configure DHCP, AAA, and SSH	
d	Configure a DMZ, Static NAT, and ACLs	

Wilson College

PROGRAM: TYBSCIT	SEMESTER: VI				
Course: Business Intelligence	Course Code: WUSITCC603				
Teaching Scheme					Evaluation Scheme
Lectures (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Continuous Internal Assessment (CIA) (Marks-40)	Semester End Examination (Marks- 60)
3	2	-	2	40	60

Learning Objectives:

1. To impart knowledge of data warehousing to students

2. To give practical knowledge to students regarding data cleaning/ETL and EDA techniques

3. To teach the standard BI methodology to the students, i.e., how to solve business problems using BI techniques and tools

4. To impart the skill of data-driven decision making through interactive dashboards with hands on activities on a BI tool of the instructor's choice

5. To convey knowledge about the BI practices and trends being followed in the global industry

Course Outcomes:

At the end of the course, the learner will be able to:

1. Skills to execute Data-driven decision making through BI, through the use of specific charts and designing interactive dashboards and stories

2. Skills to execute Data cleaning/ETL and EDA activities for a BI project

3. Knowledge of core BI methodology and its strong relationship with data warehousing

4. Knowledge of current BI practices and trends in the global industry

Wilson College
DETAILED SYLLABUS

Course Code/ Unit	Sub unit	Course/ Unit Title	Credits/ Lectures
I		**Business intelligence:** Effective and timely decisions, Data, information and knowledge, The role of mathematical models, Business intelligence architectures, Ethics and business intelligence **Decision support systems:** Definition of system, Representation of the decision-making process, Evolution of information systems, Definition of decision support system, Development of a decision support system	6L
II		**Mathematical models for decision making:** Structure of mathematicalmodels, Development of a model, Classes of models **Data mining:** Definition of data mining, Representation of input data ,Data mining process, Analysis methodologies **Data preparation**: Data validation, Data transformation, Data reduction	6L

III		**Classification**: Classification problems, Evaluation of classification models, Bayesian methods, Logistic regression, Neural networks, Support vector machines **Clustering:** Clustering methods, Partition methods, Hierarchical methods, Evaluation of clustering models	6L
IV		**Business intelligence applications:** **Marketing models**: Relational marketing, Sales force management, **Logistic and production models**: Supply chain optimization,Optimization models for logistics planning, Revenue managementsystems. **Data envelopment analysis**: Efficiency measures, Efficient frontier, TheCCR model, Identification of good operating practices	6L
V		**Knowledge Management:** Introduction to Knowledge Management,Organizational Learning and Transformation, Knowledge Management Activities, Approaches to Knowledge Management, InformationTechnology (IT) In Knowledge Management, Knowledge ManagementSystems Implementation, Roles of People in Knowledge Management **Artificial Intelligence and Expert Systems:** Concepts and Definitions of Artificial Intelligence, Artificial IntelligenceVersus Natural Intelligence, Basic Concepts of Expert Systems,Applications of Expert Systems, Structure of Expert Systems, KnowledgeEngineering, Development of Expert Systems	6L

Books and References:

1. Business Intelligence: Data Mining and Optimization forDecision Making by Carlo Vercellis 2009

2. Decision support andBusiness Intelligence Systems by Efraim   Turban,Ramesh Sharda, Dursun Delen 2011

3. Fundamental of Business Intelligence by Grossmann W, Rinderle-Ma 2015

Wilson College

PRACTICALS

Practical No WUSITC6P3	Business Intelligence PRACTICALS	CREDITS (2 credits)
1	Import the legacy data from different sources such as (Excel , SqlServer, Oracle etc.)and load in the target system. (You can download sample database such as Adventureworks, Northwind, foodmart etc.)	
2	Perform the Extraction Transformation and Loading (ETL) process to construct thedatabase in the Sqlserver.	

3	a. Create the Data staging area for the selected database. b. Create the cube with suitable dimension and fact tables based on ROLAP, MOLAPand HOLAP model.	
4	a.Create the ETL map and setup the schedule for execution. b. Execute the MDX queries to extract the data from the datawarehouse.	
5	a. Import the datawarehouse data in Microsoft Excel and create the Pivot table andPivot Chart. b. Import the cube in Microsoft Excel and create the Pivot table and Pivot Chart toperform data analysis.	
6	Apply the what – if Analysis for data visualization. Design and generate necessaryreports based on the data warehouse data.	
7	Perform the data classification using classification algorithm.	
8	Perform the data clustering using clustering algorithm.	
9	Perform the Linear regression on the given data warehouse data.	
10	Perform the logistic regression on the given data warehouse data.	

PROGRAM: TYBSCIT	SEMESTER: VI
Course: GIS	**Course Code: WUSITC604**

Teaching Scheme					Evaluation Scheme
Lectures (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Continuous Internal Assessment (CIA) (Marks-40)**	**Semester End Examination (Marks- 60)**
3	2	-	2	40	60

Learning Objectives:

1. To introduce the concept of remote sensing and GIS

2. To study maps and special information

3. To study the components of GIS

4. To understand spatial and attribute data

5. To Learn digitization and structuring of Map data

6. To understand GIS data analyzing, classification and integration

7. To understand spatial interpolation

Course Outcomes:

At the end of the course, the learner will be able to:

1. The course will help develop the basic knowledge of Remote sensing and its applications

2. Gain knowledge on GIS and its applications.

3. Develop knowledge of map making and cartography

4. Understand digitization and data editing

5. Learn how to analyze GIS data and interpret

6. Understand different types of sensors

7. Understand various data structures

| Course Code/ Unit	Sub unit	Course/ Unit Title	Credits/ Lectures
I		**A Gentle Introduction to GIS** **The nature of GIS:** Some fundamental observations, Defining GIS, GISystems, GIScience and GIApplications, Spatial data and Geoinformation. **The real world and representations of it:** Models and modelling, Maps, Databases, Spatial databases and spatial analysis **Geographic Information and Spatial Database Models and Representations of the real world** **Geographic Phenomena:** Defining geographic phenomena, types of geographic phenomena, Geographic fields, Geographic objects, Boundaries **Computer Representations of Geographic Information:** Regular tessellations, irregular tessellations, Vector representations, Topology and Spatial relationships, Scale and Resolution, Representation of Geographic fields, Representation of Geographic objects **Organizing and Managing Spatial DataThe Temporal Dimension**	6L
II		**Data Management and Processing SystemsHardware and Software Trends** **Geographic Information Systems:** GIS Software, GIS Architectureand functionality, Spatial Data Infrastructure (SDI) **Stages of Spatial Data handling:** Spatial data handling and preparation, Spatial Data Storage and maintenance, Spatial Query and Analysis, Spatial Data Presentation. **Database management Systems:** Reasons for using a	6L

		DBMS, Alternatives for data management, The relational data model, Queryingthe relational database. **GIS and Spatial Databases:** Linking GIS and DBMS, Spatial databasefunctionality.	
III		**Spatial Referencing and Positioning** **Spatial Referencing:** Reference surfaces for mapping, CoordinateSystems, Map Projections, Coordinate Transformations	**6L**
IV		**Satellite-based Positioning:** Absolute positioning, Errors in absolute positioning, Relative positioning, Network positioning, code versus phase measurements, Positioning technology **Data Entry and Preparation** Spatial Data Input: Direct spatial data capture, Indirect spatial data capture, Obtaining spatial data elsewhere Data Quality: Accuracy and Positioning, Positional accuracy, Attribute accuracy, temporal accuracy, Lineage, Completeness, Logical consistency Data Preparation: Data checks and repairs, Combining data from multiple sources Point Data Transformation: Interpolating discrete data, Interpolating continuous data	**6L**
V		**Spatial Data Analysis** Classification of analytical GIS Capabilities Retrieval, classification and measurement: Measurement, Spatial selection queries, Classification Overlay functions: Vector overlay operators,Raster overlay operators Neighbourhood functions: Proximity computations, Computation of diffusion, Flow computation, Raster based surface analysis Analysis: Network analysis, interpolation, terrain modeling GIS and Application models: GPS, Open GIS Standards, GIS Applications and Advances	**6L**

		Error Propagation in spatial data processing: How Errors propagate, Quantifying error propagation
		Data Visualization
		GIS and Maps, The Visualization Process Visualization Strategies: Present or explore?
		The cartographic toolbox: What kind of data do I have? How can I map my data?
		How to map? How to map qualitative data, How to map quantitative data, How to map the terrain elevation, How to map time series
		Map Cosmetics, Map Dissemination

Books and References:

1. Principles of Geographic Information Systems-An Introductory TextBook by Editors: Otto Huisman and RolfA 2009

2. Principles of Geographic Information Systems by P.A Burrough and R.A.McDonnell 1999

3. Fundamentals of Spatial Information Systems, by R.Laurini and D. Thompson, 1994

4. Introduction to Geographic Information Systems by Chang Kang-tsung (Karl), 2013 7th Edition
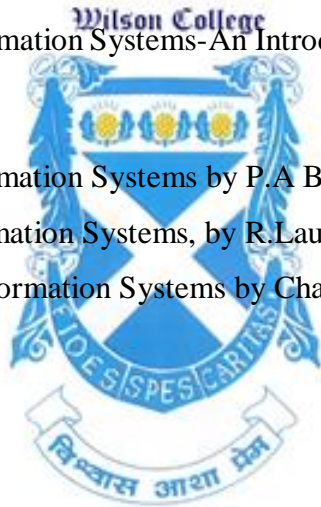
Practical No WUSITC6P4	GIS Practicals	CREDITS (2 credits)
1	Familiarizing Quantum GIS: Installation of QGIS, datasets for both Vector and Raster data, Maps.	
2	Creating and Managing Vector Data: Adding vector layers, setting properties, formatting, calculating line lengths and statistics	
3	Exploring and Managing Raster data: Adding raster layers, raster styling and analysis, raster mosaicking and clipping	
4	Making a Map, Working with Attributes, Importing Spreadsheets or CSV files Using Plugins, Searching and Downloading OpenStreetMap Data	
5	Georeferencing Topo Sheets and Scanned Maps Georeferencing Aerial Imagery Digitizing Map Data	
6	Advanced GIS Operations 1: Nearest Neighbor Analysis, Sampling Raster Data using Points or Polygons, Interpolating Point Data	
7	Advance GIS Operations 2: Batch Processing using Processing Framework Automating Complex Workflows using Processing Modeler Automating Map Creation with Print Composer Atlas	
8	Validating Map data	

PROGRAM: TYBSCIT	SEMESTER: VI
Course: Cyber law	Course Code: WUSITC605

Teaching Scheme					Evaluation Scheme
Lectures (Hours per week)	Practical (Hours per week)	Tutorial (Hours per week)	Credit	Continuous Internal Assessment (CIA) (Marks-40)	Semester End Examination (Marks- 60)
3	2	-	2	40	60

Learning Objectives:
1. To study the different cybercrimes
2. To study the law implies on cyber crimes

Course Outcomes:
At the end of the course, the learner will be able to:

1. Able to understand cybercrimes
2. Able to understand the impact on such crimes

DETAILED SYLLABUS

Course Code/ Unit	Sub unit	Course/ Unit Title	Credits/ Lectures
I		Power of Arrest Without Warrant Under the IT Act, 2000: A Critique, Crimes of this Millennium, Section 80 of the IT Act, 2000 – A Weapon or a Farce? Forgetting the Line Between Cognizable and Non-Cognizable Offences, Necessity of Arrest without Warrant from Any Place, Public or Otherwise, Check and Balances Against Arbitrary Arrests, Arrest for "About to Commit" an Offence Under the IT Act: A Tribute to Draco, Arrest, But NO Punishment! Cyber Crime and Criminal Justice: Penalties, Adjudication	6L

		and Appeals Under the IT Act, 2000: Concept of "Cyber Crime " and the IT Act , 2000, Hacking, Teenage Web Vandals, Cyber Fraud and Cyber Cheating, Virus on the Internet, Defamation, Harassment and E-mail Abuse, Cyber Pornography, Other IT Act Offences, Monetary Penalties, Adjudication and Appeals Under IT Act , 2000, Network Service Providers, Jurisdiction and Cyber Crime, Nature of Cyber Criminality, Strategies to Tackle Cyber Crime and Trends, Criminal Justice in India and Implications on Cyber Crime.	
II		Contracts in the Infotech World: Contracts in the Infotech World, Click-Wrap and Shrink-Wrap Contract: Status under the Indian Contract Act, 1872, Contract Formation Under the Indian Contract Act, 1872, Contract Formation on the Internet, Terms and Conditions of Contracts. Jurisdiction in the Cyber World: Questioning the Jurisdiction and Validity of the Present Law of Jurisdiction, Civil Law of Jurisdiction in India, Cause of Action, Jurisdiction and the Information Technology Act,2000, Foreign Judgements in India, Place of Cause of Action in Contractual and IPR Disputes, Exclusion Clauses in Contracts, Abuse of Exclusion Clauses,	**6L**

		Objection of Lack of Jurisdiction, Misuse of the Law of Jurisdiction, Legal Principles on Jurisdiction in the United State of America, Jurisdiction Disputes w.r.t. the Internet in the United State of America.	
III		Battling Cyber Squatters and Copyright Protection in the Cyber World: Concept of Domain Name and Reply to Cyber Squatters, Meta- Tagging, Legislative and Other Innovative Moves Against Cyber Squatting, The Battle Between Freedom and Control on the Internet, Works in Which Copyright Subsists and meaning of Copyright, Copyright Ownership and Assignment, License of Copyright, Copyright Terms and Respect for Foreign Works, Copyright	**6L**
IV		E-Commerce Taxation: Real Problems in the Virtual World: A Tug of War on the Concept of 'Permanent Establishment', Finding the PE in Cross Border E-Commerce, The United Nations Model Tax Treaty, The Law of Double Taxation Avoidance Agreements and Taxable Jurisdiction Over Non-Residents, Under the Income Tax Act, 1961, Tax Agents of Non-Residents under the Income Tax Act,1961 and the Relevance to E-Commerce, Source versus Residence and Classification between Business Income and Royalty, The Impact of the Internet on Customer Duties, Taxation Policies in India: At a Glance. Digital Signature, Certifying Authorities and E-Governance: Digital Signatures, Digital Signature Certificate, Certifying Authorities and Liability in the Event of Digital Signature Compromise, E- Governance in India: A Warning to Babudom!	**6L**
V		The Indian Evidence Act of 1872 v. Information Technology Act, 2000: Status of Electronic Records as Evidence, Proof and Management of Electronic Records; Relevancy, Admissibility and Probative Value of E-Evidence, Proving	**6L**

		Digital Signatures, Proof of Electronic Agreements, Proving Electronic Messages, Other Amendments in the Indian Evidence Act by the IT Act, Amendments to the Bankers Books Evidence Act, 1891 and Reserve Bank of India Act, 1934. Protection of Cyber Consumers in India: Are Cyber Consumers Covered Under the Consumer Protection Act? Goods and Services, Consumer Complaint, Defect in Goods and Deficiency in Services, Restrictive and Unfair Trade Practices, Instances of Unfair Trade Practices, Reliefs Under CPA, Beware Consumers, Consumer Foras, Jurisdiction and Implications on cyber Consumers in India, Applicability of CPA to Manufacturers, Distributors, Retailers and Service Providers Based in Foreign Lands Whose Goods are Sold or Services Provided to a Consumer in India. Amendments in Indian IT Act	

Books and References:

Cyber Law Simplified by Vivek Sood

Cybersecurity Law by Jeff Kosseff

PRACTICAL

Course code WUSITC6P5	**Cyber Laws case study PRACTICAL**	CREDITS (2 credits)
	Cyber Laws related to case study	

TYIT 2024-2025(Autonomous)

Modality of Assessment:-

Internal Assessment- 40%- 40 Marks per paper(CIA-I and CIA-II)

Sr.No.	Evaluation Type	Marks
1	**Written Objective Examination(CIA-I)**	**20**
2	**Assignment/ Case study/ field visit report/ presentation/ project/Industrial visit (CIA-II)**	**20**
	Total-(Marks)	**40**

External Examination- 60 Marks per

 Paper Pattern for Semester End Theory **Regular**

External Examination:
1. Duration - These examinations shall be of **two hours** duration.
2. **Theory question paper pattern:**
3. There shall be --------- questions each of marks one on each unit.
4. All questions shall be compulsory with internal choice within the questions.

Q.1Attempt any THREE of the following?   [12 Marks]
1. **Q**
2. **Q**
3. **Q**
4. **Q**
5. **Q**
6. **Q**

Q.2Attempt any THREE of the following?   [12 Marks]
1. **Q**
2. **Q**
3. **Q**
4. **Q**
5. **Q**
6. **Q**

Q.3Attempt any THREE of the following?   [12 Marks]
1. **Q**
2. **Q**
3. **Q**
4. **Q**
5. **Q**
6. **Q**

Q.4 Attempt any THREE of the following?   [12Marks]
1. **Q**
2. **Q**
3. **Q**

    4. **Q**
    5. **Q**
    6. **Q**

Q.5 Attempt any THREE of the following?   [12Marks]
    1. **Q**
    2. **Q**
    3. **Q**
    4. **Q**
    5. **Q**
    6. **Q**
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Practical Examination Pattern:

Course	501		601	Marks
Practicals	50(External Practical Examination)	50	50(External Practical Examination)	50

PRACTICAL BOOK/JOURNAL
    1. The students are required to perform 75% of the Practical for the journal to be duly certified.
    2. The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.

Overall Examination & Marks Distribution Pattern

<div align="center">Semester V & VI</div>

Course	501 (SEMESTER V)			601 (SEMESTER VI)		
	Internal	External	Total	Internal	External	Total
Theory	40	60	100	40	60	100
Practicals	50(External Practical Examination)		50	50(External Practical Examination)		50

PRACTICAL BOOK/JOURNAL

The students are required to perform 75% of the Practical for the journal to be duly certified. The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.

Overall Examination & Marks Distribution Pattern

Semester V & VI

Course	501			601				Grand Total
	Internal	External	Total	Internal	External	Total		
Theory	40	60	100	40	60	100		200
Practicals	20	30	50	20	30	50		100