SR. NO	SUBJECT	NO. OF THEORY LECT. PER WEEK	NO. OF PRACTICAL PER WEEK
BCA SEM 6			
1	**CS – 31:** Mobile Application Development in Android using Kotlin	5	6
2	**CS – 32:** Programming with ASP.NET	5	6
3	**CS – 33:** Machine Learning with Python	5	6
4	**CS – 34:** Practical – 1 (Based on CS-31)	-	6
5	**CS – 35:** Practical – 2 (Based on CS-32 and CS-33)	-	6
6	**CS – 36:** PROJECT VIVA	-	6

CS-31: Mobile Application Development in Android using Kotlin

Objectives:
- Understanding Android Development.
- Familiarize students with the Kotlin Programming Language
- Gain necessary knowledge and skills to develop high-quality Android applications using Kotlin.

Prerequisites:
- Basic Programming Knowledge
- Basic Understanding of Java and XML
- Knowledge of OOP Concepts

Unit No.	Topic	Detail
1	Introduction to Kotlin Programming	- Basics of Kotlin, Operations and Priorities, - Decision Making - Loop Control, Data Structures(Collections), - Functions - Object Oriented Programming: Inheritance abstract, interface, super and this, visibility modifiers.
2	Introduction to Android & Android Application Design	- The Open Handset Alliance, The Android Platform, Android SDK - Building a sample Android application - Anatomy of an Android applications, Android terminologies - Application Context, Activities, Services, Intents - Receiving and Broadcasting Intents - Android Manifest File and its common settings - Using Intent Filter, Permissions - Managing Application resources in a hierarchy - Working with different types of resources
3	Android User Interface Design	- User Interface Screen elements - Button, EditText, TextView, DatePicker, TimePicker, ProgressBar, ListView, GridView, RadioGroup, ImageButton, Fragement - Designing User Interfaces with Layouts - Relative Layout, Linear Layout, Table Layout etc - Dialogs - Drawing and Working with Animation - Frame By Frame Animation - Twined Animation
4	Database Connectivity Using SQLite and Content Provider	- Using Android Data and Storage APIs - Managing data using SQLite - Sharing Data Between Applications with Content Providers

5	Location Based Services (LBS), Common Android API, Notifications, Services, Deployment of applications	- Using Global Positioning Services (GPS) - Geocoding Locations - Mapping Locations - Many more with location based services - Android networking API - Android web API - Android telephony API - Notifying the user, Notifying with the status bar - Vibrating the phone - Blinking the lights - Customizing the notifications Services - Application development using JSON in MySQL - Publish android application

Notes: Android application must be developed using ANDROID STUDIO 4.0

Reference Books:
(1) Learn Android Studio 3 with Kotlin – Teg Hagos – Apress – 2019
(2) Headfirst Kotlin, A Brain Friendly Guide – Dawn Griffiths, David Griffiths – Orilly – 2019
(3) Professional Android 2 Application Development Reto Meier, Wiley India Pvt Ltd (2011)
(4) Beginning Android Mark L Murphy, Wiley India Pvt Ltd
(5) Android Developer Fundamental Course – Practical Book – 2018

Course Outcomes:
- Understand the basic of KOTLIN programming.
- Understand the basic of Android and Android Application Design.
- Understand the different user interface elements and develop application with those widgets.
- Understand, apply and develop application with SQLite and Content Providers.
- Understand, apply and develop application with Location based services, notification services.

CS-32: Programming with ASP.NET

Objectives:
- Familiarize students with the basic concepts of ASP.NET
- Explore the different approaches to building web applications in ASP.NET
- Learn to integrate databases with ASP.NET applications using technologies like ADO.NET

Prerequisites:
- Basic Programming Knowledge
- Basic Understanding of HTML, CSS, OOP Concepts and C#.NET
- Having a general understanding of web development concepts such as client-server architecture, web servers etc.

Unit No.	Topic	Detail

1	Framework and Web Contents Validation Controls	• Overview of Asp.NET Framework
		• Client Server Architecture
		• Application Web Servers
		• Types of Files in Asp.NET
		• Types of controls in Asp.NET
		• Page Architecture
		• Web form
		• Introduction to standard Controls
		(Buttons, Textbox, Checkbox, Lable, Panel, Listbox, Dropdownlist etc.)
		• Running an Asp.Net Application, File Upload Control
		• What is Validation?
		  • Client Side Validation
		  • Server Side Validation
		• Types (RequieredField Validator, Range Validator, CompareField Validator, RegularExpression Validator, Custom Validator, ValidationSummery Control)

2	State Management	• What is State? • Why is it required in Asp.Net? • Client Side State Management • Server Side State Management • Various State Management Techniques (View State, Query String, Cookie, Session State, Application State)

3	ADO .NET and Database	- Architecture of ADO.NET - ADO.NET Classes for Connected and Disconnected Architecture (Connection, Command, DataReader, DataAdapter, DataSet, DataColumn, DataRow, DataConstraints, DataView etc.) - The Gridview Control, The Repeater Control - Binding Data to DataBound Controls, - Diplaying Data in a webpage using SQLDataSource Control - DataBinding Expressions
4	Master Pages and Theme Caching, Application Pages and Data	- What is Master Page? - Requirement Of a Master Page in an Asp.NET application - Designing Website with Master Page, Theme and CSS - Overview of Caching - Page Output Caching - Partial Page Caching, Absolute Cache Expiration - Sliding Cache Expiration - Data Caching
5	Working with XML ASP.NET Application Configuration and Deployment of Application	- Reading Datasets From XML - Writing DataSets With XML - WebServices (Introduction, HTTP, SOAP, UDDI, XML, Creating a Web Service, Consuming a Web Service) - Introduction To Web.Config - Common Configuration Sections - AppSettings - Tracing - Custom Errors - Authentication And Authorization - Deployment of Application in web server

Reference Books:
- ASP.NET - Unleashed
- ASP.NET – Wrox Publication
- Pro ASP.NET Core MVC 2 Book by Adam Freeman
- Introduction to ASP.NET Web Programming using the Razor Syntax (C#) by Tom FitzMacken

Course Outcomes:
- Understand the ASP.NET framework and different controls.
- Understand form validation, apply form validation control also understand state management.
- Understand ADO .NET architecture and developing application with LINQ.
- Understand and apply concept of Master Page, CSS & Theme.
- Understand configuration of application with XML.

	CS-33: Machine Learning with Python	
Objectives:		

Objectives:
- To Understand and develop model of ML with Python.
- Apply ML techniques to real-world data sets and problems.
- Learn how to deploy machine learning models into production environments.

Prerequisites:
- Basic Understanding of Python Programming.

Unit No.	Topic	Detail
1	Introduction to Machine Learning	• Introduction to ML, Relation of ML with AI and DL, Defining Machine Learning, How machines learn, types of machine learning: supervised learning, unsupervised learning, reinforcement learning, applications of machine learning.
2	Supervised Learning	• Regression: Pre-processing data using different techniques – mean removal, scaling, normalization, binarization, label encoding, linear regression, case study implementation using Python • Classification: Building simple classifier, logistic regression classifier, Naïve bayes classifier, training and testing dataset, accuracy using cross-validation, visualizing confusion matrix, extracting the performance report. • Predictive Modeling: Building linear and non-linear classifier using Support Vector Machine (SVM), extracting confidence measurements, Case study implementation using Python.
3	Unsupervised Learning	• Clustering: Data using k-means clustering, compressing image using vector quantization, mean shift clustering model, agglomerative clustering, case study implementation using Python.
4	Natural Language Processing	• Natural Language Processing: ○ pre-processing data, ○ stemming data, ○ using lemmatization, ○ diving chunks, ○ text classifier, ○ case study implementation using Python.
5	Computer Vision with OpenCV	• Object Detection: ○ Detecting and tracking objects using Haar cascades from images and videos ○ Detecting face, eyes, mouth, nose, pupils

Reference Books:
- "Machine Learning" by Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das - Pearson
- "Python Machine Learning Cookbook" by Prateek Joshi – PACKT Publishing – 2016 Edition.
- "OpenCV: Computer Vision Projects with Python – Learning Path" by Joseph howse, Prateek Joshi, Michael Beyeler – PACKT Publishing – 2016 Edition.

Course Outcomes:
- To define and explain machine learning and its relation with AI and DL along with types of ML.
- To determine regression or classification supervised learning method of ML to any real-life application and estimate accuracy of the model.
- To be able to contrast various unsupervised learning methods and solve any real0life situation using ML and estimate accuracy of the model.
- To solve any fundamental text-processing.
- To construct a model to detect object from it.

CS-34 : Practical And Viva Based On CS – 31	
Topics	Marks
CS – 31	100

CS-35 : Practical And Viva Based On CS – 32 and CS - 33	
Topics	Marks
CS – 32 and CS – 33	100

Note:

- Practical examination may be arranged before or after theory exam.

CS-36 : Project Viva	Total Marks: 100
Project must be developed in the computer laboratory of concern institute under the supervision of faculties of concern institute on any subject of semester - V or semester - VI. **(At the time of Project-Viva Examinations student must show all the Workouts, SDLC, Documentation, Program codes and project in running mode)**	

Note:

- Project must be submitted before two weeks of commencement of theory exam.
- Project viva examination may be arranged before or after theory exam.
- During the project viva examination project must be run.