Lok Jagruti Kendra University
University with a Difference

Diploma in Artificial Intelligence & Machine Learning

Course Code: 025090508

Emerging Trends & Technologies

Programme / Branch Name			Diploma in Artificial Intelligence & Machine Learning			
Course Name	Emerging Trends & Technologies				**Course Code**	025090508
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses
ESC: Engineering Science Courses PCC: Program Core Courses
OEC: Open Elective Courses PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week / Credits				**Evaluation Scheme**			
L	**T**	**P**	**Total Credit**	**CCE**	**SEE (Th)**	**SEE (Pr)**	**TOTAL**
3	0	4	5	50	50	50	150

Legends:
L: Lectures T: Tutorial P: Practical
CCE: Continuous & Comprehensive Evaluation
SEE (Th): Semester End Evaluation (Theory)
SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisites

✓ Basic knowledge of HTML, CSS and JavaScript.

3. Rationale

Emerging trends and technologies include many aspects including Full Stack development, which is the development of both Front-End (client side) and Back-End (server side) portions of web application. React is a declarative, efficient, and flexible JavaScript library for building user interfaces for Front-End web development. In this course, you will explore the fundamental concepts that underpin the React library and learn the basic skills required to build a simple, fast, and scalable app. Node.js is an open source server environment for Back-End development. Node.js allows you to run JavaScript on the server. In this course, student will focus on Node.js and Express. Specifically, they will develop applications using asynchronous callbacks and promises - create APIs and perform CRUD operations. Throughout the course, you will complete numerous hands-on labs to gain practical experience in Front-End and Back-End web development. This course will help you succeed as a Full Stack developer.

4. Objectives

✓ The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- Use reusable components in React to render views where data changes over time.
- Create dynamic and interactive web pages and apps using React.
- Use forms to allow users to interact with the web page.
- Create server-side applications using the Node.js JavaScript run time.
- Extend your Node.js applications with third-party packages and frameworks, including Express.

5. Contents

Unit No.	Topics	Sub-Topics	Learning Outcomes	% Weightage	Hours
1	**Introduction to Full Stack Web Development**	1.1. Introduction of Full Stack Development 1.2. Overview of Full Stack and pre-requisites 1.3. Introduction to Front-End Development 1.4. Basics of JavaScript 1.5. Installation for React 1.6. Create a New React App 1.7. JSX	• To understand what is full stack, its application and Installation of IDE • To understand the basic operations of JS • To create new ReactJS App • To understand Jsx concepts and its working in React	30	12
2	**React Basics**	2.1. Different Components 2.2. Props 2.3. State & Lifecycle of React 2.4. Class 2.5. Function 2.6. Events	• To understand usage of Components and Props • To understand creation of Class and calling different events • To understand the use of function components	15	7
3	**React for Front-End Development**	3.1. Lists and Keys 3.2. Hooks, useEffect, useState 3.3. Form 3.4. Pulling Data from an API 3.5. Build & Deploy App	• To understand render lists with some type of loops (map) • To understand the item updated with help of keys • To understand the Form	15	7
4	**Introduction to Node.js**	4.1. Back-End Development 4.2. Server-Side JavaScript 4.3. Introduction to Nodejs 4.4. Creating a Web Server 4.5. Nodejs Modules 4.6. Events 4.7. Asynchronous I/O with Callback Programming	• Installation of Nodejs • Development of various Modules in Nodejs • Understanding Database connection • Understanding the concepts of Events	20	8

5	**Back-End Development using Node.js**	5.1. Introduction to Web Frameworks 5.2. Express Framework 5.3. Create Application using Express 5.4. Routing, Middleware, and Templating 5.5. HTTP Methods and Rest APIs	• Understanding the Framework and Uses • Installing Express and its Features • Understanding the concepts of Routing, Templating	20	8
				Total Hours	**42**

6. List of Practicals / Exercises

The practical/exercises should be properly designed and implemented in an attempt to develop different types of skills so that students can acquire the competencies/program outcomes. Following is the list of practical exercises for guidance.

Sr. No.	Practical / Exercises	Key Competency	Hours
1	Installation and create a new React App from Scratch.	To be able to install React and IDE.	2
2	Perform basic functions in JS (map, slice, Dice) within array.	To be able to perform array.	4
3	Show current Date and Time in React program by using JSX.	To be able to write HTML in React.	2
4	Write a code which has proper structure of project and make proper folder and files.	To be able to understand Project.	2
5	Write a code that uses Components (textbox, edittext, radio button, checkbox, toggle button).	To understand the concepts of default components.	4
6	Write a program that shows name, id, address, contact number is passed as props to components.	To be able to pass props to single components.	2
7	Create a program which has Maths as Class name and make calculator.	To be able to create Class components.	4
8	Create a program which shows list of data (user name, contact number, Address) when state changes.	To be able to show Lists when state changes.	2
9	Create a program which shows different method of Lifecycle.	To be able to understand the Lifecycle process and its flow.	2
10	Write a program which shows Lists having profile image, name, phone number, address by creating FlatList.	To be able to create render lists.	2
11	Write a program that count button clicked Event with help of Hook.	To be able to use Hooks.	2
12	Write a program that shows inline, internal and external CSS.	To be able to understand CSS.	2

13	Create the proper UI having image, name and other detail, then add API in it and fetch data.	To be able to generate API.	4
14	Create the project which shows APK data and build APK and deploy it on phone.	To be able to run project on phone.	4
15	Create a project having Nodejs database which has id, name, number, address as basics detail.	To be able to understand concepts of Nodejs.	4
16	Create a program Using Anonymous Callback Functions in Node.js.	To be able to create Anonymous Callback functions.	2
17	Create an application using Express.	To be able to create the application using Express.	2
18	Install and create React routing using NPM Library.	To understand the steps of React routing.	2
19	Create Middleware in Nodejs and setup Express Application.	To understand the Middleware in Nodejs.	4
20	Use HTTP Methods and Rest APIs.	To be able understand Rest API	4
		Total Hours	**56**

7. Suggested Specification Table with Hours

Unit No.	Chapter Name	Teaching Hours	Distribution of Topics According to Bloom's Taxonomy					
			R %	U %	App %	C %	E %	An %
1	Introduction to Full Stack Web Development	12	30	25	20	5	10	10
2	React Basic	7	25	30	20	10	5	10
3	React for Front-End Development	7	20	30	20	10	10	10
4	Introduction to Node.js	8	30	20	25	5	10	10
5	Back-End Development using Node.js	8	25	30	25	10	5	5

Legends: R: Remembering U: Understanding
App: Applying C: Creating
E: Evaluating An: Analyzing

8. Textbooks

1) React: Up & Running - Building Web Applications, Stoyan Stefanov, Shroff/O'Reilly Publication.
2) NODE.JS Guidebook, Dhruti Shah, BPB

9. Reference Books

1) MERN Quick Start Guide: Build web applications with MongoDB, Express.js, React, and Node, Eddy Wilson Iriarte Koroliova, Packt Publishing.
2) Learning React: A Hands-On Guide to Building Web Applications Using React and Redux, Kirupa Chinnathambi, Addison-Wesley

10. Open Sources (Website, Video, Movie)

1) https://Reactjs.org/docs/getting-started.html
2) https://nodejs.dev/en/learn/
3) https://egghead.io/courses/the-beginner-s-guide-to-React
4) https://www.youtube.com/watch?v=RLtyhwFtXQA