DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE STRUCTURE & SYLLABUS M.Tech CSE for COMPUTER SCIENCE & ENGINEERING PROGRAMME
(Applicable for batches admitted from 2019-2020)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

I-SEMESTER

S.No	Course Code	Courses	Category	L	T	P	C
1	MTCSE1101	**Program Core-1** Mathematical Foundations of Computer Science	PC	3	0	0	3
2	MTCSE1102	**Program Core-2** Advanced Data Structures & Algorithms	PC	3	0	0	3
3	MTCSE1103	**Program Elective-1** 1. Big Data Analytics 2. Digital Image Processing 3. Advanced Operating Systems	PE	3	0	0	3
4	MTCSE1104	**Program Elective-2** 1. Advanced Computer Networks 2. Internet of Things 3. Object Oriented Software Engineering	PE	3	0	0	3
5	MTCSE1105	**Research Methodology and IPR**	CC			0	2
6	MTCSE1106	**Laboratory-1** Advanced Data Structures & Algorithms Lab	LB	0	0	4	2
7	MTCSE1107	**Laboartory-2** Advanced Computing Lab	LB	0	0	4	2
8	MTCSE1108	**Audit Course-1***	AC	2	0	0	0
		Total Credits					18

Student has to choose any one audit course listed below.

II SEMESTER

S.No	Course Code	Courses	Category	L	T	P	C
1	MTCSE1201	**Program Core-3** Machine learning	PC	3	0	0	3
2	MTCSE1202	**Program Core-4** MEAN Stack Technologies	PC	3	0	0	3
3	MTCSE1203	**Program Elective-3** 1. Advanced Databases and Mining 2. Ad Hoc & Sensor Networks 3. Soft Computing	PE	3	0	0	3
4	MTCSE1204	**Program Elective-4** 1. Cloud Computing 2. Principles of computer security 3. High Performance Computing	PE	3	0	0	3
5	MTCSE1205	**Laboratory-3** Machine Learning with python lab	LB	0	0	4	2
6	MTCSE1206	**Laboartory-4** MEAN Stack Technologies Lab	LB	0	0	4	2
7	MTCSE1207	**Mini Project with Seminar**	MP	2	0	0	2
8	MTCSE1208	**Audit Course-2 ***	AC	2	0	0	0
		Total Credits					18

Student has to choose any one audit course listed below.

Audit Course 1 & 2:
1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Management by Yoga
8. Personality Development through Life Enlightenment Skills

III-SEMESTER

S.No	Course Code	Courses	Category	L	T	P	C
1	MTCSE2101	**Program Elective-5** 1. Deep Learning 2. Social Network Analysis 3. MOOCs-1 (NPTEL/SWAYAM) 12 Week Program related to the programme which is not listed in the course structure	PE	3	0	0	3
2	MTCSE2102	**Open Elective** 1. MOOCs-2 (NPTEL/SWAYAM)-Any 12 Week Course on Engineering/ Management/ Mathematics offered by other than parent department 2. Course offered by other departments in the college	OE	3	0	0	3
3	MTCSE2103	**Dissertation-I/ Industrial Project #**	PJ	0	0	20	10
		Total Credits					16

#Students going for Industrial Project/Thesis will complete these courses through MOOCs

	M. Tech. (CSE) IV SEMESTER						
S.No	Course Code	Courses	Category	L	T	P	C
1	MTCSE2201	**Dissertation-II**	PJ	0	0	32	16
		Total Credits					16

Open Electives offered by the Department of CSE
1. Python Programming
2. Principles of Cyber Security
3. Internet of Things
4. Machine Learning
5. Digital forensics
6. Next Generation Databases

I Year - I Semester		L	T	P	C
		3	0	0	3
Mathematical Foundations of Computer Science (MTCSE1101)					

Course Objectives: This course is aimed at enabling the students to
- To understand the mathematical fundamentals that is prerequisites for variety of courses like Data mining, Network protocols, analysis of Web traffic, Computer security, Software engineering, Computer architecture, operating systems, distributed systems bioinformatics, Machine learning.
- To develop the understanding of the mathematical and logical basis to many modern techniques in computer science technology like machine learning, programming language design, and concurrency.
- To study various sampling and classification problems.

Course Outcomes:
After the completion of the course, student will be able to

I Year - I Semester		L	T	P	C
		0	0	4	2
Advanced Data Structures & Algorithms Lab (MTCSE1106)					

Course Objectives:

From the course the student will learn
* Knowing about oops concepts for a specific problem.
* Various advanced data structures concepts like arrays, stacks, queues, linked lists, graphs and trees.

Course Outcomes:
After the completion of the course, student will be able to
* Identify classes, objects, members of a class and relationships among them needed for a specific problem.
* Examine algorithms performance using Prior analysis and asymptotic notations.
* Organize and apply to solve the complex problems using advanced data structures (like arrays, stacks, queues, linked lists, graphs and trees.)
* Apply and analyze functions of Dictionary

Experiment 1:
Write a java program to perform various operations on single linked list

Experiment 2:
Write a java program for the following
a) Reverse a linked list
b) Sort the data in a linked list
c) Remove duplicates
d) Merge two linked lists

Experiment 3:
Write a java program to perform various operations on doubly linked list.

Experiment 4:
Write a java program to perform various operations on circular linked list.

Experiment 5:
Write a java program for performing various operations on stack using linked list.

Experiment 6:
Write a java program for performing various operations on queue using linked list.

Experiment 7:
Write a java program for the following using stack
a) Infix to postfix conversion.
b) Expression evaluation.
c) Obtain the binary number for a given decimal number.

Experiment 8:
Write a java program to implement various operations on Binary Search Tree
Using Recursive and Non-Recursive methods.

Experiment 9:
Write a java program to implement the following for a graph.
a) BFS   b) DFS

Experiment 10:
Write a java program to implement Merge & Heap Sort of given elements.

Experiment 11:
Write a java program to implement Quick Sort of given elements.

Experiment 12:
Write a java program to implement various operations on AVL trees.

Experiment 13:
Write a java program to perform the following operations:
a) Insertion into a B-tree   b) Searching in a B-tree

Experiment 14:
Write a java program to implementation of recursive and non-recursive functions to Binary tree Traversals

Experiment 15:
Write a java program to implement all the functions of Dictionary (ADT) using Hashing.

I Year - I Semester		L	T	P	C
		0	0	4	2
	Advanced Computing Lab (MTCSE1107)				

Course Objectives:
From the course the student will learn
- The student should have hands on experience in using various sensors like temperature, humidity, smoke, light, etc. and should be able to use control web camera, network, and relays connected to the Pi.

Course Outcomes:
After the completion of the course, student will be able to
- The student should have hands on experience in using various sensors like temperature, humidity, smoke, light, etc. and should be able to use control web camera, network, and relays connected to the Pi.
- Development and use of s IoT technology in Societal and Industrial Applications.
- Skills to undertake high quality academic and industrial research in Sensors and IoT.
- To classify Real World IoT Design Constraints, Industrial Automation in IoT.

Experiment 1: Start Raspberry Pi and try various Linux commands in command terminal window: ls, cd, touch, mv, rm, man, mkdir, rmdir, tar, gzip, cat, more, less, ps, sudo, cron, chown, chgrp, ping etc.

Experiment 2: Study and Install IDE of Arduino and different types of Arduino.

Experiment 3: Study and Implement Zigbee Protocol using Arduino / RaspberryPi.

Experiment 4: Write a map reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with Map Reduce, since it is semi structured and record-oriented.

Experiment 5: Data analytics using Apache Spark on Amazon food dataset, find all the pairs of items frequently reviewed together.
 Write a single Spark application that
- Transposes the original Amazon food dataset, obtaining a PairRDD of the type<user_id>→ <list of the product_ ids reviewed by user_id>
- Counts the frequencies of all the pairs of products reviewed together.
- Writes on the output folder all the pairs of products that appear more than once and their frequencies. The pairs of products must be sorted by frequency.

Experiment 6:
Write a program to Implement Bankers algorithm for Dead Lock Avoidance.

Experiment 7:
Write a program to Producer-consumer problem Using semaphores.

Experiment 8:
Write a program for an image enhancement using pixel operation.

Experiment 9:
Write a Program to enhance image using image arithmetic and logical operations.

Experiment 10:
Write a program of bit stuffing used by Data Link Layer.

Experiment 11:

Write a program to configure a Network using Distance Vector Routing protocol.

Experiment 12:
Write a program to perform the function oriented diagram: DFD and Structured chart.

Experiment 13:
Write a program to perform the system analysis: Requirement analysis, SRS.

Experiment 14:
Write a program to draw the structural view diagram: Class diagram, object diagram.

Experiment 15:
Write C programs for implementing the Demorgan's law.

		L	T	P	C
I Year - II Semester		0	0	4	2
	Machine Learning with Python Lab				

Course Objectives:
This course will enable students to
- To learn and understand different Data sets in implementing the machine learning algorithms.
- Implement the machine learning concepts and algorithms in any suitable language of choice.

Course Outcomes(COs): At the end of the course, student will be able to
- Implement procedures for the machine learning algorithms
- Design Python programs for various Learning algorithms
- Apply appropriate data sets to the Machine Learning algorithms
- Identify and apply Machine Learning algorithms to solve real world problems

Experiment-1:
Exercises to solve the real-world problems using the following machine learning methods:
a) Linear Regression
b) Logistic Regression.

Experiment-2:
Write a program to Implement Support Vector Machines.

Experiment-3:
Exploratory Data Analysis for Classification using Pandas and Matplotlib.

Experiment-4:
Implement a program for Bias, Variance, and Cross Validation.

Experiment-5:
Write a program to simulate a perception network for pattern classification and function approximation.

Experiment-6:
Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.

Experiment-7:
Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.

Experiment-8:
Write a program to implement the naïve Bayesian classifier for Iris data set. Compute the accuracy of the classifier, considering few test data sets.

Experiment-9:
Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.

Experiment-10:
Apply EM algorithm to cluster a Heart Disease Data Set. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.

Experiment-11:
Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions.

		L	T	P	C
I Year - II Semester		0	0	4	2
	MEAN Stack Technologies Lab				

Course Objectives:
From the course the student will
- Learn the core concepts of both the frontend and backend programming course.
- Get familiar with the latest web development technologies.
- Learn all about SQL and Mongo databases.
- Learn complete web development process.

Course Outcomes: At the end of the course, student will be able to
- Identify the Basic Concepts of Web & Markup Languages.
- Develop web Applications using Scripting Languages & Frameworks.
- Creating & Running Applications using JSP libraries.
- Creating Our First Controller Working with and Displaying in Angular Js and Nested Forms with ng-form.
- Working with the Files in React JS and Constructing Elements with Data.

Experiment-1:
Develop static pages (using only HTML) of an online Book store. The pages should resemble: www.amazon.com. The website should consist of the following pages. Home page
- Registration and user Login
- User profile page
- Books catalog
- Shopping cart
- Payment by credit card Order Conformation

Experiment-2:
Write an HTML page including any required JavaScript that takes a number from text field in the range of 0 to 999 and shows it in words. It should not accept four and above digits, alphabets and special characters.

Experiment-3:
Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems:
a) Input: Click on Display Date button using on click ( ) function Output: Display date in the textbox
b) Input: A number n obtained using prompt Output: Factorial of n number using alert
c) Input: A number n obtained using prompt Output: A multiplication table of numbers from 1 to 10 of n using alert
d) Input: A number n obtained using prompt and add another number using confirm Output: Sum of the entire n numbers using alert

Experiment-4:
Create a simple visual bean with a area filled with a color. The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false. The color of the area should be changed dynamically for every mouse click.

Experiment-5:
Create an XML document that contains 10 users information. Write a Java Program, which takes User Id as input and returns the user details by taking the user information from XML document using DOM parser or SAX parser.

Experiment-6:
Develop and demonstrate PHP Script for the following problems:
 a) Write a PHP Script to find out the Sum of the Individual Digits.
 b) Write a PHP Script to check whether the given number is Palindrome or not

Experiment-7:
Implement the following in CSS
a) Implementation of 'get' and 'post' methods.
b) Implementation in colors, boarder padding.
c) Implementation button frames tables, navigation bars.

Experiment-8:
Implement the web applications with Database using
a) PHP,
b) Servlets and
c) JSP.

Experiment-9:
Write a program to design a simple calculator using
a) JavaScript
b) PHP
c) Servlet and
d) JSP.

Experiment-10:
Create registration and login forms with validations using Jscript query.

Experiment-11:
Jscript to retrieve student information from student database using database connectivity.

Experiment-12:
Implement the following in React JS
a) Using React Js creating constructs data elements.
b) Using React Js implementations DoM.

Experiment-13:
Implement the following in Angular JS
a) Angular Js data binding.
b) Angular JS directives and Events.
c) Using angular Js fetching data from MySQL.

Experiment-14:
Develop and demonstrate Invoking data using Jscript from Mongo DB.

Experiment-15:
Create an Online fee payment form using JSCript and MangoDB.