SN	Course Code	TITLE OF THE COURSE	L	T	P	S	C	CH	Course Type*
		Competitive Coding – II	0	0	2	0	1	2	EE

20CSP351			Course Code(s) 20CSP-351
PRE-REQUISITE	21CSP-314		
CO-REQUISITE	21CST-352,21CST-353,21CST-354,21CST-355,21CST-357,21CST-371,21CSP-356		
ANTI-REQUISITE	21CST-475		

a. Course Description
Competitive programming is the course in which students will learn how to apply algorithms in order to solve complex problems. The goal of this course is to teach students how to apply familiar algorithms to non-intuitive problems.

b. Course Objectives
Competitive programming is the course in which students will learn how to apply algorithms in order to solve complex problems.
The goal of this course is to teach students how to apply familiar algorithms to non-intuitive problems.

c. Course Outcomes

CO1	Describe how algorithmic problems are solved
CO2	Recognize the time and memory complexity of an algorithm or a structure
CO3	Explain the concrete algorithms and data structures
CO4	Analyze the given problem and recognize sub-problems
CO5	Apply the knowledge on a wider set of problems to achieve better time complexity.

d. Syllabus

Unit-1	Data Structures	Contact Hours:
Arrays, Stacks, Queues and linked list	https://leetcode.com/problems/3sum/ https://leetcode.com/problems/jump-game-ii/ https://leetcode.com/problems/valid-parentheses/ https://leetcode.com/problems/simplify-path/ https://leetcode.com/problems/implement-queue-using-stacks/ https://leetcode.com/problems/queue-reconstruction-by-height/ https://leetcode.com/problems/merge-two-sorted-lists/ https://leetcode.com/problems/remove-duplicates-from-sorted-list-ii/ https://leetcode.com/problems/reorder-list/	
Divide and conquer	https://leetcode.com/problems/count-and-say/ https://leetcode.com/problems/1-bit-and-2-bit-characters/ https://leetcode.com/problems/jewels-and-stones/ https://leetcode.com/problems/snakes-and-ladders/ https://leetcode.com/problems/water-and-jug-problem/ https://leetcode.com/problems/find-and-replace-in-string/	
Heap	https://leetcode.com/problems/kth-largest-element-in-a-stream/ https://leetcode.com/problems/last-stone-weight/ https://leetcode.com/problems/race-car/ https://leetcode.com/problems/cheapest-flights-within-k-stops/ https://leetcode.com/problems/k-closest-points-to-origin/ https://leetcode.com/problems/network-delay-time/ https://leetcode.com/problems/distant-barcodes/ https://leetcode.com/problems/furthest-building-you-can-reach/ https://leetcode.com/problems/swim-in-rising-water/	

Unit-2	(Name of the Unit)	Contact Hours:
Greedy	https://leetcode.com/problems/candy/ https://leetcode.com/problems/best-time-to-buy-and-sell-stock-ii/ https://leetcode.com/problems/remove-duplicate-letters/ https://leetcode.com/problems/can-place-flowers/ https://leetcode.com/problems/assign-cookies/ https://leetcode.com/problems/best-time-to-buy-and-sell-stock-with-transaction-fee/ https://leetcode.com/problems/lemonade-change/ https://leetcode.com/problems/boats-to-save-people/ https://leetcode.com/problems/minimum-add-to-make-parentheses-valid/ https://leetcode.com/problems/three-equal-parts/	
Trees	https://leetcode.com/problems/binary-tree-inorder-traversal/ https://leetcode.com/problems/same-tree/ https://leetcode.com/problems/symmetric-tree/ https://leetcode.com/problems/balanced-binary-tree/ https://leetcode.com/problems/path-sum/ https://leetcode.com/problems/count-complete-tree-nodes/ https://leetcode.com/problems/sum-of-left-leaves/ https://leetcode.com/problems/delete-node-in-a-bst/ https://leetcode.com/problems/diameter-of-binary-tree/ https://leetcode.com/problems/binary-tree-tilt/	
Backtracking	https://leetcode.com/problems/binary-watch/ https://leetcode.com/problems/stickers-to-spell-word/ https://leetcode.com/problems/all-paths-from-source-to-target/ https://leetcode.com/problems/word-ladder-ii/ https://leetcode.com/problems/subsets/	

	https://leetcode.com/problems/combinations/
	https://leetcode.com/problems/palindrome-partitioning/
Graph	https://leetcode.com/problems/is-graph-bipartite/
	https://leetcode.com/problems/gray-code/
	https://leetcode.com/problems/k-th-symbol-in-grammar/
	https://leetcode.com/problems/group-the-people-given-the-group-size-they-belong-to/
	https://leetcode.com/problems/the-skyline-problem/
	https://leetcode.com/problems/find-the-difference/
	https://leetcode.com/problems/predict-the-winner/
	https://leetcode.com/problems/construct-the-rectangle/
Dynamic Programming	https://leetcode.com/problems/best-time-to-buy-and-sell-stock/
	https://leetcode.com/problems/decode-ways/
	https://leetcode.com/problems/scramble-string/
	https://leetcode.com/problems/climbing-stairs/
	https://leetcode.com/problems/unique-paths/
	https://leetcode.com/problems/maximum-subarray/
	https://leetcode.com/problems/longest-palindromic-substring/
	https://leetcode.com/problems/house-robber-ii/
	https://leetcode.com/problems/range-sum-query-immutable/
	https://leetcode.com/problems/word-break/

SN	Program Code-CS201	Course Title	L	T	P	C	CH	Course Type
5	Course Code(s) 20CST-355	Mobile Application Development with Lab	2	0	2	3	4	CR

PRE-REQUISITE	21CSH-319- Project Based learning in java with Lab
CO-REQUISITE	-
ANTI-REQUISITE	-

Course Objectives
- Install and configure Android application development tools.
- Design and develop user Interfaces for the Android platform.
- Save state information across important operating system events.
- Apply Java programming concepts to Android application development.

Course Outcomes

CO 1	Design and develop User Interfaces for the Android platform.
CO 2	Ability to apply general programming knowledge in the field of developing mobile applications.
CO 3	Understanding of the specific requirements, possibilities and challenges when developing for a mobile context.
CO 4	Understanding of the interactions between user interface and underlying application infrastructure.
CO 5	At the end of this course student will Apply essential Android Programming concepts.

Syllabus

Unit-1	Introduction to Android	Contact Hours: 15
Chapter 1.1	**Introduction:** Cost of Mobile Application Development, Importance of Mobile Strategies, Challenges, Myths, Third-Party Frameworks, Mobile Web Presence, ApplicationsFactors in Developing Mobile Applications :Mobile Software Engineering ,Frameworks and Tools, Generic UI Development ,Android User	
Chapter 1.2	**Introduction to Mobility:** Mobility Landscape, Mobile Platforms, Mobile apps development, Overview of Android Platform, Setting up the mobile apps development environment with emulator.Telephony :a. Deciding Scope of an App b. Wireless Connectivity and Mobile Apps c. Android Telephony.	
Chapter 1.3	**Building block of Mobile apps:** App user Interface Designing, Layout, User Interface elements, Draw-able, Menu, Activity states and lifecycle, Interaction among activities. **App functionality based user interface**:Threads, Asynchronous task, Services-states and lifecycle, Notifications, Broadcast receivers, Telephony and SMS API**.**	
Experiment No 1.1	Setting Up the Development Environment	
Experiment No 1.2	Create "Hello World" Application	
Experiment No 1.3	Create Application by Using Widgets	
Unit-2	Data Handling	Contact Hours: 15
Chapter 2.1	**Naïve Data Handling:**On Device File I/O, Shared preferences, Mobile Databases such as SQLite and enterprise data access.	
Chapter 2.2	**Sprucing up Mobile Apps:** Graphics and animation-custom views, canvas, animation API multimedia-audio/video playback and record, location aware. **Testing Mobile apps**: Debugging Apps, White and Black Box Testing and test automation of apps.	
Chapter 2.3	**Creating Consumable Web Services for Mobile Devices:** What is a Web Service, Web Services Languages (Formats), Creating an Example Web Service, Debugging Web Services	
Experiment No 2.1	Creating the Application by using Tex Edit control	
Experiment No 2.2	Creating the Application Choosing Options CheckBox	
Experiment No 2.3	Creating the Application Choosing Options RadioButton	
Experiment No. 2.4	Creating the Application Choosing Options RadioGroup	
Unit-3	User Interface Design	Contact Hours:15
Chapter 3.1	**Mobile User Interface Design:** Effective Use of Screen Real Estate, Understanding Mobile Information Design, Understanding Mobile Application Users, Understanding Mobile Platforms, Using the Tools of Mobile Interface Design.	
Chapter 3.2	**Mobile Websites:** Choosing a Mobile Web Option, Adaptive Mobile Websites, Dedicated Mobile Websites Mobile Web Apps with HTML5 **Android:** Android as Competition to itself, Connecting to the Google Play, Android Development Practices, Building an App in Android.	
Chapter 3.3	**Operating Systems iOS:** IOS Project, Debugging iOS Apps, Objective-C Basics, Building the Derby App in IOS **Windows Phone 7:** Windows Phone 7 Project, Building an App in Windows Phone 7, Distribution.	
Experiment No 3.1	Create Application by Using Building Blocks for Android Application (Design by using Linear Layout)	
Experiment No 3.2	Create Application by Using Building Blocks for Android Application (Design by using Relative Layout)	
Experiment No 3.3	Create Application by Using Building Blocks for Android Application (Design by using Absolute Layout)	

Experiment No 3.4	Create Application by Using Building Menus and Storing Data
Experiment No 3.5	Design the Application for Menus and Action Bar

Subject Code	Internet of Things	L	T	P	S	C
20CST357/20CSP358	Total Contact Hours: 60 Hours	0	0	4	0	2
Pre-requisites:	20CST355					
Co-requisites:	20CST352, 20CST353, 20CST354, 20CST355, 20CST357, 20CST332, 20CST333, 20CST334					
Anti-Requisites:	20CST331					

Course Objectives

- To study Origins, Drivers and Applications of Internet of Things.
- To study Internet of Things Communications Models.
- To learn what issues are raised by the Internet of Things.

Course Outcomes

- Analyze the basic terminologies associated with IOT and use it.
- Justify the applications of internet of things and correlate them.
- Compare different objects and communication strategies and also able to see the issues raised by communication strategies in IOT.
- Examine the protocols required for communication and packet size required for each application.
- Illustrate security issues with IOT like security, privacy, communication standard and some other legal issues.

List of Experiments

UNIT-I

Experiment-1
Demonstration of
    a)   Arduino-MATLAB Interface
    b)   Long-Distance Serial Link Between Two Arduino Devices

Experiment-2 Study of basic script - based programming in MATLAB.
Experiment-3 To study of Simulink and different toolboxes in MATLAB.
Experiment-4 Explain the working of IoT on the MATLAB Platform.

UNIT-II
Experiment-5 To deploy LIFA (LabVIEW interface for Arduino) and to study the response using LabVIEW and Arduino.
Experiment-6 To measure the distance of an object using SONAR principle by ultrasonic proximity sensor.
Experiment-7 To study the operation of digital humidity sensor and calculate the accuracy of the device.

UNIT-III

Experiment-8
To study the following VI loops
    a)   Do While loop
    b)   For loop
    c)   Case Structure

Experiment-9 To study the sampling and quantization of analog sensor outputs.
Experiment-10 To understand servo control system.

Subject Code	Data Mining	L	T	P	S	C
20CST371/20CSP376	Total Contact Hours: 60 Hours	**0**	**0**	**4**	**0**	**2**
Pre-requisites:	20CST316					
Co-requisites:	20CST311, 20CST313, 20CSP314, 20CST315, 20CST316, 20CST371, 20CST372, 20CST373, 20CST374, 20CSR318, 20CSP312					
Anti-Requisites:	20CST319					

Course Objectives

- To understand the data analysis techniques.
- To understand the concepts behind machine learning.

Course Outcomes

- Understand the various stages of data mining process and OLAP with its characteristics.
- Classify Supervised and Unsupervised Learning and understand Regression & Classification techniques.
- Analyse regression & ANOVA approaches.
- Analyse supervised and predictive like K -Nearest Neighbors, Regression and Classification Trees etc.
- Develop the concept of big data mining with its characteristics & challenges.

<u>**List of Experiments**</u>

UNIT-I
Experiment-1   Demonstration of preprocessing on .arff file using student data .arff.
Experiment-2   To perform the statistical analysis of data.
Experiment-3   Demonstration of association rule mining using Apriory algorithm on supermarket data.
Experiment-4   Demonstration of FP Growth algorithm on supermarket data.

UNIT-II
Experiment-5   To perform the classification by decision tree induction using WEKA tools.
Experiment-6   To perform classification using Bayesian classification algorithm using R.
Experiment-7   To perform the cluster analysis by k-means method using R.

UNIT-III
Experiment-8   To perform the hierarchical clustering using R programming.
Experiment-9   Study of Regression Analysis using R programming.
Experiment-10   Outlier detection using R programming.