SHRI VENKATESHWARA UNIVERSITY

Syllabus

MASTER OF COMPUTER APPLICATION (MCA)

III Semester

(Two Years Programme)

(w.e.f. 2020-21)

SCHOOL OF ENGINEERING & TECHNOLOGY

SEMESTER- III MCA

Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	SMC – 301	Android App Development	3	0	0	20	10	30		70		100	3
	SMC -302	Artificial Intelligence	3	0	0	20	10	30		70		100	3
3	SMC -303	Design & Analysis of Algorithm	3	0	0	20	10	30		70		100	3
4	SMC-312	Web Security	3	0	0	20	10	30		70		100	3
5	SMC-321	Digital Marketing	3	0	0	20	10	30		70		100	3
6	SMC-012	Web Security LAB	0	0	4				25		25	50	2
7	SMC- 021	Digital Marketing LAB	0	0	4				25		25	50	2
8	SMC -311	Python Programming LAB	0	0	4				25		25	50	2
	SMC- 331	Project phase -I	0	0	6				50		50	100	3
												750	24

Elective-I

SMC-311 Data analysis and handling

SMC- 312Web Security

SMC- 313Security Threats and Trends

SMC- 314 Cloud Security & Management

SMC- 315 Machine learning

Elective-I LAB

SMC-011 Data analysis and handling LAB

SMC- 012Web Security LAB

SMC- 013Security Threats and Trends LAB

SMC- 014 Cloud Security & Management LAB

SMC- 015 Machine learning LAB

Elective-II

SMC- 321 Digital Marketing

SMC- 322 Ethical Hacking

SMC- 323 Data Mining and Business Intelligence

SMC- 324Block chain Technology

SMC- 325 Enterprise Resource Planning

Elective-II LAB

SMC- 021 Digital Marketing LAB

SMC- 022 Ethical Hacking LAB

SMC- 023 Data Mining and Business Intelligence LAB

SMC- 024Block chain Technology LAB

SMC- 025 Enterprise Resource Planning LAB

Subject: Android App Development
Course Code SMC – 301

COURSE OVERVIEW:

This course is concerned with the development of applications on mobile and wireless computing platforms. Android will be used as a basis for teaching programming techniques and design patterns related to the development of standalone applications and mobile portals to enterprise and m- commerce systems. Emphasis is placed on the processes, tools and frameworks required to develop applications for current and emerging mobile computing devices. Students will work at all stages of the software development life-cycle from inception through to implementation and testing. In doing so, students will be required to consider the impact of user characteristics, device capabilities, networking infrastructure and deployment environment, in order to develop software capable of meeting the requirements of stakeholders.

COURSE OBJECTIVES:

1. To facilitate students to understand android SDK
2. To help students to gain a basic understanding of Android application development
3. To inculcate working knowledge of Android Studio development tool

COURSE OUTCOMES:

At the end of this course, students will be able to:

1. Identify various concepts of mobile programming that make it unique from programming forother platforms,
2. Critique mobile applications on their design pros and cons,
3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
4. Program mobile applications for the Android operating system that use basic and advancedphone features, and
5. Deploy applications to the Android marketplace for distribution.

SYLLABUS

UNIT - I

Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file.

UNIT - II

Android Application Design Essentials: 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.

UNIT - III

Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaceswith Layouts, Drawing and Working with Animation.

UNIT - IV

Testing Android applications, Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.

UNIT - V

Using Common Android APIs: Using Android Data and Storage APIs, Managing data using Sqlite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.

TEXT BOOKS:

1. T1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed. (2011)

REFERENCE BOOKS:

1. R1. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd
2. R2. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd
3. R3. Android Application Development All in one for Dummies by Barry Burd, Edition: I

Name of The Course	**ARTIFICIAL INTELLIGENCE**			
Course Code	SMC -302			
Prerequisite	None			
Corequisite				
Antirequisite				
	L	**T**	**P**	**C**
	3	0	0	3

Course Objectives:

The objective of this course is to learn:

1. To provide a strong foundation of fundamental concepts in Artificial Intelligence
2. To provide a basic exposition to the goals and methods of Artificial Intelligence
3. To enable the student to apply these techniques in applications which involve perception, reasoning and learning.
4. Distinguish between a conventional system and an intelligent system.
5. Artificial Intelligent techniques in solving problems of a particular domain

Course Outcomes

CO1	Understand different types of AI agents and knows various AI search algorithms
CO2	Understand the fundamentals of knowledge representation (logic-based, frame-based, semantic nets), inference and theorem proving .
CO3	Know how to build simple knowledge-based systems
CO4	Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information
CO5	Ability to apply knowledge representation, reasoning, and machine learning techniques to real-world problems

Text Book (s)

1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", 2nd Edition, Pearson Education / Prentice Hall of India, 2004.

Reference Book (s)

1. Elaine Rich and Kevin Knight, "Artificial Intelligence", 2nd Edition, Tata McGraw- Hill, 2003

Unit-1 Introduction	**8 hours**
Various definitions of AI, Introduction to AI applications and AI techniques, Production systems, control strategies, reasoning - forward & backward chaining Intelligent agents – agents and environments - good behavior – the nature of Environments –structure of agents - Problem Solving - problem solving agents – example problems – searching for solutions – uniformed search strategies – avoiding repeated states – searching with partial information.	

Unit-2 Searching Techniques	**8 hours**
Informed search and exploration – Informed search strategies – heuristic function – local search algorithms and optimistic problems – local search in continuous spaces – online search agents and unknown environments - Constraint satisfaction problems (CSP) – Backtracking search and Local search for CSP – Structure of problems - Adversarial Search – Games – Optimal decisions in games – Alpha – Beta Pruning – imperfect real-time decision – games that include an element of chance.	
Unit-3 Knowledge Representation	**8 hours**
First order logic – representation revisited – Syntax and semantics for first order logic – Using first order logic – Knowledge engineering in first order logic - Inference in First order logic –prepositional versus first order logic – unification and lifting – forward chaining – backward chaining - Resolution - Knowledge representation – Ontological Engineering - Categories and objects – Actions - Simulation and events - Mental events and mental objects	
Unit-4 Learning	**8 hours**
Learning from observations - forms of learning - Inductive learning - Learning decision trees -Ensemble learning - Knowledge in learning – Logical formulation of learning – Explanation based learning – Learning using relevant	

information – Inductive logic programming - Statistical learning methods - Learning with complete data – Learning with hidden variable - EM algorithm - Instance based learning - Neural networks - Reinforcement learning – Passive reinforcement learning
Unit-5 Uncertainty **8 hours**
Different types of uncertainty - degree of belief and degree of truth, various probability constructs - prior probability, conditional probability, probability axioms, probability distributions, and joint probability distributions, Bayes' rule, other approaches to modeling uncertainty such as Dempster-Shafer theory and fuzzy sets/logic

Name of The Course	Design & Analysis of Algorithm			
Course Code	SMC -303			
Prerequisite	None			
Corequisite				
Antirequisite				
	L	**T**	**P**	**C**
	3	0	0	3

Type of course: NA

Prerequisite: Programming (C or C++)**,** Data and file structure

Rationale: Obtaining efficient algorithms is very important in modern computer engineering as the world wants applications to be time and space and energy efficient. This course enables to understand and analyze efficient algorithms for various applications.

Content:

Sr No	Course content	Total Hrs
1	**Basics of Algorithms and Mathematics:** What is an algorithm?, Mathematics for Algorithmic Sets, Functions and Relations, Vectors and Matrices, Linear Inequalities and Linear Equations.	**02**
2	**Analysis of Algorithm:** The efficient algorithm, Average, Best and worst case analysis, Amortized analysis , Asymptotic Notations, Analyzing control statement, Loop invariant and the correctness of the algorithm, Sorting Algorithms and analysis: Bubble sort, Selection sort, Insertion sort, Shell sort Heap sort, Sorting in linear time : Bucket sort, Radix sort and Counting sort	**08**
3	**Divide and Conquer Algorithm:** Introduction, Recurrence and different methods to solve recurrence, Multiplying large Integers Problem, Problem Solving using divide and conquer algorithm - Binary Search, Max-Min problem, Sorting (Merge Sort, Quick Sort), Matrix Multiplication, Exponential.	**06**
4	**Dynamic Programming:** Introduction, The Principle of Optimality, Problem Solving using Dynamic Programming – Calculating the Binomial Coefficient, Making Change Problem, Assembly Line-Scheduling, Knapsack problem, All Points Shortest path, Matrix chain multiplication, Longest Common Subsequence.	**05**

5	**Greedy Algorithm** General Characteristics of greedy algorithms, Problem solving using	**05**

6	**Exploring Graphs:** An introduction using graphs and games, Undirected Graph, Directed Graph, Traversing Graphs, Depth First Search, Breath First Search, Topological sort, Connected components,	**04**
7	**Backtracking and Branch and Bound:** Introduction, The Eight queens problem , Knapsack problem, Travelling Salesman problem, Minimax principle	**03**
8	**String Matching:** Introduction, The naive string matching algorithm, The Rabin-Karp algorithm, String Matching with finite automata, The Knuth-Morris-Pratt algorithm.	**03**
9	**Introduction to NP-Completeness:** The class P and NP, Polynomial reduction, NP- Completeness Problem, NP-Hard Problems. Travelling Salesman problem, Hamiltonian problem, Approximation algorithms	**05**

Reference Books:

1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, PHI.
2. Fundamental of Algorithms by Gills Brassard, Paul Bratley, PHI.
3. Introduction to Design and Analysis of Algorithms, Anany Levitin, Pearson.
4. Foundations of Algorithms, Shailesh R Sathe, Penram
5. Design and Analysis of Algorithms, Dave and Dave, Pearson.

Course Outcome:

After learning the course the students should be able to:

1. Analyze the asymptotic performance of algorithms.
2. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.
3. Find optimal solution by applying various methods.
4. Apply pattern matching algorithms to find particular pattern.
5. Differentiate polynomial and nonpolynomial problems.

SMC -315 MACHINE LEARNING		
DETAILED SYLLABUS		**3-0-0**
Unit	**Topic**	**Proposed Lecture**
I	INTRODUCTION – Well defined learning problems, Designing a Learning System, Issues in Machine Learning; THE CONCEPT LEARNING TASK - General-to-specific ordering of hypotheses, Find-S, List then eliminate algorithm, Candidate elimination algorithm, Inductive bias	**08**

II	DECISION TREE LEARNING - Decision tree learning algorithm-Inductive bias- Issues in Decision tree learning; ARTIFICIAL NEURAL NETWORKS – Perceptrons, Gradient descent and the Delta rule, Adaline, Multilayer networks, Derivation of backpropagation rule Backpropagation AlgorithmConvergence, Generalization;	**08**
III	Evaluating Hypotheses: Estimating Hypotheses Accuracy, Basics of sampling Theory, Comparing Learning Algorithms; **Bayesian Learning:** Bayes theorem, Concept learning, Bayes Optimal Classifier, Naïve Bayes classifier, Bayesian belief networks, EM algorithm;	**08**
IV	**Computational Learning Theory:** Sample Complexity for Finite Hypothesis spaces, Sample Complexity for Infinite Hypothesis spaces, The Mistake Bound Model of Learning; INSTANCE-BASED LEARNING – k-Nearest Neighbour Learning, Locally Weighted Regression, Radial basis function networks, Case-based learning	**08**
V	**Genetic Algorithms:** an illustrative example, Hypothesis space search, Genetic Programming, Models of Evolution and Learning; Learning first order rules-sequential covering algorithms-General to specific beam search-FOIL; REINFORCEMENT LEARNING - The Learning Task, Q Learning.	**08**

Text books:

1. Tom M. Mitchell, ―Machine Learning, McGraw-Hill Education (India) Private Limited, 2013.
2. Ethem Alpaydin, ―Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press 2004.
3. Stephen Marsland, ―Machine Learning: An Algorithmic Perspective, CRC Press, 2009.
4. Bishop, C., Pattern Recognition and Machine Learning. Berlin: Springer-Verlag.

Name of The Course	SMC- 323 Data Mining and Business Intelligence			
Course Code	SMC -323			
Prerequisite	None			
Corequisite				
Antirequisite				
	L	**T**	**P**	**C**
	3	0	0	3

Content:

1.	**Overview and concepts Data Warehousing and Business Intelligence**	05 Hours	
Why reporting and Analysing data, Raw data to valuable information-Lifecycle of Data - What is Business Intelligence - BI and DW in today's perspective - What is data warehousing - The building Blocks: Defining Features - Data warehouses and data 1marts - Overview of the components - Metadata in the data warehouse - Need for data warehousing - Basic elements of data warehousing - trends in data warehousing.			
2.	**The Architecture of BI and DW**	07 Hours	

BI and DW architectures and its types - Relation between BI and DW - OLAP (Online analytical processing) definitions - Difference between OLAP and OLTP - Dimensional analysis - What are cubes? Drill-down and roll-up - slice and dice or rotation - OLAP models - ROLAP versus MOLAP - defining schemas: Stars, snowflakes and fact constellations			
3.	**Introduction to data mining (DM)**	04 Hours	
Motivation for Data Mining - Data Mining-Definition and Functionalities – Classification of DM Systems - DM task primitives - Integration of a Data Mining system with a Database or a Data Warehouse - Issues in DM – KDD Process			
4.	**Data Pre-processing**	07 Hours	
Why to pre-process data? - Data cleaning: Missing Values, Noisy Data - Data Integration and transformation - Data Reduction: Data cube aggregation, Dimensionality reduction - Data Compression - Numerosity Reduction - Data Mining Primitives - Languages and System Architectures: Task relevant data - Kind of Knowledge to be mined - Discretization and Concept Hierarchy.			
5.	**Concept Description and Association Rule Mining**	07 Hours	
What is concept description? - Data Generalization and summarization-based characterization - Attribute relevance - class comparisons Association Rule Mining: Market basket analysis - basic concepts - Finding frequent item sets: Apriori algorithm - generating rules – Improved Apriori algorithm – Incremental			

ARM – Associative Classification – Rule Mining			
6.	**Classification and Prediction**	07 Hours	
What is classification and prediction? – Issues regarding Classification and prediction: Classification methods: Decision tree, Bayesian Classification, Rule based, CART, Neural Network Prediction methods: Linear and nonlinear regression, Logistic Regression Introduction of tools such as DB Miner /WEKA/DTREG DM Tools			
7.	Data Mining for Business Intelligence Applications	04 Hours	
Data mining for business Applications like Balanced Scorecard, Fraud Detection, Clickstream Mining, Market Segmentation, retail industry, telecommunications industry, banking & finance and CRM etc., Data Analytics Life Cycle: Introduction to Big data Business Analytics - Stateof the practice in analytics role of data scientists Key roles for successful analytic project - Main phases of life cycle - Developing core deliverables for stakeholders.			
8.	**Advance topics**	04 Hours	
Introduction and basic concepts of following topics. Clustering, Spatial mining, web mining, text mining, Big Data: Introduction to big data: distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce. Introduction to Hadoop architecture: Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering – Monitoring & Maintenance.			

Reference Books:

1. J. Han, M. Kamber, “Data Mining Concepts and Techniques”, Morgan Kaufmann
2. M. Kantardzic, “Data mining: Concepts, models, methods and algorithms, John Wiley &Sons Inc.
3. Paulraj Ponnian, “Data Warehousing Fundamentals”, John Willey.
4. M. Dunham, “Data Mining: Introductory and Advanced Topics”, Pearson Education.
5. G. Shmueli, N.R. Patel, P.C. Bruce, “Data Mining for Business Intelligence: Concepts, Techniques,and Applications in Microsoft Office Excel with XLMiner”, Wiley India.