A.V.V.M. SRI PUSHPAM COLLEGE (AUTONOMOUS), POONDI

Programme: M.C.A.
Department: Computer science

Syllabus Revision 2017-2018

S.No.	Courses	Number of courses having changes
1.	Core Course	09
2.	Elective Course	02
	TOTAL	11

Total Number of Courses   : 40

Total Number of Courses having changes   : 11

Percentage of Revision   : 27.5 %

Note:

   The content of the syllabus which has been revised is highlighted.

MCA (Master of Computer Applications) 2017-2018

S. No	Semester	Category	Paper Code	Title of the Course	Maximum Marks			Minimum Marks for Pass			Hours Week	Credits
					CIA	E.E	Total	CIA	E.E	Total		
1	I	Core	17P1CA1	C and C++ Programming	25	75	100	10	30	50	5	4
2		Core	17P1CA2	Data Structures and Algorithms	25	75	100	10	30	50	5	4
3		Core	17P1CA3	Digital Computer Fundamentals	25	75	100	10	30	50	5	4
4		Core	17P1CA4	Database Management System	25	75	100	10	30	50	5	4
5		Core	17P1CA5	Computer Graphics	25	75	100	10	30	50	4	3
6		Core-PL	17P1CAP1	C and C++ Lab	40	60	100	16	24	50	3	2
7		Core-PL	17P1CAP2	RDBMS Lab	40	60	100	16	24	50	3	2
8		Skill Elective-I	17P1CAS1	Grooming & Business Etiquette	40	60	100	16	24	50	3	2
9	II	Core	17P2CA6	Computer Networks	25	75	100	10	30	50	5	4
10		Core	17P2CA7	Operating System Design Principles	25	75	100	10	30	50	5	3
11		Core	17P2CA8	Computer Architecture	25	75	100	10	30	50	5	4
12		Core	17P2CA9	Java Programming	25	75	100	10	30	50	4	4
13		Core	17P2CA10	Microprocessors and their Applications	25	75	100	10	30	50	5	4
14		Core-PL	17P2CAP3	Java Programming Lab	40	60	100	16	24	50	3	2
15		Core-PL	17P2CAP4	Multimedia and Operating Systems Lab	40	60	100	16	24	50	3	2
16		Skill Elective-II	17P2CAS2	Presentation Skills	40	60	100	16	24	50	3	2
17	III	Core	17P3CA11	Internet and Web Technology	25	75	100	10	30	50	5	4
18		Core	17P3CA12	Accounting and Financial Management	25	75	100	10	30	50	5	4
19		Core	17P3CA13	Mathematical foundations of Computer Science	25	75	100	10	30	50	5	4
20		Core	17P3CA14	Organizational Behaviour	25	75	100	10	30	50	4	4
21		Core	17P3CA15	Software Engineering	25	75	100	10	30	50	5	4
22		Core-PL	17P3CAP5	Object Oriented Analysis and Design Lab	40	60	100	16	24	50	3	3
23		Core-PL	17P3CAP6	Web Design-Python Lab	40	60	100	16	24	50	3	3
24		Skill Elective-III	17P3CAS3	Group Communication	40	60	100	16	24	50	3	2

S. No	Semester	Category	Paper Code	Title of the Paper	Maximum Marks			Minimum Marks for Pass			Hours Week	Credits
					CIA	E.E	Total	CIA	E.E	Total		
25		Core	17P4CA16	Optimization Techniques	25	75	100	10	30	50	5	5
26		Core	17P4CA17	Compiler Design	25	75	100	10	30	50	5	5
27		Core	17P4CA18	Big Data Analytics	25	75	100	10	30	50	5	4
28	IV	Major Elective-1	17P4CAEL1A 17P4CAEL1B 17P4CAEL1C	Distributed Programming using J2EE Ubiquitous Computing Peer-to-Peer Computing	25	75	100	10	30	50	5	4
29		Major Elective-II	17P4CAEL2A 17P4CAEL2B 17P4CAEL2C	Enterprise Resource Planning Management Information System Software Project Management	25	75	100	10	30	50	4	4
30		Core-PL	17P4CAP7	Data Analytics Lab	40	60	100	16	24	50	3	2
31		Core –PL	17P4CAP8	Distributed Programming using J2EE lab	40	60	100	16	24	50	3	2
32		Skill Elective-IV	17P4CAS4	Interpersonal Skills	40	60	100	16	24	50	3	2
33		Core	17P5CA19	Cross Platform - Mobile Applications Development	25	75	100	10	30	50	6	4
34		Core	17P5CA20	Dot Net frame work with C# Programming	25	75	100	10	30	50	6	4
35		Major Elective–III	17P5CAEL3A 17P5CAEL3B 17P5CAEL3C	Soft Computing Internet of Things Human Computer Interaction	25	75	100	10	30	50	6	4
36	V	Major Elective-IV	17P5CAEL4A 17P5CAEL4B 17P5CAEL4C	Service Oriented Architecture Semantic Web Cloud Computing	25	75	100	10	30	50	5	4
37		Core -PL	17P5CAP9	Cross Platform – Mobile Applications Development Lab	40	60	100	16	24	50	3	3
38		Core-PL	17P5CAP10	C# Programming Lab	40	60	100	16	24	50	3	3
39		Skill Elective-V	17P5CAS5	Business Models - IT Industries	40	60	100	16	24	50	3	2
40	VI	Core	17P6CAPR	Project	40	60	100	16	24	50	6 Months	10
				Total Marks - 4000							**Credits – 140**	

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
III	**17P3CA13**	**MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE**	**5**	**4**

Objectives:

➢ To know about Mathematical techniques required for computer science.

Unit I
   Mathematical logic: statements and notation – connectives – normal forms – the theory of inference for the statements calculus – the predicate calculus - inference theory of the predicate calculus.

Unit II
   Relations and ordering: relations – properties of binary relations in a set– relation matrix and the graph of a relation – partition and covering of a set– equivalence relations – compatibility relations – composition of binary relations– partial ordering – partially ordered set; representation and associated terminology– **Functions:** Definition and introduction – composition of function – inverse functions– binary and n-array operations.

Unit III
   Algebraic structures: Algebraic systems: examples and general properties – definition and examples – some simple algebraic systems and general properties – Semi groups and monoids: definition and examples – homomorphism of semi groups and monoids – sub-groups and submonoids - Grammars and languages: discussion of Grammars – formal definition of a language.

Unit IV
   Graph theory: Basic concepts of graph theory: Basic definitions – paths, reachability and connectedness – matrix representation of graphs – trees – storage representation and manipulation of graphs: Trees: their representation and operations.

Unit V
   Vector Spaces: Introduction – Definitions and examples – subspaces – linear transformations – span of a set – linear independence – **Theory of Matrices:** Simultaneous linear equations – characteristic equation and Cayley Hamilton Theorem – Eigen values and Eigen vectors.

Text Book:
1. Discrete mathematical structures with application to computer science, J.B.Tremblay and R.Manohar, McGraw-hill international edition, 2004.
      Unit – I   : Chapter.1 (Sec: 1.1 to 1.6)
      Unit – II   : Chapter.2 (Sec: 2.3, Sec: 2.4.1 to 2.4.4)
      Unit – III   : Chapter.3 (Sec: 3.1 to 3.3.2)
      Unit – IV   : Chapter.5 (Sec: 5.1 to 5.2.1)
2. Modern Algebra, Arumugam.S, Isaac.A.T, Scitech publications, 2014.
      Unit – V   : Chapter.5 (Sec: 5.0 to 5.5), Chapter.7 (Sec: 7.6 to 7.8)

General Reference:
1. Applied Discrete structures for computer science, D.Alan, L.Lenneth, Galgotia publication, New Delhi, 1983.
2. Formal languages and their relations to automata, J.E.Hopcroft and A.D.Ullman, Addison – Weslay publishing company, 1969.

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
III	**17P4CA14**	**ORGANIZATIONAL BEHAVIOUR**	**4**	**4**

Objective:
- ❖ This Course aims at providing in depth Knowledge in Organizational Behavior to enhance the problem formulation in solving skills with a focus on Human Relations aspects.

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UNIT 1 **Hrs 15**

Nature of Organizational Behaviour: Concept of Organization –concept of organization behaviour-challenges and opportunities for organizational behaviour – Applying OB knowledge to management practices. **Foundations of organizational Behaviour:** Classical Approach **–** Neoclassical approach-modern approach-Organizational behaviour models.

UNIT II **Hrs 15**

Nature of Human Behaviour: Concept of behaviour – Process of behaviour – Individual differences-Models of Man. **Personality:** Concept of Personality -Personality measurement. **Perception:** Concept of Perception-Interpersonal perception – Developing Perceptional Skills.

UNIT III **Hrs 15**

Learning: Concept of Learning – Learning theories – Reinforcement-organizational behaviour modification-Learning organization-Knowledge management. **Interpersonal Behaviour:** Nature of Inter personal behaviour –Transactional Analysis. **Group Dynamics:** Concept of group dynamics-Formal groups-Informal group or organization – Group behaviour-Group decision making – Intergroup behaviour.

UNIT IV **Hrs 15**

Power and Politics: Concept of Power -Politics. **Leadership:** Concept of Leadership – Leadership theories-Leadership styles – Leadership styles in Indian organizations- Contemporary issues in Leadership.

UNIT V **Hrs 15**

Communication: Concept of Communication – Communication symbols-Communication network- Barriers in communication- Making communication effective-Communication pattern in Indian organization. **Conflict Management:** Concept of conflict**-** Individual level conflict –Group level conflict- Organizational level conflict-Managing conflict- Negotiation.

Text Book:
1. L.M.Prasad "Organizational Behaviour" Sultan Chand & Sons Educational Publishers, New Delhi, Fifth Edition 2011.

References:
1. Fred Luthans "Organizational Behaviour" McGraw Hill Publishers.
2. Huge J. Arnold, Daniel C.Feldman "Organizational Behaviour" McGraw Hill Publishers.
3. Stephen P.Robbins , Nancy Langton "Organizational Behaviour" Pearson Education series.

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
III	**17P3CAP6**	**WEB DESIGN-PYTHON LAB**	**3**	**3**

Objective

❖ To apply Web technology concepts.

1. Using for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4... 1/10.

2. Write a program using a for loop that calculates exponentials. Your program should ask the user for a base base and an exponent exp, and calculate baseexp

3. Write a method fact that takes a number from the user and prints its factorial.

4. Write a function roots that computes the roots of a quadratic equation. Check for complex roots and print an error message saying that the roots are complex.

5. Write a Python script to generate Password

6. Python script to parse XML/HTML code

7. Tweet Search using Python

8. Geo Location of an IP Address

9. Log Checker in Python

10. Write a Python script to get all the links from a website

Semester	Subject code	Title of the course	Hours of Teaching / Week	No. of Credits
IV	**17P4CA16**	**OPTIMIZATION TECHNIQUES**	**5**	**5**

Objectives:
➢ To understand different techniques to optimize for decision making

Unit I
Linear Programming: Introduction **–** solved examples – modeling in OR – Methodology in OR – Applications and limitations in OR – Formulation of LPP – Model formulation – solved problems – Graphical solution method – solved problems.

Unit II
Game Theory: Introduction – optimal solution of to person zero sum game – rules for determining a saddle point – solved problems – Games with mixed strategy – The graphical method – Use of dominance property.

Unit III
Queuing Problems: Introduction – Classification of queues – the Queueing problems (M/M/1) : (∞/FCFS) model – (M/M/1) : (N/FCFS) model – (M/M/C) : (∞/FCFS) model – (M/M/C) : (N/FCFS) model – solved problems

Unit IV
Inventory Models: Introduction – Deterministic models – purchasing problem with no shortages – production problems with no shortages - purchasing problem with shortages – production problems with shortages – solved problems.

Unit V
Replacement Theory: Introduction – Replacement policy for equipment which deteriorates gradually – replacement of items that fail suddenly – Individual Replacement policy – Group Replacement Policy – problems in mortality and staffing – solved problems.

Textbook:
Problems in Operations Research - PK. GUPTA and MANMOHAN, Sultan Chand & Sons (Fourteenth Edition), 2014.
Unit – I   : Chapters 0, 1, 2 (Pages: 1 – 19, 43 – 53)
Unit – II   : Chapters 20 (Pages: 471 – 486)
Unit – III   : Chapters 22 (Pages: 535 – 550)
Unit – IV   : Chapters 23 (Pages: 571 – 583)
Unit – V   : Chapters 24 (Pages: 619 – 635)

Reference:
1. Operation Research, Kanthi Swarub, P. K. Gupta and Manmohan, Sultan Chand & Sons, New Delhi, 1982.
2. Operation Research – Principles and Practice, Don T. Philips, A. Ravindran, James J. Solberg, John Wiley & Sons, 1976.

Semester	Subject code	Title of the course	Hours of Teaching /Week	No. of Credits
IV	**17P4CA18**	**Big Data Analytics**	**5**	**4**

Objectives:

1. To provide an overview of an exciting growing field of big data analytics.
2. To introduce the tools required to manage and analyze big data like Hadoop, NoSql Map- Reduce.
3. To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
4. To enable students to have skills that will help them to solve complex real-world problems in for decision support.

Unit I : Introduction to Big Data, Hadoop and NoSQL   Hrs 15

Introduction to Big Data, Big Data characteristics, types of Big Data, Traditional vs. Big Data business approach, Case Study of Big Data Solutions - What is Hadoop? Core Hadoop Components; Hadoop Ecosystem; Physical Architecture; Hadoop limitations - What is NoSQL? NoSQL business drivers - NoSQL case studies - NoSQL data architecture patterns: Key-value stores, Graph stores, Column family (Bigtable) stores, Document stores, Variations of NoSQL architectural patterns - Using NoSQL to manage big data: What is a big data NoSQL solution? - Understanding the types of big data problems - Analyzing big data with a shared-nothing architecture - Choosing distribution models: master-slave versus peer-to-peer - Four ways that NoSQL systems handle big data problems

Unit II: MapReduce and the New Software Stack   Hrs 15

Distributed File Systems : Physical Organization of Compute Nodes, Large-Scale File-System Organization - **MapReduce:** The Map Tasks, Grouping by Key, The Reduce Tasks, Combiners, Details of MapReduce Execution, Coping With Node Failures - **Algorithms Using MapReduce**: Matrix-Vector Multiplication by MapReduce , Relational-Algebra Operations, Computing Selections by MapReduce, Computing Projections by MapReduce, Union, Intersection, and Difference by MapReduce, Computing Natural Join by MapReduce, Grouping and Aggregation by MapReduce, Matrix Multiplication, Matrix Multiplication with One MapReduce Step.

Unit III: Finding Similar Items and Mining Data Streams   Hrs 15

Applications of Near-Neighbor Search, Jaccard Similarity of Sets, Similarity of Documents, Collaborative Filtering as a Similar-Sets Problem - **Distance Measures:** Definition of a Distance Measure, Euclidean Distances, Jaccard Distance, Cosine Distance, Edit Distance, Hamming Distance - **The Stream Data Model**: A Data-Stream-Management System, Examples of Stream Sources, Stream Querie, Issues in Stream Processing - **Sampling Data in a Stream** : Obtaining a Representative Sample , The General Sampling Problem, Varying the Sample Size - **Filtering Streams**: The Bloom Filter, Analysis - **Counting Distinct Elements in a Stream:** The Count-Distinct Problem, The Flajolet-Martin Algorithm, Combining Estimates, Space Requirements - **Counting Ones in a Window**: The Cost of Exact Counts, The Datar-Gionis-Indyk-Motwani Algorithm, Query Answering in the DGIM Algorithm, Decaying Windows.

Unit IV: Link Analysis and Frequent Itemsets   **Hrs 15**

PageRank Definition, Structure of the web, dead ends, Using Page rank in a search engine, Efficient computation of Page Rank: Page Rank Iteration Using MapReduce, Use of Combiners to Consolidate the Result Vector - Topic sensitive Page Rank, link Spam, Hubs and Authorities - **Handling Larger Datasets in Main Memory:** Algorithm of Park, Chen, and Yu, The Multistage Algorithm, The Multihash Algorithm - **The SON Algorithm and MapReduce - Counting Frequent Items in a Stream:** Sampling Methods for Streams, Frequent Itemsets in Decaying Windows

Unit V: Clustering, Recommendation Systems and Mining Social-Network Graphs   **Hrs 15**

CURE Algorithm - Stream-Computing- A Stream-Clustering Algorithm - Initializing & Merging Buckets - Answering Queries - A Model for Recommendation Systems- Content-Based Recommendations - Collaborative Filtering - Social Networks as Graphs- Clustering of Social-Network Graphs – Direct Discovery of Communities – SimRank- Counting triangles using Map-Reduce

Text Books:

1. Anand Rajaraman and Jeff Ullman "Mining of Massive Datasets", Cambridge University Press,
2. Alex Holmes "Hadoop in Practice", Manning Press, Dreamtech Press.
3. Dan McCreary and Ann Kelly "Making Sense of NoSQL" – A guide for managers and the rest of us, Manning Press.
4. Study Material for "Big Data Analytics" based on Stanford Info-Lab Manual, Compiled by ANURADHA BHATIA, Mumbai University.

References:

1. Bill Franks **, "**Taming The Big Data Tidal Wave: Finding Opportunities In Huge Data Streams With Advanced Analytics", Wiley
2. Chuck Lam, "Hadoop in Action", Dreamtech Press

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
IV	**17P4CAP7**	**Data Analytics Lab**	**3**	**2**

1. Study of Hadoop ecosystem

2. Programming exercises on Hadoop

3. Programming exercises in No SQL

4. Implementing simple algorithms in Map- Reduce (3) - Matrix multiplication, Aggregates, joins, sorting, searching etc.

5. Implementing any one Frequent Itemset algorithm using Map-Reduce

6. Implementing any one Clustering algorithm using Map-Reduce

7. Implementing any one data streaming algorithm using Map-Reduce

8. Mini Project: One real life large data application to be implemented (Use standard Datasets available on the web)
    a. Twitter data analysis
    b. Fraud Detection
    c. Text Mining etc.

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
IV	**17P4CAP8**	**Distributed Programming using J2EE Lab**	**3**	**2**

Objectives:

➢ To learn the usage and implementation of distributed application development packages.

- Distributed applications using RMI

  a. Simple RMI application

  b. RMI application with a server and more than one clients

  c. RMI application with Database Connectivity

- Web based distributed application in J2EE platform with Java Servlets Web based distributed application in J2EE platform with JSP

- Enterprise Java Beans

  a. Session Bean
  i. Stateless Session Bean
  ii. Stateful   Session
  Bean b. Entity Bean

  i. Container Managed Persistence
  ii.   Bean Managed Persistence

Semester	Subject code	Title of the course	Hours of Teaching /Week	No. of Credits
V	**17P5CA19**	**Cross Platform - Mobile Applications Development**	**6**	**4**

Unit I   **Hrs 18**
Mobile Development Using Xamarin

What is Xamarin – What's new: Mobile Development Techniques – Mobile UI – Xamarin Forms Custom Renderers – Building Mobile User Interfaces – Xamarin Forms Architecture – Platform UI Specification Approach – Xamarin Forms or a Platform-Specific UI.

Unit II   **Hrs 18**
Xamarin Views

Xamarin Forms - Creating Xamarin Forms Solution –Adding Xamain.Forms views – UI Design Using Layouts – Xamarin Forms Layouts – Android Layout – iOS Layout

Unit III   **Hrs 18**
Xamarin Controls

Xamain.Forms Views – Android controls – iOS controls – Making a Scrollable List – Data Adapters – Xamarin. Forms Listview – Android Listview – iOS TableView

Unit IV   **Hrs 18**
Navigation & Database

Navigation Patterns – Xamarin. Forms Navigation – android Navigation – iOS Navigation – Data Access with SQLite and Data Binding.

Unit V   **Hrs 18**
Custom Renderers & Cross – Platform Architecture

Custom Renderers – Preparing custom renderers – Creating Custom renderers – android, iOS, Windows phone custom renderers – Cross platform Architecture – Shared code and Platform specific code – Core Library – PCL – Dependency Injection.

Text book:

Xamarin Mobile Application Development: Cross-Platform C# and Xamarin. Forms Fundamentals 2015 by Dan Hermes, Apress

Semester	Subject code	Title of the course	Hours of Teaching / Week	No. of Credits
V	**17P5CAEL3B**	**Major Elective - III Internet of Things**	**6**	**4**

OBJECTIVES:

- To Understand the concepts and techniques of IoT.

UNIT I
Internet of Things Strategic Research and Innovation Agenda:

Internet of Things Vision – Internet of Common Definition – IoT Strategic Research and Innovation Directions – IoT Strategic Research and Innovation Directions – IoT Application and Use Case Scenarios – IoT Functional View – Application Areas - IoT Smart-X Applications – Smart Cities – Smart Energy and the Smart Grid - Smart Mobility and Transport – Smart Home , Smart Buildings and Infrastructure – Smart Factory and Smart manufacturing – Smart Health – Food and Water Tracking and Security – Participatory Sensing - Smart Logistics and Retail

UNIT II
Internet of Things and Related Future Internet Technologies:

Cloud Computing –IoT and Semantic Technologies – Networks and Communication – Networking Technology – Communication Technology - Processes – Adaptive and Event- Driven Processes – Processes Dealing with Unreliable Data – Processes dealing with unreliable resources – Highly Distributed Processes – Data Management – Data Collection and Analysis (DCA) – Big Data – Semantic Sensor Networks and Semantic – Annotation of data – Virtual Sensors –Security , Privacy & Trust – Trust for IoT – Security for IoT – Privacy for IoT – Device Level Energy Issues –Low Power Communication – Energy Harvesting – Future Trends and Recommendations – Related Standardization – The Role of Standardization Activities – Current Situation – Area for Additional Consideration – Interoperability in the Internet-of –Things – IoT Protocols Convergence – Message Queue Telemetry Transport (MQTT) - Constrained Applications Protocol (CoAP) – Advanced Message Queuing Protocol (AMQP) - Java Message Service API (JMS) – Data Distribution Service (DDS) – Representational State Transfer (RESET) – Extensible Messaging and Presence Protocol (XMPP)

UNIT III
Internet of Things Global Standardisation – State of Play:

Introduction – General –IoT Vision –IoT Drivers _IoT Definition – IoT Standerdisation Landscape – CEN\ISO and CENELEC/IEC – ETSI – IEEE – IETF – ITU-T - OASIS - OGC – oneM2M – GS1 – IERC Research Projects Positions – BETaas – Advisory Board Experts Position – IoT6 Position.

UNIT IV
Dynamic Context-Aware Scalable and Trust-Based IoT Security, Privacy Framework:

Introduction – Background Work – Main Concept and Motivation of the Framework – Identity Management – Size and Heterogeneity of the System – Anonymization of user Data and Metadata - Action's Control – Privacy by Design Context Awareness – summary – A policy-based framework for Security and Privacy in Internet of

Things – Deployment   in a Scenario – Policies and Context Switching – Framework Architecture and Enforcement–Conclusion and Future Developments – Acknowledgments.

Scalable Integration Framework for Heterogeneous Smart Object , Applications and Services: Introduction – IPv6 Potential – IoT6 – IPv6 for IoT – Adapting IPv6 to IoT Requirements – IoT6 Architecture- DigCovery – IoT6 Integration with the Cloud and EPICS – Enabling Heterogeneous Integration – IoT6 Smart Office Use-case – Scalability Perspective – Conclusions.

UNIT V
Internet of Things Applications- Form Research and Innovation to Deployment:
Introduction – Open IoT – Project Design and Implementation – Execution and Implementation Issues- Project Results – Acceptance and Sustainability – Compose – Project Design and   Implementation – The IoT Communication Technology - Execution and Implementation Issues – Expected Project Results.

Text Book:

Internet of Things – From Research and Innovation to Market Deployment by Ovidiu Vermesan and Peter Friess.