



**SWAMINARAYAN
UNIVERSITY**
THE RESERVOIR OF ALL KNOWLEDGE

FACULTY OF IT AND COMPUTER SCIENCE

COURSE CURRICULUM

Course Title: INTRODUCTION TO BLOCKCHAIN
(Code: MSCIT1301)

IT and CS Programmes in which this course is offered	Semester in which offered
Master of Science in Information Technology -(M.Sc.IT)	Third Semester

Course Objectives – Blockchain helps to manage and secure data as a record with their digital relationships in a decentralized manner. With blockchain technology, there is no need for a central authority and two parties can securely conduct communication with one another at a faster pace. Blockchain makes the Transaction transparent by keeping the chain of records.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks				150
L	T	P	T	P	Theory Marks		Practical Marks		
			3	2	E	M	I	EV	
3	0	4	5		60	40	30	20	

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva, EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.	Weightage %
1	Fundamentals of Blockchain: Introduction, Origin of Blockchain, Blockchain solution, Components of Blockchain, Block in Blockchain, The Technology Blockchain Types and Consensus Mechanism: Introduction, Decentralization and Distribution, Types of Blockchain, Consensus Protocol Cryptocurrency – Bitcoin, Altcoin, Token: Introduction, Bitcoin and the cryptocurrency, Cryptocurrency Basics, Types of Cryptocurrency, Cryptocurrency usage	8	20
	Public Blockchain System: Introduction, Public Blockchain, Popular public Blockchain, The	15	30

2	Bitcoin Blockchain, Ethereum Blockchain Smart Contracts: Introduction, Smart Contract, Characteristics of a Smart Contract, Types of Smart contracts, Types of Oracles, Smart Contracts in Ethereum, Smart Contracts in Industry		
3	Private Blockchain System: Introduction, Key characteristics of Private Blockchain, Private Blockchain Examples, Smart Contract in Private Environment, State Machine, Different Algorithms of Permissioned Blockchain, Byzantine Fault	10	25
4	Consortium Blockchain Introduction, Key characteristics of Consortium Blockchain, Hyperledger platform, Overview of Ripple, Overview of Corda	10	15
5	Applications of Blockchain: Introduction, Blockchain in Education, Blockchain in Healthcare Limitations and Challenges of Blockchain Blockchain Implementation – Limitation, Challenges	5	10

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
10	40	10	0	0	0

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :Evaluate C : Create and Above Levels (Revised Bloom's Taxonomy)

SUGGESTED LEARNING RESOURCES

A. List of Books

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	Blockchain Technology By Chandramouli Subramanian	Asha George, Abhilash K A and Meena Karthikeyan	Universities Press Publication
2	Blockchain Blueprint for a New Economy	Melanie Swan	O'Reilly Publication
3	Blockchain For Dummies	Tiana Laurence	Wiley Publication

B. List of Software/Learning Websites

<https://www.javatpoint.com/blockchain-tutorial>

SUGGESTED LIST OF PRACTICAL/EXERCISES

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	Ethereum – With respect to Ethereum, carry out following : <ul style="list-style-type: none">• Install Geth Client & Configure Ethereum Nodes• Manage Accounts and Account states.• Enable Mining and checking balance in Ether• Setting up Metamask and Testing Fund Transfer – work with Ethereum Ecosystem.• Add Parameters to Cryptocurrency• Check Balance Before Transfer• Adding Transfer Event for Logging	14
2.	Hyperledger - With respect to Hyperledger, carry out following : <ul style="list-style-type: none">• Installing Hyperledger Fabric(latest version)• Build Network with Network configuration• Hyperledger Fabric Demo	02
3.	Corda - With respect to Corda, carry out following : <ul style="list-style-type: none">• Corda – Setting up the Environment• Building the Corda Network	02



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FACULTY OF IT AND COMPUTER SCIENCE

COURSE CURRICULUM

Course Title: INTERNET OF THINGS (IOT)
(Code: MSCIT1306)

IT and CS Programmes in which this course is offered	Semester in which offered
Master of Science in Information Technology -(M.Sc.IT)	Third Semester

Course Objectives – C Programming, Microprocessor, Networking

Internet of Things plays an important role in connecting the things i.e. variety of devices through the Internet. The IoT has emerged as an cutting-edge technology with applications in manufacturing, healthcare, Agriculture, transport, mining, smart cities and many more. This subject covers the fundamentals of IoT with its architecture, protocols and Applications. It also covers the overview and programming of two widely used IoT platforms Arduino and Raspberry Pi.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks					
L	T	P	T	P	Theory Marks		Practical Marks		150	
			2	1	E	M	I	EV		
2	0	2	3		60	40	30	20		

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,
EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.	Weightage %
1	Introduction to Internet of Things: Application areas of IoT, Characteristics of IoT, Things in IoT, IoT stack, Enabling technologies, IoT challenges, IoT levels, IoT and cyber physical system, IoT and WSN Sensors, Microcontrollers, and Their Interfacing: Sensor interfacing, Types of sensors, Controlling sensors, Microcontrollers, ARM	8	20

2	Protocols for IoT : Messaging protocols, Transport protocols, IPv4, IPv6, URI	16	30
3	Cloud for IoT: IoT and cloud, Fog computing, Security in cloud, Case study Application Building with IoT: Various application of IoT : Food, Healthcare, Lavatory maintenance, Water quality, Warehouse, Retail, Driver Assistance, Collision impact	10	30
4	Arduino and Raspberry Pi: Arduino : Architecture, Programming and Application Raspberry Pi : Architecture, Programming and Application IoT Security: Various security issues and need, architecture, requirement, challenges and algorithms	6	20

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
10	40	10	0	0	0

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :Evaluate C : Create and Above Levels (Revised Bloom's Taxonomy)

SUGGESTED LEARNING RESOURCES

A. List of Books

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	Internet of Things	Vasudevan, Nagrajan and Sundaram	Wiley India
2	IoT Fundamentals	David Hence at el	Cisco Press
3	21 IoT Experiments	Yashavant Kanetkar, Shrirang Korde	BPB
	IoT Based Projects	Rajesh Singh at el	BPB
	Internet of Things with ARDUINO and BOLT	Ashwin Pajankar,	BPB

B. List of Software/Learning Websites

1. https://www.tutorialspoint.com/internet_of_things/index.htm
2. <https://www.iotworldtoday.com/>
3. <https://aws.amazon.com/iot/>
4. https://www.cisco.com/c/en_in/solutions/internet-of-things/overview.html
5. https://www.cisco.com/c/en_in/solutions/internet-of-things/iot-network-connectivity.html

SUGGESTED LIST OF PRACTICAL/EXERCISES

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	Practical should be performed by students based on - Using Arduino or Raspberry Pi boards and its software platforms	40



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FACULTY OF IT AND COMPUTER SCIENCE

COURSE CURRICULUM

Course Title: OPERATING SYSTEM
(Code: MSCIT1302)

IT and CS Programmes in which this course is offered	Semester in which offered
Master of Science in Information Technology -(M.Sc.IT)	Third Semester

Course Objectives - This course OPERATING SYSTEMS is an essential part of any Computer-Science education. The purpose of this course is to understand the mechanisms of the Operating Systems like Process Management, Memory Management, Device Management, Information Management, Storage Structures used in OS and Protection Principles. How effectively the OS is utilizing the CPU resources with the help of these mechanisms.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks				150
L	T	P	T	P	Theory Marks		Practical Marks		
			3	2	E	M	I	EV	
3	0	4	5		60	40	30	20	

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,
EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	INTRODUCTION What is an Operating System, Simple Batch System, Multiprogram Batch System, Time Sharing Systems, Personal Computer System, Network OS, Parallel System, Distributed Systems, Real-Time Systems <ul style="list-style-type: none">Memory Management: Background, Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation.Virtual Memory: Demand Paging, Page Replacement, Page Replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Consideration.	8
2	PROCESSES <ul style="list-style-type: none">Process Concept, Process Scheduling,Operation on Processes, Process Scheduling – Basic Concepts - Scheduling Criteria - Scheduling Algorithms FCFS, SJF, Priority, Round- Robin)Thread – Overview – Benefits - User & Kernel Threads and Multithreading Models.CPU Scheduling: Basic Concepts, Scheduling, Criteria, Scheduling, Algorithms, Multiple Processor Scheduling,Process Synchronization: Background, The Critical Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization.	12
3	DEADLOCKS <ul style="list-style-type: none">System Model,Deadlock Characterization,Methods for Handling Deadlocks,Deadlock Prevention,Deadlock Avoidance,Deadlock Detection,Recovery from Deadlock.	12
4	DEVICE MANAGEMENT <ul style="list-style-type: none">Techniques for Device Management,Dedicated Devices, Shared Devices,Virtual Devices,Input or Output Devices, Storage Devices,Buffering,Secondary Storage Structure Disk Structure,Disk Scheduling,Disk Management,Swap Space Management,Disk Reliability.	12

5	INFORMATION MANAGEMENT	15
	<ul style="list-style-type: none"> • Introduction, A Simple File System, • General Model of a File System, • Symbolic File System, Basic File System, • Access Control Verification, • Logical File System, Physical File System, • File System interface, • File Concept Access Methods, • Directory Structure Protection, • Consistency, Semantics • File System Implementation: • File System Structure Allocation Methods, • Free Space Management. 	

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

SUGGESTED LEARNING RESOURCES

A. List of Books

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	Modern Operating Systems 4 th Edition (2014)	Andrew S. Tanenbaum, Herbert Bos	Pearson
2	Operating Systems – Internals and Design Principles 8 th Edition (2009)	Willaim Stallings	Pearson
3	Operating System Concepts 8 th Edition	Abraham Silberschatz, Peter B. Galvineg Gagne	Wiley India Education
4	Operating Systems 3 rd Edition	Godbole and Kahate	McGraw Hill
5	Operating Systems – Internals and Design Principles 5 th Edition (2005)	Stallings	Pearson

SUGGESTED LIST OF PRACTICAL/EXERCISES

Sr. No	Practical/ Exercises	Approx Hrs. Required
1	Installation of virtual machine software.	04
2	Installation of Linux operating system (RedHat / Ubuntu) on virtual machine.	04
3	Installation of Windows operating system on virtual	04

	machine	
4	Linux commands: Working with Directories: (a) pwd, cd, absolute and relative paths, ls, mkdir, rmdir (b) file, touch, rm, cp, mv, rename, head, tail, cat, tac, more, less, strings, chmod	04
5	Linux commands: Working with files: (a) ps, top, kill, pkill, bg, fg (b) grep, locate, find, locate. (c) date, cal, uptime, w, whoami, finger, uname, man, df, du, free, whereis, which. (d) Compression: tar, gzip.	08
6	Windows (DOS) Commands – 1 (a) Date, time, prompt, md, cd, rd, path. (b) Chkdsk, copy, xcopy, format, fidsk, cls, defrag, del, move.	04
7	Windows (DOS) Commands – 2 (a) Diskcomp, diskcopy, diskpart, doskey, echo (b) Edit, fc, find, rename, set, type, ver	04
8	Working with Windows Desktop and utilities (a) Notepad (b) Wordpad (c) Paint (d) Taskbar (e) Adjusting display resolution (f) Using the browsers (g) Configuring simple networking (h) Creating users and shares	08
9	Working with Linux Desktop and utilities (a) The vi editor (b) Graphics (c) Terminal (d) Adjusting display resolution (e) Using the browsers (f) Configuring simple networking (g) Creating users and shares	08
10	Installing utility software on Linux and Windows	02



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FACULTY OF IT AND COMPUTER SCIENCE

COURSE CURRICULUM

Course Title: DATA SCIENCE
(Code: MSCIT1304)

IT and CS Programmes in which this course is offered	Semester in which offered
Master of Science in Information Technology -(M.Sc.IT)	Third Semester

Course Objectives – The practical exercises, the underpinning knowledge and the relevant soft skills associated with this competency are to be developed in the student to display the following COs:

The practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented COs associated with the above-mentioned competency:

- Discuss various concepts of data science.
- Utilize Python toolkits to read, manipulate, extract and analyze data.
- Apply various Statistical analysis techniques.
- Use various data visualization libraries for effective interpretations and insights of data.
- Summarize fundamental concept of big data analysis.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks			
L	T	P	T	P	Theory Marks		Practical Marks	
			2	1	E	M	I	EV
2	0	2	3		60	40	30	20
150								

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,
EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	Overview of Python and Data Structures: <ul style="list-style-type: none">Basics of Python including data typesVariablesExpressionsobjects and functionsPython data structures including String, Array, List, Tuple, Set, Dictionary and operations them	8
2	Introduction to Data Analysis <ul style="list-style-type: none">Sources and nature of data, classification of data (structured, semi-structured, unstructured)Characteristics of dataIntroduction to Big Data platformNeed of data AnalysisEvolution of analytic scalabilityAnalytical processAnalysis vs. reportingModern data analysis toolsApplications of data analysis.Key roles for successful analysis	8
3	Python libraries for Data Science <ul style="list-style-type: none">NumPy-<ul style="list-style-type: none">Difference between array and listN dimension array - 1D array, 2D array, 3D arrayZeros matrix, Ones matrix, Identity matrix, Reshape, Working with random numberStacking - Vertical stacking, horizontal stackingPandas-<ul style="list-style-type: none">Working with Dataframes Read csv and xlsx fileAnalyze the basic dataset characteristicsPerform different merge and sort operations with multiple dataframesAnalyze the DataFrame with loc and iloc, nlargest(), nsmallest(), add or remove an attribute from the DataFrame.	8
4	Statistical Analysis <ul style="list-style-type: none">Regression modelingMultivariate analysisApply basics of descriptive statistics including measures of central tendency such as mean, median, and modeMethods of Least SquaresDifferent probability distributions such as Normal, Poisson, Bernoulli	8
	Data Visualization <ul style="list-style-type: none">Introduction to Data VisualizationImportance of Data Visualization	6

5	<ul style="list-style-type: none"> • Basic Data Visualization with matplotlib • Customizing matplotlib plots • Data visualization with Seaborn 	
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***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
19	25	16	-	-	-

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :Evaluate C : Create and Above Levels (Revised Bloom's Taxonomy)

SUGGESTED LEARNING RESOURCES

A. List of Books

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	Data Science and Analytics	Jain V.K	Khanna Publishing House, Delhi
2	Data Science From Scratch: First Principles with Python	Joel Grus , SPD	Shroff/O'Reilly Second Edition, 2019, ISBN-978-9352138326
3	Data Mining Concepts and Techniques	Jiawei Han and Jian Pei	Morgan Kaufmann, Third Edition 2011, ISBN- 978-9380931913
4	Data Science with Jupyter	Author: Prateek Gupta,	BPB publicationU

B. List of Major Equipment/ Software

1. Computer System with latest configuration and memory
2. Latest version of python
3. Python anaconda/Jupyter
4. Microsoft Excel

C. List of Software/Learning Websites

1. <https://www.anaconda.com>
2. <https://www.python.org>
3. <https://www.w3schools.com>
4. <https://www.tutorialspoint.com>

SUGGESTED LIST OF PRACTICAL/EXERCISES

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	Write a program to perform the below operations on the list: <ul style="list-style-type: none"> • Create a list. • Add/Remove an item to/from a list. • Get the number of elements in the list. • Access elements of the list using the index. • Sort the list. • Reverse the list. 	02
2.	Write a program to perform below operations on tuple: <ul style="list-style-type: none"> • Create a tuple with different data types. • Print tuple items. • Convert tuple into a list. • Remove data items from a list. • Convert list into a tuple. • Print tuple items. 	02
3.	Write a program to perform below operations on set: <ul style="list-style-type: none"> • Create two different sets with the data. • Print set items. • Add/remove items in/from a set. • Perform operations on sets: union, intersection, difference, symmetric difference, check subset of another set. 	02
4.	Write a program to perform below operations on dictionary: <ul style="list-style-type: none"> • Create a dictionary. • Print dictionary items. • Add/remove key-value pair in/from a dictionary. • Check whether a key exists in a dictionary. • Iterate through a dictionary. • Concatenate multiple dictionaries. 	02
5.	Write a program to check whether a given string is palindrome or not.	06
6.	Create numpy array with filled with all zeros	04
7.	Find the most frequent value in a array	02
8.	Count number of non zero value in the array	04
9.	Write a numPy program to generate five random numbers from the normal distribution.	04
10.	Write a numPy program to create a 5x5 array with random values and find the minimum and maximum values	04
11.	Write a Pandas program to create a dataframe from a dictionary and display it	02
12.	Write a Pandas program to select the rows where the number of attempts in the examination is greater than 2.	02
13.	Data Analysis Using Microsoft Excel: Predicting the number of umbrellas sold based on rainfall using Simple Linear Regression	02
14.	Write a Pandas program to read specific columns from a given excel file	02

15.	Write a Pandas program to import excel data into a Pandas data frame.	
16.	Write a Pandas program to import some excel data skipping first twenty rows into a Pandas dataframe.	
17.	Implement a Python program that takes a dataset with numerical features and applies min-max scaling to normalize the values between 0 and 1.	
18.	Apply Descriptive Statistics in Python to Analyze Passenger Demographics on the Titanic, Including Mean, Median, and Mode	
19.	Create a Python script that uses Matplotlib to generate simple line charts	
20.	Create a Python script that uses Matplotlib to generate simple bar graph	
21.	Create a Python script that uses Matplotlib to generate scatter plots from sample data	
22.	Customize the appearance of these plots, including labels, colors, and annotations	
23.	Utilize Seaborn to create a bar plot to visualize the average income across different regions in the "tips" dataset.	
24.	Write a Pandas program to import excel data (coalpublic2013.xlsx) into a Pandas dataframe	



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COURSE CURRICULUM

Course Title: BIG DATA ANALYTICS
(Code: MSCIT1305)

IT and CS Programmes in which this course is offered	Semester in which offered
Master of Science in Information Technology -(M.Sc.IT)	Third Semester

Course Objectives – Today's world is a data-driven world. Increasingly, the efficient operation of organizations across sectors relies on the effective use of vast amounts of data. Big data analytics helps us to examine these data to uncover hidden patterns, correlations, and other insights. It is a fast-growing field and skills in the area are some of the most in-demand today.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks				
L	T	P	T	P	Theory Marks		Practical Marks		150
			2	1	E	M	I	EV	
2	0	2	3		60	40	30	20	

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva, EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.	Weightage %
1	Introduction to Big Data: Introduction to Big Data, Big Data characteristics, Challenges of Conventional System, Types of Big Data, Intelligent data analysis, Traditional vs. Big Data business approach, Case Study of Big Data Solutions.	8	20
2	Hadoop: History of Hadoop, Hadoop Distributed File System: Physical organization of Compute Nodes, Components of Hadoop Analyzing the Data with Hadoop, Scaling Out, Hadoop	15	

	Streaming, Design of HDFS, Java interfaces to HDFS Basics, Developing a Map Reduce Application, How Map Reduce Works, Anatomy of a Map Reduce Job run, Failures, Job Scheduling, Shuffle and Sort, Task execution, Map Reduce Types and Formats, Map Reduce Features, Hadoop environment. Setting up a Hadoop Cluster, Cluster specification, Cluster Setup and Installation, Hadoop Configuration, security in Hadoop, Administering Hadoop, Monitoring-Maintenance, Hadoop benchmarks, Hadoop in the cloud		30
3	NoSQL: 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	10	20
4	Mining Data Stream: Introduction to Streams Concepts, Stream Data Model and Architecture, Stream Computing, Sampling Data in a Stream, Filtering Streams, Counting Distinct Elements in a Stream, Estimating moments, Counting oneness in a Window, Decaying Window, Real time Analytics Platform (RTAP) applications, Case Studies, Real Time Sentiment Analysis, Stock Market Predictions. Using Graph Analytics for Big Data: Graph Analytics	10	20
5	Frameworks: Applications on Big Data Using Pig and Hive, Data processing operators in Pig, Hive services, HiveQL, Querying Data in Hive, fundamentals of HBase and ZooKeeper, IBM InfoSphere BigInsights and Streams. Spark: Introduction to Data Analysis with Spark, In-Memory Computing with Spark, Spark Basics, Interactive Spark with PySpark, Writing Spark Applications	5	10

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
10	15	15	10	05	05

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :Evaluate C : Create and Above Levels (Revised Bloom's Taxonomy)

SUGGESTED LEARNING RESOURCES

A. List of Books

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	Intelligent Data Analysis	Michael Berthold, David J. Hand	Springer

2	Taming The Big Data Tidal Wave: Finding Opportunities In Huge Data Streams With Advanced Analytics	Bill Franks	Wiley
3	Professional Hadoop Solutions	Boris lublinsky, Kevin t. Smith, Alexey Yakubovich	Wiley.
4	Understanding Big data	Chris Eaton and Paul C. Zikopoulos	TMH
5	Big Data and Analytics	Seema Acharya, Subhashini Chhellappan	Wiley,
6	MongoDB in Action	Kyle Banker, Piter Bakkum , Shaun Verch	DreamTech,

B. List of Software/Learning Websites

<http://in.reuters.com/tools/rss>

<http://www.altova.com/xmlspy.html>

<https://www.w3.org/RDF/>

SUGGESTED LIST OF PRACTICAL/EXERCISES

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	<p>Case Study:</p> <p>Stage 1: Selection of case study topics and formation of small working groups of 2/3 students per group. Students engage with the cases, read through background material provided in the session and work through an initial set of questions to deepen the understanding of the case. Sample applications and data will be provided to help students familiarize themselves with the cases and available (big) data.</p> <p>Stage 2: The groups are given a specific task relevant to the case in question and are expected to develop a corresponding big data concept using the knowledge gained in the course and the parameters set by the case study scenario. A set of questions that help guide through the scenarios will be provided.</p> <p>Stage 3: Each group prepares a short 2 – 5 page report on their results and a 10 min oral presentation of their big data concept.</p>	06
2.	To draw and explain Hadoop Architecture and Ecosystem with the help of a case study using WorkCount example. To define and install Hadoop.	02
3.	To understand the overall programming architecture using Map	02

	Reduce API.	
4.	To implement the following file management tasks in Hadoop System (HDFS): Adding files and directories, Retrieving files, Deleting files.	02
5.	Store the basic information about students such as roll no, name, date of birth ,and address of student using various collection types such as List, Set and Map.	02
6.	Basic CRUD operations in MongoDB.	02
7.	To perform NoSQL database using MongoDB to create, update and insert.	02
8.	Retrieve various types of documents from students collection.	02
9.	To find documents from Students collection.	02
10.	To run a basic Word Count MapReduce program to understand MapReduce	02
11.	Paradigm: To count words in a given file, To view the output file, and To calculate	02



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FACULTY OF IT AND COMPUTER SCIENCE

COURSE CURRICULUM

Course Title: MINOR PROJECT
(Code: MSCIT1307)

IT and CS Programmes in which this course is offered	Semester in which offered
Master of Science in Information Technology -(M.Sc.IT)	Third Semester

Course Objectives - New technologies are replacing older one very quickly whose effects can be seen in our society. Internship Project is a opportunity for the students to get flavor of such emerging technology and familiar with industry environment to identify scope as well as focus of their career development path. The main objective of the internship is to get hands-on practice. In turn it will help students to lay down a path for their further professional career by observing, understanding, adopting mechanism of working in the industry. Students will also develop various types of skills by pursuing the internship project programme.

The duration of internship will be six weeks. It will be after completion of 3rd Semester and in the Semester 4th. Any options from following can be chosen by the students:

1. Internship in the industry - The student is suggested to select branch-specific training in the IT or relevant Industry where they learn the skills. The student shall produce a joining letter in the beginning and relieving letter after the completion of the internship. It is desirable to do the internship offline. In the case of the online conduction mode, the student has to submit supporting evidence in the form of a screenshot and activity log report of the conducted session along with other necessary documents.

2. Project – If student is not able to carry internship in the industry, student may develop a project on topic related to respective computer engineering branch under faculty guidance. Additionally, Institute/ department may arrange technical sessions/ workshops from industry experts to give exposure to students about recent technologies and tools. It can be fabrication / experimental results/ simulations/ Application development / Design and / or Analysis of System(s) etc. related to the emerging technologies of the Computer/IT.

Students needs to report at institute every 15 days about progress to internal guide in suggested reporting format which is given in syllabus and represent his/her work carried out for monitoring and evaluation purpose.

COMPETENCY

The purpose of this course is to help the student to attain the following industry identified competency through various teaching-learning experiences:

Develop effective programming skills, problem-solving abilities, and technical knowledge to solve challenge innovatively while gaining hands-on experience for professional development opportunities.

COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge, and the relevant soft skills associated with this competency are to be developed in the student to display the following COs:

The student will develop underpinning knowledge, adequate programming skills of competency for implementing various applications using tools and technologies to attain the following course outcomes.

- a) Apply acquired knowledge to solve domain related societal problems.
- b) Develop effective communication within academic and industrial environments.
- c) Utilize industry-standard tools as well as technologies to design, develop, and test the systems.
- d) Apply problem-solving skills to resolve technical issues encountered in IT Industry.
- e) Develop life-long learning skills for a successful professional career.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks			
L	T	P	T	P	Theory Marks		Practical Marks	
0	0	4	0	4	E	M	I	EV
0	0	4	2		0	0	60	40

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva, EV - External Viva

List of Documents to be prepared for Submission:

1. Student has to submit Work Report Sheet duly signed by industry resource person and internal guide fortnightly (suggested format given in syllabus).
2. Student Attendance Sheet Report (suggested format given in syllabus) duly signed by industry resource person. In the case of the online internship, student has to take screenshot of daily attended session in softcopy and submit to institute resource person by email for every 15 days.
3. Detailed report of said work approved and duly signed by the institute and/or industry resource person.
4. A softcopy of Presentation approved by the institute and/or industry resource person.
5. A Poster showing overall work carries out during the Internship project approved by institute and/or industry resource person

Note: Faculty should counsel as well as inform students in advance about the internship or project. Student needs to finalize training from industry or project at institute during 4th semester and report at institute.