

**JYOTI NIVAS COLLEGE AUTONOMOUS
SYLLABUS FOR 2018 BATCH AND THEREAFTER**

Programme: B.C.A

Semester: VI

MACHINE LEARNING

Course Code: 18BCAVIE1A

No. of Hours: 60

COURSE OBJECTIVES:

- To study the basics of machine learning.
- To learn about how data is prepared for the learning.
- Learn about supervised and unsupervised learning techniques
- Learning how to build a machine learning model from the scratch.

LEARNING OUTCOMES:

- An understanding of what is machine learning.
- The ability to learn both supervised and unsupervised learning techniques in machine learning
- Student will have clear understanding about how to build a machine learning model.

UNIT - I

08 HRS

Introduction- What is machine learning? - Training and testing data- ML categories- Supervised Learning- Unsupervised Learning- Reinforcement Learning.

UNIT - II

10 HRS

The ML toolbox- Data- Infrastructure- Algorithms: linear regression, logistic regression- decision trees- k-nearest neighbors- k-means- Visualization

UNIT - III

12 HRS

Data scrubbing- Feature Selection- Row Compression- One-hot Encoding- Binning- Missing Data- Setting up your data- Cross Validation- How Much Data Do I Need?
Regression analysis- Introduction- Calculation Example- Logistic Regression- Support Vector Machine.

UNIT - IV

16 HRS

Clustering- k-Nearest Neighbors- k-Means Clustering- Setting k- Bias & variance. Artificial neural networks- Decision trees- Building a Decision Tree- Random Forests- Boosting- Ensemble modeling.

UNIT - V

14 HRS

Building a model- Set up the development environment- Import the dataset- Scrub the dataset- Split the dataset- Select the algorithm and configure its hyperparameters- Evaluate the results- Model optimization.

REFERENCES:

1. Oliver Theobald, Machine Learning for absolute beginners, second edition.
2. Jiawei Han and MichelineKamber, Data Mining Concepts and Techniques, Second edition.
3. E. Alpaydin, Introduction to Machine Learning, 3rd Edition, MIT Press, 2014.
4. C.M. Bishop, Pattern Recognition and Machine Learning, Springer, 2016.
5. T. Hastie, R. Tibshirani and J. Friedman, The Elements of Statistical Learning: Data Mining, Inference and Prediction, Springer, 2nd Edition, 2009.

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Programme: B.C.A

Semester: VI

BIG DATA AND ANALYTICS

Course Code: 18BCAVIE1B

No. of Hours: 60

COURSE OBJECTIVES:

- The major aim of Big Data Analytics is to discover new patterns and relationships which might be invisible.
- There are a number of tools available for mining of Big Data and Analysis of Big Data, both professional and non-professional.
- Big Data Analytics is aimed to offer a thorough professional training which prepares students to embark on Big Data Analytics careers which is one of the fastest growing technologies.

LEARNING OUTCOMES:

- Prepare and equip students for opportunities in ever changing technology
- Nurture the creativity and inculcate entrepreneurial skills among the students.
- To learn tools available for mining of Big Data and Analysis of Big Data, both professional and non-professional.

UNIT - I

05 HRS

Introduction to big data: Classification of Digital Data-Structured, Semi-Structured Data, Un-structured, Characteristics of data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, What is Big Data-Volume, Velocity, Variety, Why Big Data, Business Intelligence verses Big Data.

UNIT - II

12 HRS

Big data analytics:What is Big Data Analytics, Classification of big data analytics, Data science, Data Scientist, **Terminology Used in Big Data Environment**-In-Memory Analytics, In-Database Processing, Symmetric Multiprocessor System, Massively Parallel Processing, Distributed Systems, Cap theorem, Introduction to Open-Source analytical tools.

UNIT - III

15 HRS

Big Data Technology: NoSQL Database-Definition,Types of NoSQL Database,Why NoSQL? Advantages of NoSQL, NewSQL, comparison of SQL, NoSQL, NewSQL.

Introduction to MongoDB-Definition, Using Java Script Object Notation(JSON),Creating Unique Key, Support for dynamic Queries, Storing Binary Data, Replication, Sharding, Terms used in RDBMS and MonogoDB- Create Database,Drop Database,Datatypes in Monogodb, MonogoDB Query Language (Create,Read,Update,and Delete).

UNIT - IV**15 HRS****Introduction to Hadoop :**Introducing Hadoop, need of Hadoop, RDBMS versus Hadoop.**Hadoop Overview-**Key Aspects of Hadoop, Hadoop Components,High level Architecture of Hadoop, Use Case of Hadoop, **HDFS** (Hadoop Distributed FileSystem),Processing Data with Hadoop.**Introduction to MAPREDUCE Programming:** Introduction , Mapper, Reducer, Combiner, Partitioner , Searching, Sorting , Compression, Real time applications using MapReduce,**UNIT - V****13 HRS****Case studies: Applications of Big Data**using Hive Architecture, Hive Data types, Hive Query Language(HQL), Pig on Hadoop.**Machine Learning Algorithms-**Implementation of Regression, Implementation of k- Means.**REFERENCES:**

1. Chris Eaton, Dirk deRoos et al. “Understanding Big data ”, McGraw Hill, 2012.
2. Seema Acharya, Subhashini Chellappan, Big Data Analytics, Wiley, 2019
3. Runkler, Thomas. A, Data Analytics: Models and Algorithms for Intelligent Data Analysis, Springer, 2012.
4. Tom White “ Hadoop: The Definitive Guide” Third Edition, O’Reilly Media, 2012.
5. Michael Minelli, Michelle Chambers, and AmbigaDhiraj, “Big Data ,Big Analytics: Emerging Business Intelligence and Analytics Trends for Today’s Businesses”, Wiley.

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Programme: B.C.A

Semester: VI

INTERNET OF THINGS

Course Code: 18BCAVIE1C

No. of Hours: 60

COURSE OBJECTIVES:

- To expose students to the world of interconnected devices,
- To understand the communication protocols among these connected devices.
- To transfer the data which is gathered and further analyze this data to make appropriate decisions.

LEARNING OUTCOMES:

- Analyze the functional blocks involved in Internet of Things.
- Understand the architecture of Internet of Things.
- Demonstrate the application of IoT in real world.

UNIT - I

14 HRS

Introduction to Internet of Things

Introduction, Definition and Characteristics, Physical Design of IoT, Things in IoT, IoT Protocols, Logical Design of IoT, IoT Functional Blocks, IoT Communication Models, IoT Communication APIs, IoT Enabling Technologies, Wireless Sensor Networks, Cloud Computing, Big Data Analytics, Communication Protocols, Embedded Systems, IoT Levels & Deployment Templates.

UNIT - II

14 HRS

IoT Physical Devices & Domain Specific IoT

IoT Devices, Boards –Arduino - Raspberry PI – ESP 8266, ESP 8233 – About the board, Sensors, Actuators, Gateways.

Domain Specific IoT: Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Lifestyle.

UNIT - III

12 HRS

IoT & M2M- Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT.

Protocols for IoT:

Infrastructure Protocols: Routing Protocol, IEEE 802.15.4, Bluetooth Low Energy, Z-Wave, Zigbee, MQTT Protocol.

Protocols For IoT Service Discovery: multicast Domain Name System (mDNS).

UNIT - IV

08 HRS

Arduino Programming

The Arduino ecosystem, Installing the Software, Connecting the Arduino, Opening a Sketch, Sketching in Code, The Structure of Arduino C, Verifying and Uploading, Working with Variables, Making Decisions, Digital Ins and Outs, Analog-In, Analog-Out.

UNIT - V

12 HRS

IoT Security & Advanced Topics

IoT Security: Introduction, IoT Security Threats, IoT Security Requirements, IoT Routing Attacks, Security Frameworks for IoT.

Data Analytics in IoT- Introduction to Apache (Hadoop, Oozie, Spark, Storm),

IoT & Cloud-introduction to python web application framework- Django, Amazon Web services for IOT, SkynetIoT Messaging platform.

REFERENCES:

1. Arshdeep Bahga, Vijay Madiseti, The Internet of Things: A Hands on Approach Universities press, 2015.
2. RajkumarBuyya and Amir VahidDastjerdi, Internet of Things-Principles and Paradigms - 1st Edition, 2016.
3. Brian Evans Beginning Arduino Programming, Apress, 2011
4. Olivier Hersent, David Boswarthick, Omar Elloumi, The Internet of Things: Key Applications and Protocols –Wiley, 2011.
5. Pethuru Raj and AnupamaC.Raman, The Internet of Things: Enabling Technologies, Platforms and Use Cases- CRC Press, 2017.