5.1   BASICS OF MANAGEMENT

L T P

3 - -

RATIONALE

The diploma holders are generally expected to take up middle level managerial positions, their exposure to basic management principles is very essential. Topics like Structure of Organization, Leadership, Motivation, Ethics and Values, Marketing management, Financial management, Customer Relationship Management (CRM) & Total Quality Management (TQM), etc. have been included in the subject to provide elementary knowledge about these management areas.. This course explores cyber-security measures and the different forms of cybercrime and emergent forms of cyber-warfare.

LEARNING OUTCOME
After undergoing the subject, the student will be able to:
- Explain the principles of management including its functions in an organisation.
- Have insight into different types of organizations and their structures.
- Inculcate leadership qualities to motivate self and others.
- Manage human resources at the shop-floor
- Maintain and be a part of healthy work culture in an organisation.
- Use marketing skills for the benefit of organization .
- Maintain books of accounts and take financial decisions.
- Undertake store management.
- Use modern concepts like TQM, TPM and CRM.
- Distinguish and classify the forms of cybercriminal activity and the technological and 'social engineering' methods used to undertake such crimes.
- Analyse and assess the impact of cybercrime on government, businesses, individuals and society.

DETAILED CONTENTS

1.   Principles of Management   (06 hrs)

   1.1.   Introduction, importance and general functions of management.
   1.2.   Concept and Types of an organization - Sole trading ,partnership, companies, corporation, PSU's and cooperative societies.
   1.3.   Structure of an organisation -
        a) Line organization
        b) Staff organisation
        c) Functional organization
        d) Line and staff organization

1.4. Hierarchical Management Structure
   - Top, middle and lower level management
1.5. Departmentalization
   - Introduction and its advantages.

2. Leadership and Motivation (06 hrs)

2.1 Leadership
   - Definition and Need of Leadership
   - Qualities of a good leader
   - Manager vs. leader
   - Theories of leadership –trait theory and Behaviour theory.
2.2 Motivation
   - Definition and characteristics of motivation
   - Factors affecting motivation
   - Maslow's Need Hierarchy Theory of Motivation and X&Y need Hierarchy theory of motivation.

3. Work Culture (06 hrs)

3.1. Introduction and importance of Healthy Work Culture in organization
3.2. Components of Culture
3.3. Importance of attitude, values and behaviour
   Behavioural Science – Individual and group behavior.
3.4. Professional ethics – Concept and need of Professional Ethics and human values.

4. HRM and its functions (04 hrs)

4.1 Human Resource Management
   - Manpower Planning, recruitment and selection
   - Training and development of work force at the shop-floor.
   - Performance appraisal
   - Wages, salary and incentive schemes

5. Marketing and sales (06 hrs)

5.1 Marketing
   - Introduction, importance and its functions
   - Marketing mix for industries and service sector
   - Basic Marketing strategies
5.2 Sales
   - Difference between marketing and selling
   - Advertisement- print media and electronic media
   - Market-Survey and Sales promotion.

6. **Basic of Accounting and Finance** (06 hrs)

    6.1   Basic of Accounting:
- Meaning and definition of accounting
- Double entry system of book keeping
- Trading account, PLA account and balance sheet of a company

    6.2   Objectives of Financial Management
- Profit Maximization v/s Wealth Maximization

7. **Material and Stores Management** (04hrs)

- Introduction, functions and objectives of material management
- Purchasing: definition and procedure
- Just in time (JIT)

8. **TQM , TPM** (02 hrs)

Total Quality Management (TQM) and Total Preventive Maintenance (TPM) - Concepts and importance

9. **Customer Relationship management (CRM)** (02 hrs)

Customer Relationship management - Concepts and importance

10. **Cyber Security** (06 hrs)

-Introduction to Cyberspace and Cyber Law, Pros and Cons of social media.
-Different Components of cyber Laws; Cyber Law and Netizens
- Categories of Cyber Crime: Personal, Business, Financial, Office Security
-Cyber Crime – Complete transparency, hacking/cracking, denial of service, IP piracy,
   phrasing, hetaerism etc. Cyber Attack – cyber attackers.
-Introduction to IPR, copyright & patent

INSTRUCTIONAL STRATEGY

It is observed that the diploma holders generally take up middle level managerial positions, therefore, their exposure to basic management principles is very essential. Accordingly students may be given conceptual understanding of different functions related to management. Some of the topics may be taught using question answer, assignment or seminar method. The teacher will discuss success stories and case studies with students, which in turn, will develop appropriate managerial qualities in the students. In addition, expert lectures may also be arranged from within the institutions or from management organizations. Appropriate extracted reading material and handouts may be provided.

RECOMMENDED BOOKS

1.   Principles of Management by Philip Kotler TEE Publication

2.   Principles and Practice of Management by Shyamal Bannerjee: Oxford and IBM Publishing Co, New Delhi.

3.   Modern Management Techniques by SL Goel: Deep and Deep Publications Pvt Limited , Rajouri Garden, New Delhi.

4.   Management by James AF Stoner, R Edward Freeman and Daniel R Gilbert Jr. : Prentice Hall of India Pvt Ltd, New Delhi.

5.   Essentials of Management by H Koontz, C O' Daniel , McGraw Hill Book Company, New Delhi.

6.   Intellectual Property Rights and the Law by Dr. GB Reddy.

7.   Service Quality Standards, Sales & Marketing Department, Maruti Udyog Ltd.

8.   Nandan Kamath, A Guide to Cyber Laws & IT Act 2000 with Rules & Notification

9.   Keith Merill & Deepti Chopra (IK Inter.), Cyber Cops, Cyber Criminals & Internet

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	06	12
2.	06	12
3.	06	12
4.	04	9
5.	06	12
6.	06	12
7.	04	9
8.	02	05
9.	02	05
10.	06	12
Total	**48**	**100**

5.2   MICROPROCESSORS

L T P
4 - 3

RATIONALE

The study of microprocessors in terms of architecture, software and interfacing techniques leads to the understanding of working of CPU in a microcomputer. The development in microprocessors of 32 bit architecture brings them face-to-face with mainframe, finding employment in R&D, assembly, repair and maintenance of hardware of microprocessors and computers.

Microprocessors find application in process control industry. They also form a part of the electronic switching system between source and destination in long distance telecommunications. Thus the microprocessor is an area of specialization. Students of electronics and related engineering branches often use microprocessors to introduce programmable control in their projects, in industrial training.

LEARNING OUTCOMES

After undergoing the subject, student will be able to:

- Write, edit a machine language program using mnemonics
- Describe all the internal parts and pins of 8085 and 8086
- Write, execute and debug assembly language programs for simple applications.
- Interface various peripheral devices with microprocessor.
- Use various data transfer techniques used in microcomputers.

DETAILED CONTENTS

1.   Evolution of Microprocessor   (3 hrs)

     -    Typical organization of a microcomputer and functions of its various blocks
     -    Microprocessor, its evolution, function and impact on modern society

2.   Architecture of a Microprocessor (With reference to 8085 microprocessor)
                                                                    (8 hrs)

     -    Concept of Bus, bus organization of 8085
     -    Functional block diagram of 8085 and function of each block
     -    Pin details of 8085 and related signals
     -    De-multiplexing of address/data bus of read/write control signals
     -    Steps to execute a stored programme

3.   Memories and I/O interfacing   (8 hrs)

-    Basic RAM Cell, N X M bit RAM, Expansion of word length and capacity, static and dynamic RAM, basic idea of ROM, PROM, EPROM and EEPROM
-    Memory organization, Concept of memory mapping, partitioning of total memory space, Address decoding, concept of I/O, mapped I/O and memory mapped I/O, interfacing of memory mapped I/O devices
-    Concept of stack and its function

4.   Programming (with respect to 8085 microprocessor)   (14 hrs)

-    Brief idea of machine and assembly languages, Machines and Mnemonic codes
-    Instruction format and addressing modes, identification of instructions as to which addressing mode these belong
-    Concept of instruction set, Explanation of the instructions of the following groups of instruction set

     Data transfer groups, arithmetic group, logic group, stack, I/O and machine control group
-    Programming exercises in assembly language. (Examples can be taken from the list of experiments)
-    Serial data transfer using RIM and SIM instructions

5.   Instruction Timing and Cycles   (3 hrs)

-    Instruction cycle, machine cycle and T-states
-    Fetch and execute cycle

6.   Interrupts   (4 hrs)

-    Concept of interrupt
-    Maskable and non-maskable interrupts
-    Edge triggered and level triggered interrupts
-    Software interrupts
-    Restart interrupts and its use
-    Various hardware interrupts of 8085
-    Servicing interrupts, extending interrupt system

7.   Peripheral devices   (8 hrs)

-    8255 PPI and 8253 PIT

- 8257 DMA controller
- 8279 Programmable KB/Display Interface
- 8251 Communication Interface Adapter
- 8155/8156

8.   Architecture of 8086 Microprocessor   (8 hrs)

- Internal Architecture of 8086.
- Concept of memory segmentation and physical address generation.
- Memory and date addressing mode
- Minimum and Maximum mode of 8086

9.   Instruction sets of 8086   (8 hrs)

- Instruction Format.
- Data transfer.
- Arithmetic
- Bit and logical manipulation
- String
- Program transfer and processor control instructions
- Assembler and assembler directives

LIST OF PRACTICALS

1.   Familiarization of different keys of 8085 microprocessor kit and its memory map.
2.   Steps to enter, modify data/program and to execute a programme on 8085 kit.
3.   Execution of ALP on 8085 kit for addition/subtraction of two 8 bit numbers.
4.   Execution of ALP on 8085 kit for Multiplication/Division of two 8 bit numbers.
5.   Execution of ALP on 8085 kit for arranging 10 numbers in ascending/descending order.
6.   Execution of ALP on 8085 kit for 0 to 9 BCD counters (up/down counter according to choice stored in memory).
7.   Interfacing exercise on 8255 like LED display control.
8.   Demonstration of different keys of 8086-microprocessor kit and its memory map.
9.   Execution of steps to enter, check /modify data or program and to execute a program on 8086 microprocessor kit.
10.   Execution of ALP on 8086 kit for addition/subtraction of two 16 bit numbers (signed and unsigned).
11.   Execution of ALP on 8086 kit for Multiplication/Division of two signed/unsigned numbers.

RECOMMENDED BOOKS

1. Microprocessor Architecture, Programming and Applications with 8080/8085 by Ramesh S Goanker, Willey Eastern Ltd, New Delhi
2. Introduction to Microprocessor by Mathur, Tata McGraw Hill Education Pvt. Ltd. New Delhi
3. Advanced Microprocessor and Interfacing by Badri Ram, Tata McGraw Hill Education Pvt. Ltd. New Delhi
4. Microprocessor and Application by D.V. Hall; McGraw Hill Book Co. New Delhi
5. Microprocessor 8086/88 by B.B. Brey; Pearson Education, New Delhi
6. Microprocessor and Applications by B Ram; McGraw Hill Book Co. New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	03	05
2.	08	13
3.	08	13
4.	14	20
5.	03	05
6.	04	05
7.	08	13
8.	08	13
9.	08	13
Total	**64**	**100**

5.3   COMPUTER PERIPHERALS AND INTERFACING

L T P

3 - 3

RATIONALE

A computer engineer should be able to interface and maintain key-board, printer, mouse monitor etc along with the computer system. The course provides the necessary knowledge and skills regarding working construction and interfacing aspects of peripherals. The students will get to know how various peripherals communicate with central processing unit of the computer system and pattern their respective operations. The student will be able to maintain keyboard, printer, monitors and Power Supplies (CVTs and UPSs) along with computer system. This subject provide the required background of computer installation, maintenance and testing of peripheral with micro computers So a course on Computer Peripherals and Interfacing Devices is required to develop such skills.

LEARNING OUTCOME

After undergoing the subject, the students will be able to:

- Identify various types of display devices/technologies.
- Describe different types and various parts of motherboard.
- Define and describe various types of processors.
- Use and describe various storage devices.
- Identify, various input-output devices and explain their working.
- Change various BIOS features.
- Assemble/maintain and troubleshoot a system.

DETAILED CONETENTS

1.   Video Display   (08 hrs)

The basic principle of working of video monitors (CRT, LCD,LED), video display adapters, video modes,   Video display EGA/VGA/SVGA/PCI adapters and their architecture, Overview of raster scan, vector graphic, their main difference and relative advantages, Concept of reduction and bandwidth of monitors refreshing of screen

2.   Hardware Organization of PCs   (07 hrs)

Types of motherboard and their details (Form Factor, Chipset), types of processors (INTEL, AMD) and their compatibility with motherboards, serial and parallel ports, PS/2, USB Ports, Interconnection between units, connectors and cables.

3.   Storage Devices   (06 hrs)

Types of Hard Disk Drives- EIDE, SATA, SCSI, SAS External Hard Disk. Constructional features and working of hard disk drive, optical (CD, DVD, Blue Ray) disk drive and Flash Drive, Logical structure of Hard Disk and its organization, boot record.

4.   Input Devices   (06 hrs)

Detailed working principle and troubleshooting of various input devices such as keyboard, mouse, scanner. Basic principle of touch screen, light pen, digitizers. Drivers for various input devices and their role.

5.   Output Devices   (06 hrs)

Overview of printer and its classification, impact and non-impact printer, principle and working of desk Jet, dot matrix, line Printer and laser printers (Monochrome and Colour), plotter (Piezoelectric and Thermal), and modems. Software drivers for various output devices and their role.

6.   Power Supplies   (06 hrs)

Explain the working of SMPS used in computers. On-Line/Off-Line/Line-Interactive/uninterrupted power supplies (UPS), basic principle of working their importance and maintenance

7.   The Basic Input/Output System   (05 hrs)

What is BIOS? Function of BIOS, software interrupts, testing and initialization, configuring the system

8.   Introduction to Raspberry Pi   (04 hrs)

LIST OF PRACTICALS

1)   To study the construction and working of CRT, LCD, LED (coloured and black and white monitor) and its troubleshooting .
2)   To Study the components and internal parts, working of hard disk and CDROM, DVD, Flash Drives
3)   To study the operations and components and internal parts of Key Board, mouse and their troubleshooting
4)   Study of components and internal parts and working of DMP, Inkjet printer and Laser printer and various installation of printers
5)   To study the SMPS circuit and measure its various voltages. Connecting SMPS to mother- board and other devices.
6)   Study the operation and maintenance of UPS.
7)   Exercise on assembling a PC with peripherals and testing the same.
8)   Setup and configuration of ROM BIOS
9)   Visit to nearby industry

INSTRUCTIONAL STRATEGY

While teaching the subject the teacher may take the interfacing devices like disk drives, printers, key-boards, scanners, plotters etc. physically and explain its working. Additional practical exercise on maintenance and repair on peripheral devices will help the students to develop adequate skills.

RECOMMENDED BOOKS

1.   Hardware Trouble Shooting and Maintenance by B. Govinda Rajalu, IBM PC and Clones, Tata McGraw Hill 1991
2.   The waite group writing MS DOS Device, Drives byRobert, S Lai: Addison, Wesley Publishing Co. 2nd Ed. 1992.
3.   Hardware and Software of Personal Computers by SK Bose; Wiley Eastern Limited, New Delhi.
4.   Microprocessors and Interfacing by Hall, Douglas: McGraw Hill
5.   Microprocessors and Interfacing by Uffenbeck.
6.   Fundamentals of Computers by Sukhvir Singh; Khanna Publishers, New Delhi

7. Computer Peripherals for Micro Computers, Microprocessor and PC by Levis Hahensteu
8. Inside the PC (Eight Edition) by Peter Norton; Tech Media Publication, New Delhi
9. Upgrading and Preparing PC

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (hrs)	Marks Allotted (%)
1.	08	16
2.	07	16
3.	06	12
4.	06	12
5.	06	12
6.	06	12
7.	05	12
8.	04	08
Total	**48**	**100**

5.4   WEB DEVELOPMENT USING PHP

L T P
3 - 4

RATIONALE

This course will enable the students to understand the basics of internet and various application of internet like e-mail, FTP, Telnet, Newsgroups and video conferencing In addition, this course develops competency amongst the students to design professional web sites and interactive web pages. They will have overview of different technologies like of HTML, DHTML, XML, CGI, ASP, JSP, Java Scripts, VB Scripts.

LEARNING OUTCOME

After undergoing the subject, the students will be able to:

- Compare and contrast the use of various markup languages.
- Create a simple XML document.
- Perform various logical operations in PHP.
- Create simple programmes to validate forms in PHP.
- Perform database connectivity using PHP.
- Design a simple HTML form using AJAX technologies.

DETAILED CONTENTS

1.   XML Basics   (08 hrs)

The History of XML;The Origins of XML; Comparison of XML And HTML Components of XML; Anatomy of an XML Document : A Sample XML Document,; XML Declaration; The Root Element ; An Empty Element; Attributes, Markup Delimiters; Element Mark Up; Attribute Mark Up;

2.   PHP   (24 hrs)

Introduction, syntax, variables, statements, operators, decision making, loops, arrays, strings, forms, get and post methods, functions, Introduction to cookies, storage of cookies at client side, Using information of cookies, Creating single or multiple server side sessions, Timeout in sessions, Event management in PHP, introduction to content management systems based on PHP

3.   PHP and MySQL   (10 hrs)

Introduction to MySQL, connecting to MySQL database, creation, insertion, deletion and retrieval of MySQL data using PHP, PHP and XML, XML parsers, XML DOM, Introduction to NoSQL and use of new databases (MongoDb, Hbase)

4.   AJAX   (06 hrs)

Introduction, HTTP request, AJAX Server Script, AJAX Database.

LIST OF PRACTICALS

1.   To design a simple XML document with new tags

2.   Represent Library books data using XML

3.   Understanding XML schema and its various data types and tags

4.   Creation of Web pages using PHP

5.   To store a cookie using PHP on client side.

6.   To save the user session on server side.

7.   To connect mysql database using PHP, reading the database and writing values into the database

8.   To implement web pages using the AJAX.

INSTRUCTIONAL STRATEGY

Teachers should lay emphasis on developing practical skills among the students. Experts may be invited from industries to discuss actual projects and experiences.

RECOMMENDED BOOKS

1.   XML How to Program by Deitel, Deitel, Nieto, and Sandhu; Pearson Education.

2.   Java 2: The Complete Reference by Herbert Scheldt; BPB

3.   Web Enabled Development Application by Ivan Bayross : Commercial; TMH

4.   HTML,CSS, JavaScript,Perl, Python and PHP by Schafer Textbooks; Wiley India

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	08	18
2.	24	48
3.	10	20
4.	06	14
Total	**48**	**100**

ELECTIVE
5.5 (a)   MOBILE TECHNOLOGIES

L T P
5 - -

RATIONALE

Mobile Technologies includes basic introduction of various wireless, cellular and mobile communication technologies. Different concepts related to communication of mobile devices and their hardware and software configuration will be explained.

Note: Teachers should give examples of engineering/technology applications of various concepts and principles in each topic so that students are able to appreciate learning of these concepts and principles.

LEARNING OUTCOMES

After undergoing this subject, the student will be able to:

- Identify various issues in different mobile communication technologies.
- Explain the evolution of computing techniques such as distributed computing, Cloud Computing etc..
- Compare and contrast the different features of GSM and 3G, 4G Technologies.
- Analyse and use of various layers such as Physical, Network, Transport layer in Mobile IP technology.
- Classify various infrastructure based wireless LAN technologies such as Wi -fi, Wi-Max etc,
- Compare various infrastructure less wirelss LAN technologies such as Bluetooth, Mobile Adoc networks, VANETS, NFC etc for various applications.
- Describe the use of various Mobile OS and their features.
- Write a simple program to run on mobile devices.

DETAILED CONTENTS

1.   Mobility: (14 hrs)

       Issues, challenges,   and benefits; Introduction of mobile and cellular communication technology; Review of distributed/network operating systems, ubiquitous computing, Cloud Computing

2.   Global System for Mobile Communication (GSM) System Overview: (14 hrs)

       GSM Architecture, Mobility Management, Network Signaling, GPRS, CDMA, EDGE, Introduction to 3G, 4G Technologies

3.   Mobile IP Networks   (16 hrs)

Physical mobility, challenges, limits and connectivity, mobile IP and cellular IP in mobile computing. Transport layer issues in wireless, Indirect TCP, Mobile TCP

4.   Wireless LANs: (16 hrs)

Introduction to IEEE 802.11, wifi standards, Bluetooth technologies and standards, Near Field Communication, Wi Max Standard. Mobile AdHoc Networks, Vehicular Area Networks.

5.   Mobile Devices and OS: (12 hrs)

Various types of Devices, Operating Systems: Introduction to various mobile operating systems (Android, Windows 10, iOS)

6.   Application Development: (8 hrs)

WWW programming model, Development Environment for Mobile Devices, Introduction to small program development in Mobile

INSTRUCTIONAL STATREGY

Teacher may use various teaching aids like slides, animations, flow charts, block diagrams etc. for imparting effective instructions in the subject. The teacher should explain about field applications before teaching the basics of different communication technologies to develop proper understanding latest development in this area.

RECOMMENDED BOOKS

1.   Mobile Communication by Jochen Schiller; Pearson Education.

2.   Principles of Mobile Computing by U. Hansman and L. Merck; Springer.

3.   Computer Networks by A. S. Tanenbaum; Pearson Education

4.   Mobility Processes, Computers and Agents by D. Milojicic, F. Douglis; Addison Wesley

5.   Mobile Computing by Raj Kamal; Oxford University Press

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (hrs)	Marks Allotted (%)
1.	14	18
2.	14	18
3.	16	20
4.	16	20
5.	12	14
6.	08	10
Total	**80**	**100**

5.5 (b) INTERNET OF THINGS

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5 - -

RATIONALE

This course will enable students to familiarize with the basics of Internet of Things , some of the application areas where Internet of Things can be applied, understand the middleware for Internet of Things , concepts of Web of Things and IOT protocols.

LEARNING OUTCOMES:

Upon completion of the course, the students will be able to
- Identify and design the new models for market strategic interaction
- Design business intelligence and information security
- Analyze various protocols for IoT
- Design a middleware for IoT
- Analyze and design different models for network dynamics

DETAILED CONTENTS

18 hrs

1. IoT & Web Technology:

Introduction to IoT- Concept and Terminology of the Internet of Things, History of IoT, Requirements of IoT, Internet of Things Vision, Challenges in IoT, IoT Strategic Research and Innovation Directions, Future Internet Technologies, Security, Privacy & Trust.

2. M2M to IoT   **18 hrs**

Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, IoT enabling technologies- Sensors, Actuators, Gateways, Local and Global connectivity ,Introduction to wireless communication network, MANET

3. IoT -State of the Art: **18 hrs**

Reference Architecture Model- Introduction , IoT reference Model, IoT Protocols Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

4. Security and Governance: **14 hrs**

Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities.

5. IoT Applications for Value Creations: **10 hrs**

Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, IoT for Retailing Industry, IoT For Oil and Gas Industry.

INSTRUCTIONAL STATREGY

Teacher may use various teaching aids like slides, animations, flow charts, block diagrams etc. for imparting effective instructions in the subject. The teacher should explain about field applications before teaching the basics of different communication layers and technologies to develop proper understanding latest development in this area.

RECOMMENDED BOOKS:

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.
3. Cuno Pfister, Getting Started with the Internet of Things, O" Reilly Media, 2011.
4. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1 st Edition, Academic Press, 2014.
5. Wireless sensor network by Sunil Gupta, Dr. Harsh Kumar Verma, Katson Publisher

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	18	20
2	18	20
3	18	25
4	16	20
5	10	15
Total	**80**	**100**

5.5 (c) BIG DATA

L T P
5 - -

RATIONALE

The importance of Big Data in various domain disciplines has increased tremendously in recent years. The subject provides an overview of the historical and modern context and operation of Big Data for beginners. The objective of the curriculum is that the students can begin to study/practice Big Data tools and techniques.

Note: Teachers should demonstrate and expose the students to various practical applications of Big Data through tutorials and exercises.

LEARNING OUTCOME

After undergoing this subject, the student will be able to:

- Understand the challenges of Big Data
- Install and run Big Data tools
- Use tools to analyze big data and create statistical models.
- Solve problems using tools such as R and RStudio, and MapReduce/Hadoop
- Analyze data using different statistical techniques.
- Explain the utility of popular Big Data tools like: - Hadoop, Hive, Pig, Map Reduce, R Programming
- Deploy a structured life cycle approach to data science and big data analytics projects
- Use techniques and tools to analyze big data and create statistical models

DETAILED CONTENTS

1. Introduction to Data Science and BIG DATA   (20 hrs)

    Data science process – roles, stages in data science project – working with data from files – working with relational databases – exploring data – managing data – cleaning and sampling for modeling and validation – big data, Evolution of big data, Future of big data, Challenges in big data, Batch computing models for Big Data computing. Introduction to NoSQL.

2. Introduction to HADOOP and MAP REDUCE   (20 hrs)

    Introduction – distributed file system – algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce – Hadoop - Understanding the Map Reduce

architecture - Apache Hadoop & Hadoop EcoSystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.

3.   BIG Data Tools   (24 hrs)

Hadoop Installation, Hadoop Commands, Open Source Big Data Databases, Hbase , MongoDB , Hive, Open Source Big Data Analysis Platforms and Tools, Hadoop ,MapReduce, HPCC Systems Pig, Hive

4.   Introduction to R   (16 hrs)

Reading and getting data into R – ordered and unordered factors – arrays and matrices – lists and data frames – reading data from files – probability distributions – statistical models in R.

Suggested list of exercises to be done by students to understand and use big data applications:

1.   Installation of Hadoop , pig and Hive on GNUlinux/Debian/ubuntu
2.   Practice of various Hadoop commands
3.   Getting started with Pig.
4.   Using Hive.
5.   Installation of MongoDB on Gnulinux.
6.   Installation of MapReduce
7.   Basics of R Programming/ Rstudio

INSTRUCTIONAL STRATEGY

The teachers should lay emphasis on demonstration and application of big data along with the theoretical inputs in the class. Experts may by invited to deliver lectures and share experiences.

RECOMMENDED BOOKS

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.
2. Chris Eaton, Dirk deroos et al. , "Understanding Big data ", McGraw Hill, 2012.
3. Tom White, "HADOOP: The definitive Guide" , O Reilly 2012.
4. Vignesh Prajapati, "Big Data Analytics with R and Haoop", Packet Publishing 2013.
5. Nina Zumel, John Mount, "Practical Data Science with R", Manning Publications, 2014.
6. Jure Leskovec, Anand Rajaraman, Jeffrey D. Ullman, "Mining of Massive Datasets", Cambridge University Press, 2014.

7. Mark Gardener, "Beginning R - The Statistical Pr ogramming Language", John Wiley & Sons, Inc., 2012.

8. A Simple Introduction to DATA SCIENCE: BOOK ONE (New Street Data Science Basics 1) Kindle Edition ,by Lars Nielsen (Author), Noreen Burlingame (Author) .

9. A Simple Introduction to Data Science: BOOK TWO (New Street Data Science Basics 2) Kindle Edition by Lars Nielsen (Author)

10. The Big Data Revolution : Kindle Edition, by Jason Kolb (Author), Jeremy Kolb (Author)

11. Big Data:Principles and best practices of scalable realtime data systems (Englisch),von Nathan Marz (Autor), James Warren (Autor)

12. Data Mining Methods and Models: wileyindia ,by Daniel T Larose (Author)

13. Pro Apache Hadoop, 2ed :Author: wileyindia , by Sameer Wadkar, Madhu Siddalingaiah, Jason Venner ,(Authors)

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	20	25
2	20	25
3	24	30
4	16	20
Total	**80**	**100**

5.6   MINOR PROJECT WORK

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Minor project work aims at exposing the students to the various industries dealing with computers. It is expected from them to get acquainted with computer environment possess desired attitudes. For this purpose student during middle of the course are required to be sent for a period of two to four weeks at a stretch in different establishments. Depending upon the interest of students they are sent for exposure to:

1)   Industrial practices in installation and maintenance of computers and computer networks
2)   Fabrication of computers
3)   Fault diagnosis and testing of computers
4)   Industrial practices in respect of documentation and fabrication
5)   A variety of computers and peripherals in assembly organizations
6)   Software package development organizations
7)   Maintenance of database
8)   Write be stored procedure or functions which can be attached as the library objects to the main projects
9)   Write a procedure function to convert number of words.
10)   Write a procedure function to convert all data function (create your own) Database connectivity, (SQL server, Oracle, Access), Library classes in C++ (same application).,
11)   design web applications using PHP

Note: The teachers may guide /help students to identify their minor project work and chalk out their plan of action well in advance.

As a minor project activity each student is supposed to study the operations at site and prepare a detail project report of the observations/processes/activities by him/her. The students should be guided by the respective subject teachers; each teacher may guide a group of 4 to 5 students.

The teachers along with field supervisors/engineers will conduct performance assessment of students. Criteria for assessment will be as follows:

	Criteria	**Weightage**
(a)	Attendance and Punctuality	15%
(b)	Initiative in performing tasks/creating new things	30%
(c)	Relation with people	15%
(d)	Report Writing	40%

PERSONALITY DEVELOPMENT CAMP

This is to be organized at a stretch for two to three days during fifth or sixth semester. Extension Lectures by experts or teachers from the polytechnic will be delivered on the following broad topics. There will be no examination for this subject.

1. Communication Skills

2. Correspondence and job finding/applying/thanks and follow-up

3. Resume Writing

4. Interview Techniques: In-Person interviews; telephonic interviews, panel interviews; group interviews and video conferencing etc.

5. Presentation Techniques

6. Group Discussions Techniques

7. Aspects of Personality Development

8. Motivation

9. Leadership

10. Stress Management

11. Time Management

12. Interpersonal Relationship

13. Health and Hygiene