ST. ALOYSIUS' COLLEGE(AUTONOMOUS) JABALPUR				
PART A: Introduction				
Program: Diploma	Session: **2023-24**	Class: BCA	Year: III SEM	SESSION: 2023-24
Subject: **Computer Application (BCA)**				
1. Course Code		S2-BCAA1T		
2. Course Title		**Data Communication and Computer Networks**		
3. Course Type		**Major**		
4. Pre-Requisite (if any)		To study this course, a student must have the basic knowledge of Computers.		
5. Course learning outcome(CLO)	• Demonstrate the Basic Concepts of Networking, Networking Principles, Routing Algorithms, IP Addressing and working of Networking Devices. • Demonstrate the significance, purpose and application of Networking protocols and Standards. • Describe, compare and contrast LAN, WAN, MAN, Intranet, Internet, AM, FM, PM and Various Switching Techniques. • Explain the working of Layers and apply the various protocols of OSI & TCP/IP model. • Analyze the Requirement for a given Organizational structure and select the most appropriate Networking Architecture and Technologies. • Design the Network Diagram and solve the Networking problems of the Organization with consideration of Human and Environment install and configure the networking device.			
6. Credit Value	Theory—6 Credits			
7. Total Marks	Max. Marks: **40+60**	Min. Passing Marks: 35		
PART B: Content of the Course				
Lectures (in hours per week): 3 Hrs. per week				
Total No. of Lectures (in hours): 90 Hrs.				

Unit	Topics	No. of Lectures
I	Network goals and application, Network structure, Network services, Example of network and Network Standardization, Networking models: centralized, distributed and collaborative. Network Topologies: Bus, Star, Ring, Tree, Hybrid: Selection and Evaluation factors.	15
II	Theoretical basis for Data communication, Transmission media, Twisted pair, Coaxial Cable, Fiber optics: Selection and Evaluation factors Line of Sight Transmission, Communication Satellites. Analog and Digital transmission. Transmission and switching, frequency division and time division multiplexing, Circuit switching, packet. Switching and message switching.	20
III	Brief overview of LAN (local area network) Classification, Brief overview of Wide Area Network (WAN). Salient features and difference of LAN with emphasis on Media, Speed of Transmission,	20

	Terminal Handling, Polling, Token passing, Contention IEEE Standards their need and developments.	
IV	Open System: What is an Open System? Network Architectures is OSI Reference Model, Layers: Application, Presentation, Session, Transport, Network, Data Link & Physical Layer - Transmission, Bandwidth, Signaling devices used, media type. Data Link Layer - : Addressing, Media Access Methods, Logical link Control.	20
V	Routing: Fewest-Hops routing, Type of Service routing, Bridges and Routers, Gateway protocols, routing daemons. OSI and TCP/IP model. TCP/IP and Ethernet. The Internet: The structure of the Internet, the internet layers, Internetwork problems. Internet Standards.	15

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

1. Tannanbaum, A.S.: Computer Networks, Prentice Hall, 1 985.processing, Prentice Hall,1983.
2. Black : Computer Networks : Protocols, standards and Interfaces, Prentice Hall International I. Tannanbaum, A.S.: Computer Networks, Prentice Hall, 1985.processing, Prentice Hall, 1983.
3. Fourauzan B., "Data Communications and Networking", 3rd edition, TataMcGraw- Hill Publications,

Reference Books:

1. Comer· D., "Computer Networks and Internet", 2ND Edition, PearsonEducation
2. S.K.Basandra& S. Jaiswal, "Local Area Networks", Galgotia Publications
3. William Stallings, "Data and Computer Communication"
4: Book published by M.P. Granth Academy, Bhopal

Suggested Web Links:

https://www.nptel.ac. in/courses/106/105/106105082/
https://www. iitkg . ac
https://www.nptel.ac.in/course. html
https://www.harvard.edu/subject/computer-networking
http://www.m12hindigranthacademy.org/
http://www.mphindigranthacademy.org/

Part D-Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: 100		
Continuous Comprehensive Evaluation (CCE): 40 marks University Exam (UE) 60 marks		
Internal Assessment Continuous Comprehensive Evaluation (CCE): 40	Class Test Assignment/Presentation	Total 40
External Assessment University Exam Section: 60	Section (A) : Objective Questions Section (B): Short Questions Section (C): Long Questions	Total 60

St. Aloysius' College (Autonomous), Jabalpur

Part A – Introduction

Session:	2023-24
Subject	Computer Application
Programme	Diploma
Class	BCA III Semester
Course Code	S2-BCAA2T
Course Type	Minor
Course Title	**Database Management Systems**
Pre–requisite	To study this course, a student must have the basic knowledge of Computers.
Course Learning Outcome	After completion of this course, it is expected that the student shall be able CO1. Explain the features of database management systems and relational database. CO2. Design conceptual models of a database using ER modeling for real life applications and construct queries in relational algebra. CO3. Create and populate a RDBMS for a real-life application, with constraints and keys, using SQL. CO4. Retrieve any type of information from a database by formulating complex queries in SQL. CO5. Analyse the existing design of a database schema and apply concepts of normalization to design an optimal database.
Credit Value	**4 credits (4-TH)**

Total Marks	Max. Marks: 40+60	Min. Passing Marks:35

Part B – Course Content
Total No. of Lectures-Tutorials-Practical (in hours per week): L-4

Unit I	**Introduction to DBMS:** Why database? Characteristics of datain database, DBMS. What are advantages of DBMS? **Database Architecture and Modeling:** Conceptual, physical and logical database models, Role of DBA, Database design. **Entity Relationship (ER) Model:** Components of ER-model, ER modeling symbols, Relationships, Specialization, Generalization, Aggregation.
Unit II	**Relational database implementation** **Relational Implementation with SQL:** Schema and Table Definition: Schema definition (CREATE), Data types & domains, Defining Tables, Column Definition. Data Manipulation: Simple Queries (SELECT, FROM, WHERE), Built-ln Functions (SUM, AVG, COUNT, MAX, and MIN).GROUP BY, ORDER BY and HAVING clause. Database Change Operations: INSERT, UPDATE, DELETE.

Unit III	**Relational database implementation:** Multiple Table Queries-Subqueries, EXISTS and NOT EXISTS operators. **Relational Algebra and Calculus** Relational Algebra: Union, Intersection, Difference, Product, Select, Project, Join - Natural, Theta & Outer Join, Divide, Assignment. Relational Algebra Operations with SQL: UNION, INTERSECT, EXCEPT.
Unit IV	**The Relational Data Model:** *Fundamental Concepts:* Relations, Null Values, Keys, Foreign Keys, Integrity Constraints - Entity Integrity & Relational Integrity. *Normalization Process:* First Normal Form, Functional Dependencies, Second Normal Form, Third Normal Form, Boyce-Codd Normal Form (BCNF), Fourth Normal Form; Other Normal Forms - Fifth Normal Form & Domain/Key Normal Form.
Unit V	**Physical Database Systems** Overview of Physical Storage Media, Magnetic Disk and Flash Storage, RAID, RAID Levels, Choice of RAID level. *Physical Storage Media.* Secondary Storage, Physical Storage Blocks. *Data Storage Formats on Disk:* Track Format, Record Format—Fixed-Length Records & Variable-Length Records, Input/output Management. *File Organizing and Addressing Methods:* Sequential File Organization, Indexed- Sequential File Organization, Direct File Organization, Data Dictionary Storage.

Part C – Suggested Readings

S.N.	Author	Name of the Book	Publication
1	Gary W. Hansen & James V. Hansen	Database Management and Design	Prentice Hall of India Pvt Ltd.
2	Ramez Elmasri, Shamkant Navathe	Fundamentals of Database Systems	Pearson
3	Raghu Ramakrishnan & Johannes Gehrke	Database Management Systems	McGraw Hill Education
4	C.J. Date	An Introduction to Database System	Pearson
5	Abraham Silberschatz, Henry F. Korth, S. Sudharshan	Database System Concepts	Tata McGraw Hill

Attainment Expressions	PO Mapping	PSO mapping	Cognitive level
Identifying basic problem of real world with abstract requirement (CO1, CO2)	PO2	PSO4	R, U
Applying advanced and basic queries on real databases (CO3, CO4,CO5)	PO2, PO3	PSO4, PSO7	AP

PART A: **INTRODUCTION**				
Program: Diploma	Class: BCA		Year. III Semester	Session: **2023-24**
Subject: **Computer Applications**				
1.	Course Code		**S2-BCAA2P**	
2.	Course Title		**DBMS**	
3.	Course Type		Minor	
4.	Pre-Requisite (if any)		To study this course, a student must have the basic knowledge of Computers.	
5.	Course Learning Outcomes (CLO)		This lab is based on the theory course of DBMS. This lab course Involves the development of the practical skills in DBMS using MS-Access/Visual-FoxPro/SQL-Server/etc. This course is an attempt to upgrade and enhance student's theoretical skills and provide the hands-on experience. After completing this lab course sessions, student will be able: • to create Databases & Views, • execute simple advance SQL queries, • use DBMS tools in the areas of database applications. Topics to be covered in the lab syllabus- • Introduction to MS-Access/Visual-FoxPro/SQL-Server/etc • Hands on practice on the application package used in the lab(i.e. on MS-Access/Visual-FoxPro/SQL-Server/etc) • Database creation using MS-Access/Visual-FoxPro/SQL-Server/etc • Simple SQL queries (Single table) • Use of Advanced SQL queries	
6.	Credit Value		2 credits (2-PR)	
7.	Total Marks		Max. Marks: 40 Int + 60 Ext	Min. Passing Marks: 35
PART B: **CONTENT OF THE COURSE**				
Total No. of Lectures-Tutorials-Practical (in hours per week): P – 2				
Total timber of Practical: **02 Hours per Week**				

List of Practical's

1. To draw ER Model and Relational Model for a given database. Show ER to Relational Model reduction.

2. Implementation of Database

- Creation of Database with proper constraints
- Insert into database using different types of insert statements
- Display

3. Data Definition (schema) Modification

4. Simple SQL queries (Single table retrieval)

- Make use of different operators (relational, logical etc.)
- Selection of rows and columns, renaming columns, use of distinct keyword
- String handling (%, etc.)
- Update statement
- Delete

5. Advanced SQL Queries-1

- Group by, having clause, aggregate functions
- Set operations like union, union all and use of order by clause
- Nested queries: in, not in, exists, not exists and any, all

6. Advanced SQL Queries -2

- Join (Inner & Outer)
- Exists & Union

PART C: LEARNING RESOURCES
Textbooks, Reference Books, Other Resources
Suggested Readings:
1. SQL, PL/SQL-The programming language of ORACLE, Ivan Bayross, BPB publication. 2. Dr Rajeev Chopra, ―Database Management System (DBMS) A Practical Approach‖, 2010, S Chand 3. Jitendra Patel, ―DBMS Lab Manual‖ Kindle Edition, 2012.
Suggestive digital platform web finds
https://_•fec.kai.nic.in/i'aibag/FileHandler/270-101d6l_6b-255a-4add-8d9bdd__e22fec7c1.pdf https://nesitsoiith.pes.edu/pdf/2019/3u1v/CS/LM DBMS%20LAB.ndf
http://www.mphindigranthacademy.org/
Suggested equivalent online courses

ST. ALOYSIUS' COLLEGE(AUTONOMOUS) JABALPUR				
PART A: Introduction				
Program: Diploma	Session: **2023-24**	Class: BCA	Year: III Semester	SESSION: 2023-24
Subject: **Computer Application (BCA)**				
8. Course Code		S2-BCAC 1 G		
9. Course Title		**Internet of Things (IOTs)**		
10. Course Type		Elective		
11. Pre-Requisite (if any)		Students must have basic Computer Knowledge		
12. Course learning outcome	• CO1. To understand the basics of the Internet of Things • CO2. To get an idea of some of the application areas where the Internet of Things can be applied. • CO3. To understand the middleware for the Internet of Things and the concepts of the Web of Things. • CO4. To understand the concepts of the Cloud of Things with an emphasis on Mobile cloud computing. • CO5. To understand the IOT protocols.			
13. Credit Value	Theory—3Credits		Practical— 1 Credits	
14. Total Marks	Max. Marks: 4**0+60**		Min. Passing Marks: 35	
PART B: Content of the Course				
Lectures (in hours per week): 2 Hrs. per week				
Total No. of Lectures (in hours): 60 Hrs.				

Module	Topics	No. of Lectures
I	Introduction: Introduction: Definition, characteristics of IoT, IoT Conceptual framework, IoT Architectural view, Physical design of IoT, Logical design of IoT, Application of IoT, Arduino IDE, Setup(), loop(), delay, bound, serial monitor.	14
II	Machine-to-machine (M2M). SDN (software-defined networking) and NFV (network function virtualization) for IoT, data storage in IoT. IoT Cloud-Based Services.	14
III	Design Principles for Web Connectivity: Web Communication Protocols for connected devices, Message Communication Protocols for connected devices, SOAP, and REST. HTTP Restful Web Sockets. Internet. Connectivity Principles: Internet Connectivity, Internet-based communication, IP addressing in IoT, and Media Access control.	14
IV	Sensor Technology, Participatory Sensing, Industrial IOT and Automotive IOT, Actuator. Sensor data Communication Protocols, Radio Frequency Identification Technology, Wireless-Sensor Network Technology. IoT Design methodology: Specification Requirement, process, model, service, functional & operational view. IoT Privacy and security solutions, Raspberry Pi & Arduino devices. IoT Case studies: smart city streetlights control & monitoring.	14

Suggested Readings

Textbooks:
- Rajkamal, Internet of Things—, Tata McGraw Hill publication.
- Hakima Chaouchi —The Internet of Things: Connecting Objects, Wiley publication.
- Francis Dacosta -Rethinking the Internet of things: A scalable Approach to connecting everything, 1st edition, Apress publications20l3.
- Donald Norris—The Internet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi, and BeagleBone Black—, McGraw Hill publication.

Reference books:
- I . Philip Levis, -TinyOS Programming.
- D. Norris, —The Internet of Things: Do-it-Yourself Projects with Arduino, Raspberry Pi, and Beagle Bone Black, McGraw-Hill Education, New Delhi.
- Raj Karnal, —Internet of Things: Architecture and Desist, Tata McGraw Hill publication.
- Pajankarand A. Kakkar, —Raspberry Piby Example J, Pack Publishing Ltd, Birmingham, UK.
- S. Dooks published by II.P. Hindi Granth Academy, Bhopal

- Suggestive digital platform web links.
- https://www.iotforall.com/introduction-rot-applications-in-education
- https://onlinecourses.swayam2.ac.in/arpl9_ap52/preview
- http://www.mphindigranthacademy.org.

Part D-Assessment and Evaluation
Suggested Continuous Evaluation Methods: Maximum Marks: 100
Continuous Comprehensive Evaluation (CCE): 40 marks University Exam (UE) 60 marks

Internal Assessment Continuous Comprehensive Evaluation (CCE):40	Class Test Assignment/Presentation	Total 40
External Assessment University Exam Section: 60 Time : 03.00	Section (A) : Objective Questions Section (B): Short Questions Section (C): Long Questions	Total 60

<table>
<tr><td colspan="4" align="center">**PART' A:**
1ntroduction</td></tr>
<tr><td>Program:

Diploma</td><td>Class: BCA</td><td>**Year: III SEM**</td><td>**Session: 2023-24**</td></tr>
<tr><td></td><td colspan="3">Subject: Internet of Things(IOTs) Practical /Lab</td></tr>
<tr><td align="center">1.</td><td>Course Code</td><td colspan="2">S2-BCAC 1 R</td></tr>
<tr><td>2.</td><td>Course Title</td><td colspan="2">Internet of Things (lOTs) tab</td></tr>
<tr><td>3.</td><td>Course Type(Core Course/ Elective/ Generic Elective/ Vocational</td><td colspan="2">Elective</td></tr>
<tr><td>4.</td><td>Pre-Requisite (if any)</td><td colspan="2">Open for all</td></tr>
<tr><td>5.</td><td>Connie 1.earning Outcomes (CLO)</td><td colspan="2">After completing this lab course, students will be able to:
1. Arduino/Raspberry Concept.
2. Knowledge of Digital Sensor.
3. Uses of DHT11 Sensors.
4. Knowledge of Bluetooth interface.</td></tr>
<tr><td>6.</td><td>Credit Value</td><td colspan="2">Practical — 2 Credits</td></tr>
<tr><td>7.</td><td>Total Marks</td><td>Max. Marks: 40+60</td><td>Min. Passing Marks: 35</td></tr>
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<tr><td colspan="2" align="center">**PART B: Content of the Course**</td></tr>
<tr><td colspan="2" align="center">No. of Lab. Practical (in hours per week): 1 Hr. per week</td></tr>
<tr><td colspan="2" align="center">Total No. of Labs: 15 Hrs.</td></tr>
<tr><td align="center">**Suggestive List of Practical**</td><td>No. of Labs.</td></tr>
<tr><td>

1. To interface LLD/Buzzer with Arduino /Raspberry Pi and write a program to turn on LED after every 2 seconds.

2. To interface Push button/Digital sensor (IR/PDR) with Arduino/Raspberry Pi and write a program to turn on LED when push button is pressed or at sensor detection.

3. To interface DHT 11 sensor with Arduino/Raspberry Pi and write a program to print temperature and humidity readings.

4. To interface motor using relay with Arduino/Raspberry Pi and write a program to turn on motor when push button is pressed.

5. To interface OLED with Arduino/Raspberry Pi and write a program to temperature and humidity reading on it.

6. To interface blue tooth with Arduino/Raspberry Pi and write a program to send sensor data to smartphone using Bluetooth.

7. To interface Bluetooth with Arduino/Raspberry Pi and write a program to turn LED 'OFF when 1 "0'is received from smartphone using Bluetooth.

8. Write a program Arduino/Raspberry Pi to upload temperature and humidity data to thing speak cloud.

9. Write a program Arduino/Raspberry Pi to retrieve temperature and humidity data from thing speak cloud.

10. To install MySQL database on Raspberry Pi and perform basic SQL queries.

</td><td></td></tr>
</table>

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