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1.3.2 Average percentage of courses that include experiential learning through project work/field work/internship during last five years

PRIYADARSHINI COLLEGE OF ENGG. NAGPUR
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B.E – INFORMATION TECHNOLOGY 2019-20

Sr. No	Name of the course that include experiential learning through Project work/ Internship	Subject Code	Domain	Page No
1	Programming Logic And Design Using 'C'	BEIT302T/P	**Computer Programming Language**	**2-14**
2	Object Oriented Methodology	BEIT405T/P		
3	Java Programming	BEIT505T/P		
4	Internet Programming	BEIT604T/P		
5	Computer Lab-I	BEIT307P		
6	Computer Lab-II	BEIT406P		
7	Computer Graphics	BEIT504T/P		
8	Software Engineering	BEIT503T/P	**Software Development**	**15-23**
9	Elective-II-Software Testing and Quality Assurance	BEIT705T1		
10	Gaming Architecture and Programming	BEIT802T/P		
11	Elective-I-Multimedia Systems	BEIT704T2		
12	Algorithms And Data Structures	BEIT402T/P	**Algorithm Design**	**24-29**
13	Theory Of Computation	BEIT403T		
14	Design and Analysis of Algorithms	BEIT502T		
15	Computer Networks	BEIT601T	**Networking**	**30-39**
16	Computer System Security	BEIT702T/P		
17	Elective-II-Cluster and Grid Computing	BEIT705T2		
18	Elective-II-Digital Signal Processing	BEIT705T3		
19	Elective-IV-Cyber Security	BEIT804T1		
20	Elective-IV-Cloud Computing	BEIT804T2		
21	Elective-IV-Wireless Sensor Networks	BEIT804T4		
22	Artificial Intelligence	BEIT703T	**Artificial Intelligence**	40-47
23	Elective-III-Pattern Recognition	BEIT803T3		
24	Elective-III-Machine Learning	BEIT803T4		
25	Elective-III-Digital Image Processing	BEIT803T2		
26	Operating Systems	BEIT602T	**Operating System**	**48-52**
27	Distributed Systems	BEIT801T/P		
28	System Programming	BEIT501T		
29	Elective-I-Compiler Design	BEIT704T4		
30	Computer Architecture And Organization	BEIT404T	**Computer Architecture**	**53-57**
31	Elective-III-Embedded Systems	BEIT803T1		
32	Digital Electronics And Fundamentals Of Microprocessor	BEIT304T/P		
33	Data Communication	BEIT305T		
34	Elective-I-Mobile Computing	BEIT704T1		
35	Mini Project and Industrial Visit	BEIT606P	**Other**	
36	Seminar on Project	BEIT706P		
37	Project	BEIT805P		

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Domain-1: Computer Programming Language

Sr. No	Name of the course that include experiential learning through Project work/ Internship	Subject Code
1	Programming Logic And Design Using 'C'	BEIT302T/P
2	Object Oriented Methodology	BEIT405T/P
3	Java Programming	BEIT505T/P
4	Internet Programming	BEIT604T/P
5	Computer Lab-I	BEIT307P
6	Computer Lab-II	BEIT406P
7	Computer Graphics	BEIT504T/P

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BEIT302T **PROGRAMMING LOGIC AND DESIGN USING 'C'**
(Theory Credit: 05)

Teaching Scheme:
Lecture: 4 Hours/week
Tutorial: 1 Hour/week

Examination Scheme:
Theory: T (U): 80 Marks T (I): 20 Marks
Duration of University Exam. : 03 Hours

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UNIT I: Programming with 'C
Introduction and Structure of 'C' Programming: Algorithms and Flowchart, Characteristics of algorithm, Basic Techniques, Decision Making, Looping Technique, Multiway Decision Making. Examples through 'C'

UNIT II:
Function and Pointers: Introduction to functions, why use function, Scope rule of function, call by value, call by reference, recursion, Iterative versus recursive style, Storage Classes in C. Preprocessor Directives in 'C': Macro, File Inclusion. Array: one dimensional array, pointer and Programming with 'Carray, Searching (Linear and Binary) and Sorting (Selection, Bubble, Insertion). Array of pointers, multidimensional array (2-D array).

UNIT III:
String and Structure: Introduction to string, pointers and strings, standard library function and user defined function, two dimensional array of character, array of pointer to string, limitation. Structure: Declaration, Accessing and memory representation of structure, array of structure, additional features of structure, pointer to structure. Union: Introduction, difference between structure and union, union of structure.

UNIT IV:
Console and File I/O: Types of I/O, console I/O functions, File I/O: data organization, file operation, file opening modes, file copy programming, String I/O files, Text file and binary file, low level disk I/O, Command line argument, detecting errors in reading / writing. Bitwise operators, Enumerated data types, typedef, typecasting, bit-field operator, volatile qualifier.

UNIT V
Dynamic memory allocation and Graphics in 'C': Malloc(), Calloc(), free(), realloc(), Sizeof() operator. Setting Text mode: textmode(), textbackground(), textcolor(), gotoxy(), cputs().Setting Graphics Mode: Drawing a Point on Screen, Drawing – lines, rectangle, circles, arcs, polygon. Functions to fill colors. Display Text in Graphics mode, outtext(), outtextxy(), justifying text. Computer animation: getimage (), putimage (), imagesize().

UNIT VI:
Advanced Concept in 'C: Different types of pointers, ROM – BIOS function, Elementary TSR's.

Text Books:
1. Programming Techniques Through 'C' : M. G. Venkateshmurthy (Pearson)
2. LET US 'C : Yashwant P. Kanetkar. (BPB).
3. Graphics Under C: Yashwant Kanetkar (BPB).
4. Writing TSR'S through 'C': Yashwant Kanetkar (BPB).
5. Programming in 'C': Ashok N. Kamthane (2nd Edition[Pearson])

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BEIT405T **OBJECT ORIENTED METHODOLOGY**
(Theory Credit: 05)

Teaching Scheme:
Lecture: 4 Hours/week
Tutorial: 1 Hour/week

Examination Scheme:
Theory: T (U): 80 Marks T (I): 20 Marks
Duration of University Exam. : 03 Hours

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UNIT I:
Introduction object-oriented development,Object Oriented Methodology, three Models, object oriented terms, object modeling Technique, object and classes links and associations, generalization and inheritance, grouping constructs a sample object module. Advanced object modeling; aggregation abstract classes, multiple, inheritance, metadata, candidate keys.

UNIT II:
Dynamic modeling, events and states, nested state diagrams, concurrency, advanced dynamic modeling concepts, functional models, data flow diagram, constraints, a sample functional module

UNIT III:
Design methodology overview of analysis, problem statement, ATM network, object modeling, various phases, dynamic modeling, various phases

UNIT IV:
System design, overview, sub systems, allocating subsystems, management of data stores, choosing software control, implementation, handling boundary condition

UNIT V:
Object design, overview, designing algorithms, design optimization, optimization of control, adjustment of inheritance, design of associations, object representation, physical packaging,

UNIT VI:
Implementation, programming languages, database systems, object oriented style, reusability, extensibility, robustness.

Text Books:

1. Object Oriented Modeling and Design by James Rumbaugh, Michal Blaba, William Premerlani, Frederic Eddy, William Lorerson, PHI, 1997
2. Object –oriented Programing Using C++ and Java by Ramesh Vasappanavar, Anand Vasappanavar , Gautam Vasappanavar, PEARSON, 2011

Reference Books:

1. Mastering C++ by A.R.Venugopal, Rajkumar, T. Ravishanker ,TMH, 1997.
2. Computer Science A Structured Approach Using C++ by Behrouz A. Forouzan , Richard F. Gilberg, Second Edition, CENGAGE Learning.
3. Object Oriented Programming with C++ by E Balagurusamy, Fifth Edition, TMH.

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BEIT505T **JAVA PROGRAMMING**
(Theory Credit: 04)

Teaching Scheme:
Lecture: 3 Hours/week
Tutorial: 1 Hour/week

Examination Scheme:
Theory: T (U): 80 Marks T (I): 20 Marks
Duration of University Exam. : 03 Hours

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UNIT I:
Introduction to Java, Data types, Literals: Types of Literals, Operators, Control Statements: If, switch, do-while, while, for, enhanced for loop, Nested Loop, break, continue, return statements, Classes: Fundamentals of classes, Declaring objects, Assigning objects, Reference variables, Overloading methods, Constructors, this keyword, Wrapper classes, Using object as parameter, Argument passing, Command line arguments, returning object, static modifier, final modifier, Nested classes: inner classes, Garbage collection.

UNIT II:
Arrays, Vectors and Generics, String Handling: String and StringBuffer class, String constructors, Data conversion using valueOf(), toString() methods, Methods for String Comparison, Searching string and modifying string.

UNIT III:
Object class, Inheritance, Abstract classes and methods, Interfaces, Method Overriding, Packages: Package Fundamental, Access protection, Importing packages, Exception Handling: Fundamental Exception type: Checked, Unchecked and Uncaught Exceptions, throw and throws keywords, Creating user defined exceptions, Built-in Exceptions.

UNIT IV:
Multithreading:Fundamentals, Thread Life Cycle, Ways of creating threads, Creating multiple threads, isAlive (), join (), Thread Synchronization, Thread priorities, Interthread communication, Methods for suspending, resuming and stopping threads.

UNIT V:
I/O stream, Byte stream, Character stream, Pre-defined streams, Reading console input, Writing console output, PrintWriter class, Reading and Writing files, transient and volatile modifiers, instanceof, strictfp and native methods.

UNIT VI:
Introduction to Swings, AWT as a origin of Swing, Key swing features, Components and container, Swing packages, Event handling, Creating swing applets, Controls: label and image icons, JTextField, Swing Buttons, Tabbed Panes, JScrollPanes, JList, JComboBox, JTable.

Text Books:

1. The Complete Reference (Seventh Edition) by Herbelt Schildt, TATA McGRAW-HILL Publications

Reference Books:

1. Sun Certified Java Programmer for Java 6 by Kathy Sierra.
2. Core Java for Beginners by Rashmi Kanta Das(III Edition) Vikas Publication
3. Programming in Java(Second Edition) by Sachin Malhotra and Saurabh Choudhary, Oxford University Press

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BEIT604T **INTERNET PROGRAMMING**

(Theory Credit: 05)

Teaching Scheme:
Lecture: 4 Hours/week
Tutorial: 1 Hour/week

Examination Scheme:
Theory: T (U): 80 Marks T (I): 20 Marks
Duration of University Exam. : 03 Hours

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UNIT I:

HTML and common tags: Introduction, www, Internet, URL, **Common tags:** Text formatting tags Line and Paragraph tags, **Lists:** ordered list Unordered List, definition List, anchor tag , Absolute and relative path, Tables and its attributes, Image tag- alt attribute, image mapping frames, forms , cascading style sheet, External style sheet, internal Style sheet.

UNIT II:

Java Scripts: Introduction Benefits of java script, Editing java scripts Displaying information, Alerls(), Promots(), confirm box, Operators, conditional statements, conditional loops, functions, arrays, *Objects*-math, string, date, Boolean, number, document, windows. DHTML with java script, Object model collection, events in java script, filters and transitions-Flip filter, Image mask, shadow filter, alpha filter, Blur filter. Difference between HTML and DHTML

UNIT III:

XML: Introduction, Advantages, Difference between HTML and XML, XML Namespace, Well formed and valid XML, XML Document type definition, XML schemas, Data types Attribute Types, XML Transformation- xsl, Document object model (DOM) using XML processors: DOM and SAX.

UNIT IV:

The Server Side: Client side Vs. Server side, Transformation from static to dynamic sites, Java Servlets, reading environment parameters, accessing parameter data, state management, event driven tracking.

UNIT V:

Java Server Pages: Need of JSP, JSP Life Cycle, Elements in JSP Page, Implicit JSP Objects, JSP Objects scope, JSP tags, JSP exceptions ,Expression Language, JSP standard tag Library custom tag Library, JSP and Equivalent Technologies.

UNIT VI:

Android applications Project: android applications components, application design, the screen layout and main.xml file, component Ids, few simple controls, getting and configuring android emulator, Key Classes like Button, TextView, EditText, View. OnClickListner

Text Books:

1. Web Technology Theory and Practices by M. Shrinivasan, PEARSON publication.
2. Android application Development for Java Programmers by James c. Sheusi, CENGAGE Learning.
3. The Modern approach to Web Technologies by Dr. Vaka Murali Mohan and Mr. S. Pratap Singh SCITECH Publications.
4. Web Technologies TCP/IP architecture, and Java Programming by Achyut S. Godbole & Atul Kahate , Tata McGraw-Hill publication Second edition.

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BEIT307P **COMPUTER LAB-I**
(Practical Credit: 02)

Teaching Scheme:
Practical: 2 Hours/week

Examination Scheme:
Practical: P (U): 25 Marks P (I): 25 Marks
Duration of University Exam. : 02 Hours

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G-01: Demonstration of computer hardware and Bios settings.
(North Bridge, South Bridge, PCI slots, ISA slots, AGP slot, memory bank slots, EIDE connector, Floppy connector, Chipset, Power connector, CPU slot, SMPS, Bios cell, Clock) (Ports-Serial, Parallel, PS/2, USB, Types of USB-A, B, Mini-A, Mini-B, Games, Ethernet/RJ42, Modem/RJ11, VGA, S-Video, HDMI, DVI- Mini & Micro DVI, IEEE 1394 Interface, SCSI, Minijack)

G-02: To demonstrate and study the various types I/O devices.
(Ex: Printers, Mouse, Scanner, monitor (CRT, LCD) etc.)

G-03: Execution of internal and external dos commands.
(Ex: Format, type, copy con, prompt, etc.)

G-04: Batch programming: Command Redirection and Pipelines, Variables and Control constructs.

G-05: Demonstration of system tools for windows operating systems.

G-06: Experiment based on system Registry of windows operating system.

G-07: Demonstration of complete booting process of windows operating system.

G-08: Demonstrate and study of networking accessories and Commands
(Hub, Switch, Bridge, Router, LAN Card, CAT cables, Coaxial cable, Fiber Optic cable, Repeater, Modem, Commands: ping, tracert etc.)

G-09: To demonstrate and study the troubleshooting of a computer system.
(Power supply problem, Boot failure Problem, Display problem, RAM problem, Motherboard Problem, CPU problem, CMOS battery problem etc.)

Note:

1. Practical sessions based on Any Six/Seven groups may be planned.

Reference Books:

1. PC Hardware: The complete Reference by Craig Zacker, 1st Edition, TMH publication.
2. Troubleshooting, Maintaining and Repairing PCs by Stephen Bigelow, 5th Edition, TMH publication.
3. PC Hardware: A Beginner's Guide by Ron Gilster, 1st edition, TMH publication.
4. Mastering Windows XP registry by Peter D Hipson. Sybex publication.
5. Windows ® Command-Line Administration: Instant Reference by John Paul Mueller, Sybex publication
6. Network + Training Guide by Drew Bird and Mike Harwood, Pearson Education

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BEIT406P **COMPUTER LAB-II**
(Practical Credit: 02)

Teaching Scheme:
Practical: 2 Hours/week

Examination Scheme:
Practical: P (U): 25 Marks P (I): 25 Marks
Duration of University Exam. : 02 Hours

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G-01. Experiment based on MS Office macro programming.

G-02. Installation of OS and Configuring a Desktop for– the Windows Operating System (XP and 7) and the Linux Operating System (Ubuntu/Fedora/Mint).

G-03. Introduction to UNIX Operating System, The UNIX architecture and Command Usage, The File System, PIPES, Filters using Regular Expressions.

G-04. Introduction to Linux Operating System, flavors of Linux vi Editor, vim Editor

G-05. The Shell - Shell Variables; Scripts; Meta Characters and Environment; if and case Statements; for, while and until loops; Essential Shell Programming.

G-06. AWK (The Pattern-Action Language) - BEGIN and END Patterns; Variables, Records and Fields; Loops; Handling Text; String Manipulations.

Note:

1. Practical sessions based on Any Four/Five groups may be planned.

Reference Books:

1. Sumitabha Das, "UNIX – Concepts and Applications", Fourth Edition, Tata McGraw Hill, 2006.
2. Behrouz A. Forouzan and Richard F. Goldberg, "UNIX and Shell Programming", Thomson Publishing, 2005.
3. Guide to Unix and Linux by Harley Hahn's 1st edition, TMH publication, 2011
4. Microsoft Office Programming: A Guide for Experienced Developers by Rod Stephens, Apress,2003
5. Dale Dougherty and Arnold Robbins, "sed and awk", Second Edition, O'Reilly Media, 1997

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BEIT504T **COMPUTER GRAPHICS**
(Theory Credit: 05)

Teaching Scheme:
Lecture: 4 Hours/week
Tutorial: 1 Hour/week

Examination Scheme:
Theory: T (U): 80 Marks T (I): 20 Marks
Duration of University Exam. : 03 Hours

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UNIT I:
Geometry and line generation: points, lines, planes, pixels and frames buffers, types of display devices and its architecture DDA and Bresenham's algorithms for line generation, Bresenham's algorithm for circle generation, aliasing , anti-aliasing and its techniques.

UNIT II:
Graphics primitives: Display files, algorithms for polygon generation, polygon filling algorithms, NDC (normalized device co-ordinates), **2D transformations:** scaling, rotation, translation, rotation about arbitrary point, reflections, shearing.

UNIT III:
Segment tables: operations on segments, data structures for segments and display files, **Windowing and clipping:** window, viewport, viewing transformations, clipping, line and Polygon clipping.

UNIT IV:
3D Graphics: 3D Transformation, parallel, perspective and isometric projections, 3D Transformations. **Hidden surfaces and line removal**: Painter's, Z-buffer, Warnock's, Back-face Removal algorithm

UNIT V:
Curves and surfaces: Methods of interpolation, Bezier and B-splines, **surface rendering methods:** Gouraurd Shading, Phong Shading, Constant Intensity Shading, Fast Shading.

UNIT VI:
Color Models and Color Application: Properties of light, standard primaries, chromaticity Diagram, Intuitive colour concept RGB, YIQ CMY, HSK, colour models and their conversion, colour selection and applications. **Animation:** Design of Animation sequences, animation Function, Raster animation, animation Language, Key-Frame System, motion Specification.

Text Books:

1. Procedural elements for computer graphics by David F. Rogers, Mc-Graw Hill.
2. Computer Graphics 'C' Version, Second Edition By Donald Hearn and M.Pauline Baker, Pearson publication
3. Mathematical elements for computer graphics by David Rogers and J. Alan Adams, Tata Mcgraw Hill Education Private Limited
4. Computer graphics principles and practice by Foley, Vandam, Feiner and Huges Addison Wesley
5. Principles of interactive computer graphics by Newman and Sproul.

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Project Report
ONLINE RAILWAY FOOD DELIVARY APPLICATION

Submitted By

Suraj Mendhe
Ravina Pole
Mina Nagpure
Payal Ramteke
Abhishek khandare

Guided by
Prof. Priyanka Thakare

PRIYADARSHINI COLLEGE OF ENGINEERING

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DEPARTMENT OF INFORMATION TECHNOLOGY
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NAGPUR-440019

Certificate

This is to certify that the BE project entitled

ONLINE RAILWAY FOOD DELIVERY APPLICATION

Submitted By

SURAJ MENDHE RAVINA POLE MINA NAGPURE

PAYAL RAMTEKE ABHISHEK KHANDARE

In the partial fulfillment of the requirement for the degree of **'Bachelor of Engineering'** *in* **Information Technology** *of Priyadarshini College of Engineering, Nagpur is bonafide work carried under guidance and supervision.*

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REQUIREMENT SPECIFICATIONS

Hardware: -

1) Processor (CPU): -Intel i3
2) A minimum of 8GB of RAM and 64-bit OS
3) A minimum of 5GB of available space on the hard disk
4) Mobile device

Software: -

1. Android Studio
2. OS (windows 10)

Processor: Developed and manufactured by Intel, the Core i3 is a dual-core computer processor, available for the use in both desktop and laptop computers. It is one of three type of processor in the "i" series (also called the Intel Core family of processors). The core i3 processor is available in multiple speeds, ranging from 1.30 GHz up to 3.50 GHz and features either 3 MB or 4 MB of cache. It utilizes either the LGA 1150 or LGA 1155 socket on a motherboard. Core i3 processors are most often found as dual-core, having two cores.

Mobile Device: A mobile device is a computer small enough to hold and operate in the hand. Typically, any handheld computer device will have an LCD or OLED flat screen interface, providing a touchscreen interface with digital button and keyboard or physical button along with a physical keyboard. Many such devices can connect to the internet and interconnect with other devices such as car entertainment system or headsets via wi-fi, Bluetooth, cellular networks or near field communication (NFC). Integrated cameras, the ability to place and receive voice and video telephone calls, video games, and Global Positioning System (GPS) capabilities are common. Mobile device may run mobile operating system

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Project Report
On

SMART IRRIGATION SYSTEM

Submitted By

Divya Patil
Darshika Gajbhiye
Harsha Langote
Pragati Ingole
Tejaswini Borkar

Guided by
Prof. Nikita Hatwar

DEPARTMENT OF INFORMATION TECHNOLOGY
PRIYADARSHINI COLLEGE OF ENGINEERING,
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NAGPUR-440019

Certificate

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SMART IRRIGATION SYSTEM

Submitted By

Divya Patil, Darshika Gajbhiye, Harsha Langote,
Pragati Ingole, Tejaswini Borkar

In the partial fulfillment of the requirement for the degree of
'Bachelor of Engineering' *in* **Information Technology** *of*
Priyadarshini College of Engineering, Nagpur
is bonafide work carried under guidance and supervision.

Lokmanya Tilak Jankalyan Shikshan Sanstha's
PRIYADARSHINI COLLEGE OF ENGINEERING
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ABSTRACT

India is mainly an agricultural country. Agriculture is the most importantoccupation for the most of the Indian families. It plays vital role in thedevelopment of agricultural country. In India, agriculture contributes about16% of total GDP and 10% of total exports. Water is main resource forAgriculture. Irrigation is one method to supply water but in some cases therewill be lot of water wastage. So, in this regard to save water and time we haveproposed project titled automatic irrigation system using IoT. In this proposedsystem we are using various sensors like temperature, humidity, soil moisturesensors which senses the various parameters of the soil and based on soilmoisture value land gets automatically irrigated by ON/OFF of the motor. Thesesensed parameters and motor status will be displayed on user androidapplication. Automation of farm activities can transform agricultural domain from being manual and static to intelligent and dynamic leading to higher production with lesser human supervision. This paper proposes an automated irrigation system which monitors and maintains the desired soil moisture content via automatic watering. Microcontroller ATMEGA328P on arduinouno platform is used to implement the control unit. The setup uses soil moisture sensors which measure the exact moisture level in soil. This value enables the system to use appropriate quantity of water which avoids over/under irrigation. IOT is used to keep the farmers updated about the status of sprinklers. Information from the sensors is regularly updated on a App using WiFi modem through which a farmer can check whether the water sprinklers are ON/OFF at any given time. Also, the sensor readings are transmitted to a Thing speak channel to generate graphs for analysis.

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Domain-2: Software Development

Sr. No	Name of the course that include experiential learning through Project work/ Internship	Subject Code
1	Software Engineering	BEIT503T/P
2	Elective-II-Software Testing and Quality Assurance	BEIT705T1
3	Gaming Architecture and Programming	BEIT802T/P
4	Elective-I-Multimedia Systems	BEIT704T2

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BEIT503T **SOFTWARE ENGINEERING**

(Theory Credit: 04)

Teaching Scheme:
Lecture: 3 Hours/week
Tutorial: 1 Hour/week

Examination Scheme:
Theory: T (U): 80 Marks T (I): 20 Marks
Duration of University Exam. : 03 Hours

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UNIT I:
Basics: Introduction to Software Engineering, Software Myths, Software Engineering- A Layered Technology, Software Process Framework, **Software Process Models:** The Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, Agile Process Models

UNIT II:
Measures Metrics and Indicator, **Metrics for process & projects:** Software measurement, metrics for software quality, metrics for small organization, **Estimation:** Software scope and Feasibility, Resources, Software project estimation, Decomposition Techniques, Empirical Estimation Models, Make-buy Decision, **Project scheduling**

UNIT III:
System Engineering: Hierarchy, Business Process Engineering, Product Engineering, System Modeling, **Requirements Engineering**: Requirements Analysis, Analysis Modeling Approaches, Data Modeling, Object-Oriented Analysis, Scenario-Based Modeling, Flow-Oriented Modeling, Class-based Modeling, Behavioral Model, Metrics for Analysis Models

UNIT IV:
Design Engineering Concepts, Design Model, Pattern-Based Software Design, Architectural Design, Mapping data flow into software architecture, Cohesion, Coupling, User interface analysis and Design,
Metrics for Design Models

UNIT V:
Unit Testing, Integration Testing, Validation Testing, System Testing, Art of Debugging, Software Testing Fundamentals, Black-Box Testing, White-Box Testing, Metrics for Source Code, Metrics for Testing & Maintenance

UNIT VI:
Risk Management: Risk strategies, Software risks, Risk identification, Risk refinement, RMMM **Quality Management:** Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Review, Software Reliability, **Change Management:** Software Configuration Management, SCM Repository, SCM Process, **Reengineering:** Software reengineering, Reverse Engineering, Restructuring, Forward Engineering

Text Books:

1. Software Engineering-A Practitioner's Approach (Sixth Edition) by Roger Pressman (TMH)
2. Software Engineering (Ninth Edition)-Ian Summerville (Pearson)

Reference Books:

1. Schaum's Outline of Theory and Problems of Software Engineering by David Gustafson (TMH)
2. Software Engineering (Third Edition) by K. K. Aggarwal and Yogesh Singh (New age International Publishers)

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ELECTIVE: I

BEIT704T2 **MULTIMEDIA SYSTEMS**

(Theory Credit: 05)

Teaching Scheme: **Examination Scheme:**

Lecture: 4 Hours/week **Theory: T (U): 80 Marks T (I): 20 Marks**

Tutorial: 1 Hour/week **Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction :Definition of multimedia, Multimedia Basics, Where to use Multimedia, Multimedia Elements, Multimedia Applications

Multimedia Systems Architecture: Multimedia Workstation Architecture, High resolution Graphic displays, Multimedia Architecture Based on interface bus, Network architecture for Multimedia systems.

Evolving Technologies For Multimedia Systems: Hyper Speech, HDTV and UDTV, 3DTechnologies and Holography, Virtual Reality, Video conferencing.

UNIT II:

Hardware: Macintosh Versus Windows Platform, Connections, Memory and Storage Devices, Input Devices, Output Hardware, Communication Devices

Basic Software Tools : Text Editing, Word Processing, OCR Software, Painting and Drawing Tools, 3D Modeling and Animation Tools, Image Editing, Sound Editing, Animation, Video, Digital Movie tools, Movie Editors, Compressing Movie Files

Making instant Multimedia : Linking Multimedia Object, office suites, word processors , spread sheets, databases, presentation tools, power point

Multimedia authoring tools: Types of authoring tools, card and page based authoring tools, Icon based authoring tools, and Time based authoring tools.

UNIT III:

Text: About Fonts and Faces, Using Text in Multimedia, Designing with Text, Hypermedia and Hypertext, The Power of Hypertext, Using Hypertext, Hypermedia Structures, Hypertext tools.

Images: Making Still Images, Bitmaps, 1 bit images, 8 bit gray level images, 8 bit color images, Dithering, 24 bit color images, Vector Drawing, Vector Drawn Objects vs. Bitmaps, 3 D Drawing and Rendering, Color, Understanding Natural Light and Color, Computerized Color, Color Palettes, Color Look up table.

Sound : The Power of Sound, Digital Audio, Making Digital Audio Files, MIDI Audio, MIDI vs. Digital Audio, Multimedia System Sounds, Adding Sound to Your Multimedia Project, Audio Recording, Keeping Track of Your Sounds, Audio CDs, Sound for Your Mobile, Sound for the Internet.

Animation: the Power of Motion, Principles of Animation, Animation by Computer, Animation Techniques.

Video: Using Video, How Video Works and Is Displayed, Analog Video, Digital Video, Displays, Digital Video Containers, Codec, Video Format Converters, Obtaining Video Clips, Shooting and Editing Video.

UNIT IV:

Data Compression: Need for Data compression, General Data compression Scheme, Compression standards, Non lossy compression for images, Lossy compression for Photographs and video, Hardware Vs Software Compression.

Compression Schemes and standards: (Only Concepts of) Binary image compression, Color, Gray Scale image compression, JPEG, video image compression, Multimedia Standards for Video, Requirements for Full motion Video Compression, MPEG, Audio compression, Fractal compression, advantages / disadvantages.

UNIT V:

Data and File Format Standards: Popular File Formats: RTF, RIFF, GIF, PNG, TIFF,MIDI,JPEG, JFIF, AVI, WAV, BMP, WMF, MIX, MPEG standards TWAIN.

Multimedia Databases, Storage and Retrieval, Database Management systems, Database Organization and Transaction management for multimedia systems.

Multimedia Skills: The Team, Project Manager, Multimedia Designer, Interface Designer, Writer, Video Specialist, Audio Specialist, Multimedia Programmer, Producer of Multimedia for the Web.

UNIT VI:

Designing and Producing: Designing, Designing the Structure, and Designing the User Interface, Producing, Tracking, Copyrights, Virtual reality designing and modeling (VRML). **The Internet and Multimedia:** The Bandwidth Bottleneck, Internet Services, MIMETypes, Multimedia on the Web, Web Page Makers and Site Builders, Plug ins and Delivery Vehicles.

Designing for the World Wide Web: Developing for the Web, The Desktop Workspace and the Small, Device Workspace, Text for the Web, Images for the Web, GIF and PNG Images, JPEG Images, Clickable Buttons, Client Side Image Maps, Sound for the Web, Animation for the Web, GIF 89a Video for the Web.

Delivering: Testing Preparing for Delivery, File Archives, Delivering on CD ROM, Delivering on DVD.

Text Books:

1. Multimedia: Making It Work By Tay Vaughan Eighth Edition, TMH
2. Fundamental of Multimedia Ze Nian Li & M. S. Drew ,PHI
3. Multimedia Systems Design Prabhat k. Andleigh, Kiran Thakra
4. Multimedia Systems John F. Koegel Buford

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ELECTIVE: II

BEIT705T1 **SOFTWARE TESTING AND QUALITY ASSURANCE**

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Basic concepts of Testing: Need of Testing, Basic concepts errors, faults, defects, failures, objective of testing, central issue in testing, Testing activities, V Model, Sources of information for test cases, Monitoring and Measuring Test Execution, Test tools and Automation, Limitation of Testing.

UNIT II:

Unit Testing: Concepts of Unit Testing, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Mutation Testing, Debugging, Unit Testing in Extreme Programming, Tools for Unit Testing.

UNIT III:

Control Flow Testing: Outline of Control Flow Testing, Control Flow Graphs, Path in Control Flow Graph, Path selection criteria, All path coverage criteria, Statement coverage, Path coverage, Predicate coverage criteria, Generating Test input, Examples of Dataselection.

UNIT IV:

Data Flow and System Integration Testing: Introduction Data flow testing, Data flow graph, Data flow testing criteria, Comparison of Data flow test selection criteria. Fundamentals of System Integration: Types of interfaces and interface errors, System integration testing, Software and Hardware integration, Test plan, Off the shelf componentintegration and testing.

UNIT V:

System Test Categories and Test Design: Taxonomy of system test, Basic Test, Functionality test, Robustness test, Performance test, Scalability test, Stress test, Load and Stability test, Reliability test, Regression test, Documentation Test. Test Design: Test cases, Necessity of test case documentation, Test case design methods, Functional specification based test case design, Use case bases, Application based test case design, Level of test execution.

UNIT VI:

Acceptance Testing and Software Quality: Types of acceptance testing, Acceptance criteria, Acceptance test plan and execution, Special Tests: Client server testing, Web application testing and Mobile application testing, fire view of software quality, ISO 9126 quality characteristics, ISO 9000:2000 software quality standard, ISO 9000:2000

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BEIT802T **GAMING ARCHITECTURE AND PROGRAMMING**

(Theory Credit: 05)

Teaching Scheme: **Examination Scheme:**

Lecture: 4 Hours/week **Theory: T (U): 80 Marks T (I): 20 Marks**

Tutorial: 1 Hour/week **Duration of University Exam. : 03 Hours**

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UNIT I:

Core Design: What Is a Game? Games Aren't Everything. Games Mean Gameplay.Creating the Game Spec. Example Game Spec, Initial Design: The Beginning. Hardware Abstraction. The Problem Domain. Thinking in Tokens.

UNIT II:

Use of Technology: The State of the Art. Blue Sky Research. Reinventing the Wheel. Use of Object Technology, Building Bricks: Reusability in Software, Initial Architecture Design: The Birth of Architecture. The Tier System. Architecture Design.

UNIT III:

Development: The Development Process. Code Quality. Coding Priorities. Debugging and Module Completion. The Seven Golden Gambits. The Three Lead Balloons. GAME PROGRAMMING: Technologies: Display, Mixing 2D and 3D, DirectX, User Interface code, Resource caching, the main loop.

UNIT IV:

Design Practices: Smart & naked pointers, using memory correctly, Game scripting languages, Building your game: Creating a project, source code repositories and version control, Building the game and scripts, User interface programming and input devices: Getting the Device State, Working with the Mouse (and Joystick), Working with the Keyboard, User Interface Components, More Control Properties.

UNIT V:

2D Drawing and DirectX:

2D Drawing and DirectX, Basic 2D Drawing Concepts, Drawing Text, Working with Sprites, Graphics File Formats, Initialization and the Main Loop: Initialization, Some C++ Initialization Pitfalls, Initializing your Game, the Main Loop, Stick the Landing: A Nice CleanExit.

UNIT VI:

Loading and Caching Game Resources:

Art and Sound Formats, Resource Files, Data Compression, IPac: A Resource File Builder, the Resource Cache, World Design and Cache Prediction, 3D Graphics and 3D Engines: 3D Graphics Pipeline, Setting Up a Project, Using a Scene Graph, 3D Middleware Review, Rolling Your Own 3D Engine.

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Project Report
On

VIRTUAL PRIVATE CLOUD

Submitted By

SAHIL TELTUMBDE
PRANAY SOMKUWAR
ASHWIN KAMBLE
ROHAN MANDAL
TUSHAR KOSE

Guided by
Mr. Prakash Prasad Sir

DEPARTMENT OF INFORMATION TECHNOLOGY
PRIYADARSHINI COLLEGE OF ENGINEERING, NAGPUR
SESSION 2019-20

Lokmanya Tilak Jankalyan Shikshan Sanstha's
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DEPARTMENT OF INFORMATION TECHNOLOGY
PRIYADARSHINI COLLEGE OF ENGINEERING
NAGPUR-440019

Certificate

This is to certify that the BE project entitled

VIRTUAL PRIVATE CLOUD

Submitted By

SAHIL TELTUMBDE TUSHAR KOSE ASHWIN KAMBLE

PRANAY SOMKUWAR ROHAN MANDAL

In the partial fulfillment of the requirement for the degree of **'Bachelor of Engineering'** *in* **Information Technology** *of Priyadarshini College of Engineering, Nagpur is bonafide work carried under guidance and supervision.*

CONCLUSION

VPC provides potential for companies as a viable IT solution. For companies looking to migrate toward the cloud in a safe and secure way, this is a flexible offering that can be used in any workplace. Since VPC provides higher level of SLA, cloud services from VPC are always available to the users. So it is also considered as best solution to move towards VPC rather than public cloud. Using virtual private cloud helps to achieve efficient business processes in a secure environment. Additionally presenting it to the customers creates a new revenue stream for business and offers another, more secure solution. Since it provides a separate dedicated virtual network for transmission across public cloud, VPC can be considered as secure. As we continue moving forward with adopting cloud services, the increased number of virtual private cloud adopters will continue to grow.

The result of this thesis is a fully functional private cloud with possibilities of Infrastructure as a service which is the interactive Ubuntu Enterprise Cloud interface which is used to install images of operating systems and test the full functionality of the cloud. This has been a very challenging project because of limited educational resources. These problems require skills and experience to solve and in this case, was fortunate to find answers on internet blogs.

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Sr. No	Name of the course that include experiential learning through Project work/ Internship	Subject Code
1	Algorithms And Data Structures	BEIT402T/P
2	Theory Of Computation	BEIT403T
3	Design and Analysis of Algorithms	BEIT502T

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BEIT402T **ALGORITHMS AND DATA STRUCTURES**
(Theory Credit: 05)

Teaching Scheme:
Lecture: 4 Hours/week
Tutorial: 1 Hour/week

Examination Scheme:
Theory: T (U): 80 Marks T (I): 20 Marks
Duration of University Exam. : 03 Hours

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UNIT I:

An Introduction to data structure: Introduction, Definition, Classification of data structure, Concept of data, Data types, Abstract data Types (ADT), Features of structured program. Introduction to algorithms: Definition and Characteristics of an Algorithm, Apriori analysis, Time and space complexity, Average , Best and Worst case complexities, Big 'O' Notations, Asymptotic notations, Top-Down and bottom-up programming techniques, Recursion, Divide and conquer strategy. (e.g. Quick sort, Tower of Hanoi).

UNIT II:

Stacks and Queue: Definition and Terminology, Concept of stack, Stack implementation, Operation on stack, Algorithms for push and pop, Implementing stack using pointers, Application of stacks, Evaluation of polish notation, multiple stack. Queue: Queue as ADT Implementation of queue, Operation on queue, Limitations, Circular queue, Double ended queue (dequeue), Priority queue, Application of queues, multiple queues.

UNIT III:

Linked List : Introduction, Linked list, Representation of linear linked list, Operation on linked list, Types of linked list, Singly linked list, Circular linked list, Doubly linked list, Circular doubly linked list, Application: Addition of Two polynomials, Generalized linked list, Sparse matrix.

UNIT IV:

Tree: Introduction to Non Linear Data Structures, Binary tree Concept and terminology, Representation of binary trees, Algorithm for tree traversals (recursive and non recursive). Conversion of general tree to binary tree (Implementation not expected). Binary search trees, Extended binary tree, Threaded binary tree. Height balanced and weight balanced binary trees, B-Tree, B^+ Tree, AVL tree, Multiway tree, 2-3 Tree.

UNIT V:

Graphs: Concepts and terminology, Representation of graphs using adjacency matrix, adjacency list, Depth First search and Breadth First Search Algorithms, Spanning trees, Minimal cost spanning tree and Shortest path algorithm (Single Source-all pairs).

UNIT VI:

Searching and sorting Techniques: Importance of searching. Sequential, Binary, Sorting : Bubble sort, selection sort, quick sort, Merge sort, heap sort, Shell sort, Analysis of these algorithms in worst and average cases. Hashing techniques and collision handing mechanism.

Text Books:

1. Data Structures with C by SEYMOUR LIPSCHUTZ [TMH].
2. Data Structure using C by ISRD Group [TMH].
3. Data Structure through C by G. S. BALUJA [Dhanpat Rai & co.].
4. Introduction to Data Structure in C by Ashok N. Kamthane [Pearson].
5. Data structures using C and C++ by Tenenbaum [Pearson].
6. Data structures Pseudocode with C by Gilberg/Foruzen, Cengage Learning

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BEIT403T **THEORY OF COMPUTATION**

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Strings, Alphabet, Language operations, Finite state machine definitions, Finite automation model, Acceptance of strings and language, Non deterministic finite automation, Deterministic finite automation, Equivalence between NFA and DFA, Conversion of NFA into DFA, Minimization of FSM, Equivalence between two FSM's Moore and Mealy machines

UNIT II:

Regular sets, Regular expressions, Identity rules, Manipulation rules, Manipulation of regular expressions, Equivalence between RE and FA, Inter conversion, Pumping lemma, Closure properties of regular sets(proofs not required), Chomsky hierarchy of languages, Regular grammars, Right linear and left linear grammars, Equivalence between regular linear programming and FA, Inter conversion between RE and RG.

UNIT III:

Context free grammar, Derivation trees, Chomsky normal form, Greibach normal form, Push down automata, Definition, Model acceptance of CFL, Equivalence of CFL and PDA, Inter conversion, Closure properties of CFL(Proofs omitted),Pumping Lemma of CFL, Introduction of DCFL and DPDA

UNIT IV:

Turing Machine: Definition, Model of TM, Design of TM, Universal Turing Machine, Computable function, Recursive enumerable language, Types of TM's (proofs not required), Linear bounded automata and Context sensitive language, Counter machine

UNIT V:

Decidability and Undecidability of problems, Properties of recursive & recursively enumerable languages, Halting problems, Post correspondence problem, Ackerman function, and Church's hypothesis.

UNIT VI:

Recursive Function: Basic functions and operations on them, Bounded Minimalization, Primitive recursive function, μ-recursive function, Primitive recursive predicates, Mod and Div functions, Unbounded Minimalization, Equivalence of Turing Computable function and μ-recursive function.

Text Books:

1. Introduction to Automata Theory, Languages and Computation by J. E. Hopcraft,R. Motwani, J. D Ullman, second Edition, Pearson Education, Aisa
2. An Introduction to Formal Languages and Automata by Peter Linz
3. Introduction to Langauges and the theory of Automata by John Martin, Third Edition(TMH)

Reference Books:

1. Theory of Computer Science, Automata, Languages and Computation by K. L. P. Mishra and N. Chandrasekaran, Third Edition, PHI Learning.

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BEIT502T **DESIGN AND ANALYSIS OF ALGORITHMS**

(Theory Credit: 05)

Teaching Scheme:
Lecture: 4 Hours/week
Tutorial: 1 Hour/week

Examination Scheme:
Theory: T (U): 80 Marks T (I): 20 Marks
Duration of University Exam. : 03 Hours

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UNIT I:

Mathematical foundation, summation of arithmetic and geometric series, Σn, Σn^2, bounding summation using integrations, recurrence relations, solutions of recurrence relations using technique of characteristic equation, recursion tree method and master theorem, generating functions, Complexity calculation of various standard functions, principles of designing algorithms

UNIT II:

Asymptotic notations of analysis of algorithms, analyzing control structures, worst case, average case and best case analysis of insertion sort, selection sort and bubble sort, ,lower bound proof, amortized analysis, application of amortized analysis, Sorting networks, comparison networks, biotonic sorting network.

UNIT III:

Divide and conquer strategies: Binary search, quick sort, merge sort, heap sort, Stressen's matrix multiplication algorithm, min-max algorithm. **Greedy Approach:** Basic strategy, activity selection problem, application to job sequencing with deadlines problem, knapsack problem, optimal merge pattern, Huffman code, minimum cost spanning tree using Prim's and Kruskal's algorithm,

UNIT IV:

Dynamic Programming: Basic Strategy, Multistage graph (forward and backward approach), Longest Common Subsequence, matrix chain multiplication, Optimal Binary Search Tree, 0/1 Knapsack problems, Travelling Salesman problem, single source shortest path using Bellman-Ford algorithm, all pair shortest path using Floyd- Warshall algorithm.

UNIT V:

Basic Traversal and Search Techniques, breadth first search and depth first search, connected components. **Backtracking:** basic strategy, 4-Queen's problem, 8-Queen's problem, graph coloring, Hamiltonian cycles etc, Approximation algorithm and concepts based on approximation algorithms

UNIT VI:

NP-hard and NP-complete problems, basic concepts, non-deterministic algorithms, NP-hard and NP-complete, Cook's theorem, decision and optimization problems, polynomial reductions, graph based problems on NP Principle, Computational Geometry, Approximation algorithm.

Text Books:

1. "Introduction to Algorithms", Thirs Edition, Prentice Hall of India by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein.
2. "The Design and Analysis of Computer Algorithms", Pearson education by Alfred V. Aho, John E. Hopcraft, Jeffrey D. Ullman.
3. "Computer Algorithms", Galgotia Publications Pvt. Ltd. By Horowitz, Sahani, Rajsekharam.

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Project Report
On

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Guided by
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DEPARTMENT OF INFORMATION TECHNOLOGY
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SESSION 2019-20

design where the raspberry pi will control different Arduino gadgets with Zigbee convention. The raspberry pi will continue searching its email for any directions which will be as "Turn on the siphon for Y minutes." This order will turn on the

Project haritha - an automated irrigation system for home gardens[13] The maintenance of even a small garden gets tedious at times in the urban scenario. A fully automated system which optimizes the use of energy and water resources is the need of the day. This lead to a design and implementation of a highly energy efficient, multimode control for an automated irrigation system. The system uses an in-situ soil moisture potential measurement and the programmed data to irrigate a desired area. The soil moisture content is monitored by a microcontrollerbased data acquisition and distribution system. An integrated GSM module provides critical information to the user during system failure. The proposed microcontroller based system was programmed and tested for its performance.

The design and research on intelligent fertigation system [14]There exists a severe but normal problem that the crop fertilization is uneven such as over or too less fertilized and the concentration can't be well controlled. As to this situation, an intelligent fertilization system is presented, which can realize automatic irrigation, fertilization, injecting fertilizer and mixing fertilizer. The paper introduces the system structure, design of piping system and computer control system, and three control algorithms: fertilization control algorithm, injecting fertilizer and mixing fertilizer control algorithm and system priority algorithm. The experimental result proves that this system has a good quality for EC and pH adjustment, steady performance and good practicability.

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Domain-4:- Networking

Sr. No	Name of the course that include experiential learning through Project work/ Internship	Subject Code
1	Computer Networks	BEIT601T
2	Computer System Security	BEIT702T/P
3	Elective-II-Cluster and Grid Computing	BEIT705T2
4	Elective-II-Digital Signal Processing	BEIT705T3
5	Elective-IV-Cyber Security	BEIT804T1
6	Elective-IV-Cloud Computing	BEIT804T2
7	Elective-IV-Wireless Sensor Networks	BEIT804T4

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BEIT601T **COMPUTER NETWORKS**
(Theory Credit: 05)

Teaching Scheme:
Lecture: 4 Hours/week
Tutorial: 1 Hour/week

Examination Scheme:
Theory: T (U): 80 Marks T (I): 20 Marks
Duration of University Exam. : 03 Hours

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UNIT I: Introduction
Introduction to computer networks & Internet, Network architecture, layered approach, OSI reference model, TCP/IP protocol suite, performance issues in networks, throughput, delay, latency, jitter, packet delivery ratio, packet loss rate, reliability, Introduction to Wireless Networks, IEEE 802.11, Bluetooth and WiMAX, wireless transmission, infrared transmission

UNIT II: Data Link Layer
Design issues, framing, error control, flow control, error-correcting and detecting codes, Data link protocols, unrestricted simplex protocol, simplex stop-and-wait protocol, one-bit sliding window protocol, Go Back N ARQ protocol, selective repeat ARQ protocol, static and dynamic channel allocation, ALOHA, CSMA/CD, CSMA/CA

UNIT III: Network Layer
Design issues, classful and classless addressing, IPv4 addressing mechanism, Subnetting and Supernetting, Next generation IP, IPv6 addressing, transition from IPv4 to IPv6, ICMPv6, routing algorithms, shortest path routing, flooding, flow-based routing, distance vector routing, link state routing, hierarchical routing, congestion control algorithms, OSPF, BGP, Multicasting, firewalls

UNIT IV: Transport layer and Application Layer
Quality of service, transport service primitives, elements of transport protocol, addressing, establishing a connection, releasing a connection, flow control and buffering, multiplexing, crash recovery, client server model, concurrency, processes, sockets, socket system calls

UNIT V:
BOOTP and DHCP, packet formats, operation, error control, transition states, DNS (Domain Name System), DNS in the Internet, Resolution, FTP and TFTP, connection, communication, command processing, file transfer, messages

UNIT VI:
Mobile IP, addressing, agents, three phases, agent discovery, registration, data transfer, Internet Security, privacy, digital signature, application layer security, transport layer security, security at the IP layer IPSec, Real Time traffic over the Internet

Text Books:

1. Computer Networks, Fifth Edition, Andrew Tanenbaum(Pearson Education)
2. TCP/IP Protocol Suite, Behrouz A Forouzan, McGraw Hill Fourth Edition

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BEIT702T **COMPUTER SYSTEM SECURITY**

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I: Introduction:

Need of information security, OSI security Architecture, Attacks, services, mechanism, Model of network security, Classical Encryption Techniques: Symmetric, Asymmetric,cipher model; substitution – Ceasor cipher, monoalphabetic, play fair; Transposition Railfence, columnar; Steganography, S DES, DES, TDES, AES; Block cipher principle, Mode, strength of DES.

UNIT II:

Differential and linear Cryptanalysis, Blowfish, RC2, RC5, IDEA, CAST 128, Characteristic of advance symmetric block cipher, Euler function, Chinese remainder theorem, Discrete logarithm, confidentiality using conventional encryption, placement of encryption function traffic, confidentiality, key distribution, random number generator.

UNIT III:

Public key cryptography principles, RSA algorithm, key management, Diffie Hellman key exchange, elliptic curve cryptography, Message Authentication, hash function Authentication requirements, functions, codes, hash functions, Security of hash function and MACs, Hash and MAC algorithm, MD5, Message Digest algorithm.

UNIT IV:

Secure hash algorithm (SHA 1), RIPEMD 160, HMAC, digital signatures and Authentication protocol digital signature, authentication protocol, digital signature standard. Network Security practices, authentication applications Kerberos, x.509 directory authentication service, Kerberos encryption technique

UNIT V:

E mail security Pretty Good Privacy, S/MIME, data compression using ZIP, radix 64 conversion, PGP random number generation, IP Security Overview, Architecture, authentication header, Encapsulating security payload, combining security association, keymanagement.

UNIT VI:

Web Security requirements, secure socket layer and transport layer security, secure electronic transaction, network management security basic concepts of SNMP, SNMP V1, community facility, SNMP V3; System security intruders, viruses and worms and related threads firewall design

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BEIT705T2 **CLUSTER AND GRID COMPUTING**

(Theory Credit: 05)

Teaching Scheme: **Examination Scheme:**

Lecture: 4 Hours/week **Theory: T (U): 80 Marks T (I): 20 Marks**

Tutorial: 1 Hour/week **Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction to Cluster Computing, Cluster Middleware: An Introduction, Early Cluster Architecture and High Throughput Computing Clusters, Networking, Protocols and I/O for Clusters, Setting Up and Administering a Cluster

UNIT II:

Cluster Technology for High Availability, Performance Models and Simulation, Process Scheduling, Load Sharing and Load Balancing, Distributed Shared Memory, Case Studies of Cluster Systems: Beowulf, COMPaS, NanOS and PARAM

UNIT III:

Introduction to Grid Architecture, Characterization of Grid, and Grid related standard bodies, Grid types, Topologies, Components and Layers, Comparison with other approaches.

UNIT IV:

System Infrastructure, Traditional paradigms for distributed computing, Web Services, Grid standards: OGSA and WSRF, Introduction to Globus Toolkit 3 and GT 4

UNIT V:

Semantic Grid and Autonomic Computing , Metadata and Ontology in semantic Web , Semantic Web Services, Layered Structure of Semantic Grid , Semantic Grid Activities , Autonomic Computing

UNIT VI:

Basic Services: Grid Security, Grid Monitoring, GMA, Review criteria overview of Grid Monitoring system – Autopilot. Grid Scheduling and Resource Management: Scheduling Paradigms, working of Scheduling

Text Books:

1. Grid and Cluster Computing, Prabhu C.S.R, PHI Learning Private Limited
2. The Grid (Chapter 1,2,3,4,5) Core Technologies by Maozhen Li, Mark Baker (JohnWiley and Sons)
3. Cloud Computing for Dummies (Chapter 6,7) by Judith Hurwitz, R.Bloor, M.Kanfman, F. Halper (Wiley India Edition)
4. Cloud Security and Privacy (Chapter 8) by Tim Malhar, S.Kumaraswammy, S.Latif (SPD,O'REILLY)

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ELECTIVE: II

BEIT705T3 **DIGITAL SIGNAL PROCESSING**

(Theory Credit: 05)

Teaching Scheme: **Examination Scheme:**

Lecture: 4 Hours/week **Theory: T (U): 80 Marks T (I): 20 Marks**

Tutorial: 1 Hour/week **Duration of University Exam. : 03 Hours**

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UNIT I:

Basic elements of DSP and its requirement, advantage of digital over analog signalprocessing, Discrete time Signals and Systems, Classification of discrete time Systems, Response of LTI System to various inputs, Sampling Theorem, sampling process and reconstruction , Linear Convolution, Correlation(Auto and Cross).

UNIT II:

Z Transform: Definition, Properties of Z Transform, ROC's of Finite length and Infinite length Signals, Theorem of Z Transform (Initial value and Final value Theorem), system function of LTI system, Relation of Z Transform with Laplace and Fourier Transform.

Inverse Z Transform: Power Series expansion, Partial fraction Expansion method causality and stability.

UNIT III:

Frequency Domain description of signal and system, Definition of Fourier transform and properties of Fourier transform, inverse Fourier transform, Definition of discrete Fourier transform and properties of DFT, inverse IDFT, DFT's of typical time signals, Circular Convolution using DFT and IDFT.

UNIT IV:

Design of IIR filter from Analog filter using approximation of derivative, Impulse Invariance, Bilinear Transformation, IIR filter structure: Direct I, Direct II, parallel and cascade form

UNIT V:

Design of FIR Filter based on Windows: Rectangular, Hamming, Hanning, Bartlett and blackman Window. FIR filter structure: Direct and cascade form

UNIT VI:

Introduction to FFT algorithm: Decimation in Time FFT algorithm, Decimation in Frequency FFT algorithm, Inverse FFT algorithm, Discrete Cosine Transform.

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ELECTIVE: IV

BEIT804T1 **CYBER SECURITY**

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction: Cyber Crime; definitions, An origin of the Word, cyber crime and information security, who are criminals ? classification of cyber crimes; email spoofing, spamming, cyber defamation, internet time theft, salami attack or salami technique, data diddling, forgery, web jacking, news group spam or crimes emanating from usenet NewsGroup, Industrial spying or Industrial Espionage, hacking, online fraud, Pronography offenses, software piracy, Computer Sabotage, email bombing, mail bombs, usenet NewsGroup as a source of cyber crimes, computer network intrusion, password sniffing, credit crad fraud, identity theft.

UNIT II:

Introduction, categories of cyber crime, how criminals plan the attack: Reconnaissance, passive and active attacks, scamming/scrutinizing gathered information, attack (Gaining and maintaining the system access, Social engineering, classification of social engineering, cyber stalking, types of stalkers, cases reported on cyber stalking, how stalking works ? Real life incidents of cyber stalking, cyber cafe and cyber crimes, fuel for cyber crimes, Botnet, attack vector, cloud computing: why cloud computing ? types of services, cyber crime and cloud computing.

UNIT III:

Cyber crime: Mobile and wireless devices: Introduction proliferation of mobile and wireless devices trained in mobility, credit card fraud in mobile and wireless computing era types and technique of credit card fraud, security challenges posed by mobile devices, registry selling for mobile devices, authentication service security cryptographic security for mobile devices, LDAP security for handheld mobile computing devices, RAS security for mobile devices, Media player control security, networking API security for mobile computing applications, attacks on mobile phone mobile phone theft, mobile viruses, mishing, vishing, hacking Bluetooth mobile devices, security implications for organizations, managing diversity and proliferation of hand held devices, unconventional or stealth storage devices threats through cost and stolen devices. Protecting data on lost devices educating the laptop user, organizational

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ELECTIVE: IV

BEIT804T4 **WIRELESS SENSOR NETWORKS**

(Theory Credit: 05)

Teaching Scheme: **Examination Scheme:**

Lecture: 4 Hours/week **Theory: T (U): 80 Marks T (I): 20 Marks**

Tutorial: 1 Hour/week **Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction to wireless Sensor Network:

Network Characteristics, Network application, Network design challenges, Sensor network architectural elements, WSN standards, IEEE 802.15.4, Zig bee.

UNIT II:

Basic Wireless Sensor Technology:

Sensor node structures, Sensor network architecture, Classification of WSN, Protocol Stackfor WSN.

UNIT III:

Medium Access Control:

Fundamental MAC Protocol, MAC design for WSN, S MAC, DS MAC, MS MAC, Traffic adaptive medium access, Self organizing MAC.

UNIT IV:

Routing in WSN:

Data dissemination and gathering, Routing challenges and design issues in WSN, Routing strategies, Flooding and it's variants, Low energy adaptive clustering, Geographical routing.

UNIT V:

Transport Protocol:

Traditional transport protocol, Transport protocol design, Authenticity: Message authentication code, Signature, Authenticating public key, Broadcast and Multicast authentication.

UNIT VI:

Network Management and Operating System for WSN:

Traditional network management models, network management design issues, Example ofmanagement architecture: MANNA, Operating system design issues, Operating System: Tiny OS, Mate OS, Magnet OS.

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Project Report

On

IOT BASED ONLINE ATTENDANCE SYSTEM

Submitted By

Rural S. Barbate
Roshan S. Navdhinge
Abhishek R. Talmale
Preksha Wase
Saurabh A. Tiwari

Guided by

Prof. Priyanka B. Dongre

PRIYADARSHINI COLLEGE OF ENGINEERING

DEPARTMENT OF INFORMATION TECHNOLOGY

PRIYADARSHINI COLLEGE OF ENGINEERING, NAGPUR

SESSION 2019-20

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Certificate

This is to certify that the BE project

entitled

IOT BASED ONLINE ATTENDANCE SYSTEM

Submitted By

Rural S. Barbate **Roshan S. Navdhinge** **Abhishek R.Talmale**
Preksha Wase **Saurabh A. Tiwari**

In the partial fulfillment of the requirement for the degree of
'Bachelor of Engineering' *in* **Information Technology** *of*
Priyadarshini College of Engineering, Nagpur
is bonafide work carried under guidance and supervision.

ABSTRACT

The main purpose of this project is to build a face recognition-based attendance monitoring system for educational institution to enhance and upgrade attendance system into more efficient and effective . The current old ways has a lot of ambiguity that caused inaccurate and inefficient of attendance taking. Thus, by means of technology, this project will resolve the attendance system by automatically taking the attendance . The technology working behind will be the face recognition system. The human face is one of the natural traits that can uniquely identify an individual. Therefore, it is used to trace identity as the possibilities for a face to deviate or being duplicated is low.

Every organization whether it be an educational institution or business organization, it has to maintain a proper record of attendance of students or employees for effective functioning of organization. Designing an efficient attendance management system for students to maintain the records with ease and accuracy is an important key behind motivating this project. Nowadays attendance is taken on paper and records are maintained where someone keeps all the records and does all the calculations at the end of the month due to which it takes time and students have to wait till month end to know their attendance. This IOT based online attendance system would improve accuracy of attendance records because it will remove all the hassles of roll calling and will save valuable time of the students as well as teachers.

In this project, face databases will be created to pump data into the recognizer algorithm. Then, during the attendance taking session, faces will be compared against the database to seek for identity. When an individual is identified, its attendance will be taken down automatically saving necessary information into a database system. At the end of the day, the attendance information regarding an individual can be accessed from a web server hosted by the raspberry pi. In short, this system of attendance monitoring not only saved many resources, but also provide huge convenience to the authority as many process are automated.

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Sr. No	Name of the course that include experiential learning through Project work/ Internship	Subject Code
1	Artificial Intelligence	BEIT703T
2	Elective-III-Pattern Recognition	BEIT803T3
3	Elective-III-Machine Learning	BEIT803T4
4	Elective-III-Digital Image Processing	BEIT803T2

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BEIT703T **ARTIFICIAL INTELLIGENCE**

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

History and Application of AI, the Turing Test approach, AI Problems and AI Techniques, Defining problem as state space representation, Production system, Problem characteristics, monotonic and non monotonic production systems, Solving problems by searching Toy problems, Real World problems.

UNIT II:

Uniformed Search Strategies:

Breadth first search, Depth first search, Comparing uniformed search techniques.

Informed search strategies:

Generate and test, Hill climbing, best first search, problem reduction, constraint satisfaction, Mean ends analysis

UNIT III:

Knowledge Representation:

Issues in knowledge representation, Approaches to knowledge representation, introductionto ontology

Logic and Inferences:

Formal logic, history of logic and knowledge, propositional logic, resolution method in propositional logic

UNIT IV:

Structural Knowledge Representation:

Frames, scripts, predicate logic, semantic network, example of knowledge representation schemes, Truth maintenance system. Transition networks: RTN, ATN. Basic techniques of NLP, application of NLP

UNIT V:Expert system:

Knowledge acquisition methods, knowledge engineering process, goals in knowledge system development, basic architecture of expert system, problem domain versus knowledge domain, Development of ES and life cycle of ES. Advantages of expert system, structure of Rule based expert system, characteristics of conventional system and expert system.

UNIT VI:Statistical Reasoning:

Probability and Bayes theorem, Certainty factor, Dempster Shafer theory, Fuzzy logic:crisp sets, application of fuzzy logic.

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ELECTIVE: III

BEIT803T2 DIGITAL IMAGE PROCESSING

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

UNIT I:

DIGITAL IMAGE FUNDAMENTALS

Elements of digital image processing systems, Vidicon and Digital Camera working principles, Elements of visual perception, brightness, contrast, hue, saturation, mach bandeffect, Image sampling, Quantization, dither, Two dimensional mathematical preliminaries, 2D transforms DFT, DCT, KLT, SVD.

UNIT II:

IMAGE ENHANCEMENT

Histogram equalization and specification techniques, Noise distributions, Spatial averaging, Directional Smoothing, Median, Geometric mean, Harmonic mean, Contra harmonic mean filters, Homomorphic filtering, Color image fundamentals RGB, HSI models, Color image enhancement.

UNIT III:

IMAGE RESTORATION

Image Restoration degradation model, unconstrained restoration Lagrange multiplier and constrained restoration, Inverse filtering removal of blur caused by uniform linear motion, Wiener filtering, Geometric transformations spatial transformations.

UNIT IV:

IMAGE SEGMENTATION

Edge detection, Edge linking via Hough transform, Thresholding, Region based segmentation, Region growing, Region splitting and merging, Segmentation by morphological watersheds, basic concepts, Dam construction, and Watershed segmentation algorithm

UNIT V:

IMAGE COMPRESSION

Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmeticcoding, Vector Quantization, Transform coding, JPEG standard, MPEG

UNIT VI:

FEATURE EXTRACTION

Representation, Topological Attributes, Geometric Attributes Description, Boundary based Description, Region based Description, Relationship, Object Recognition, Deterministic Methods, Clustering, Statistical Classification, Syntactic Recognition, Tree Search, Graph Matching

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ELECTIVE: III

BEIT803T3 **PATTERN RECOGNITION**

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Pattern Classifier: Overview of Pattern recognition, Discriminant functions, supervised learning, parametric estimation, Maximum Likelihood Estimation,

UNIT II:

Bayes Classifier: Bayesian parameter Estimation, Problems with Bayes approach, Pattern classification by distance functions, Minimum distance pattern classifier.

UNIT III:

Clustering: Clustering for unsupervised learning and classification Clustering concept, C Means algorithm, Hierarchical clustering, Graph theoretic approach to pattern Clustering, Validity of Clusters.

UNIT IV:

Feature Extraction and Structural Pattern Recognition: KL Transforms, Feature selection through functional approximation, Binary selection, Elements of formal grammars, Syntactic description, stochastic grammars, Structural representation.

UNIT V:

Hidden Markov model and Support Vector Machine: State machine, Hidden Markov model, Training, Classification, Support vector machine, Feature Selection.

UNIT VI:

Recent Advances:

Fuzzy logic, Fuzzy Pattern Classifier, Pattern classification using genetic algorithms, Case study using Fuzzy pattern classifier and perception

Text Books:

1. M. Narasimha Murthy and V. Susheela Devi, "Pattern Recognition", Springer 2011
2. S. Theodoridis and K. Koutroumbas, "Pattern Recognition", 4th Ed., Academic Press, 2009.
3. Robert J. Schalkoff, "Pattern Recognition Statistical, Structural and Neural Approaches", John Wiley and Sons Inc., New York, 1992.
4. C. M. Bishop, "Pattern Recognition and Machine Learning", Springer, 2006.

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ELECTIVE: III

BEIT803T4 **MACHINE LEARNING**

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction:

Machine Learning, Machine Learning Foundations, Overview, applications, Types of machine learning, basic concepts in machine learning, Examples of Machine Learning , Applications, Linear Models for Regression, Linear Basis Function Models, The Bias, Variance Decomposition, Bayesian Linear Regression, Bayesian Model Comparison

UNIT II:

Supervised Learning:

Linear Models for Classification, Discriminate Functions, Single layer neural network, linearreparability, general gradient descent, perception learning algorithm, multi Layer perception: two layers universal approximations, back propagation learning, important parameters, Margin of a classifier, dual perception algorithm, learning non linear hypotheses with perception.

UNIT III:

Unsupervised Learning: Clustering, K means, EM, Mixtures of Gaussians, The EM Algorithm in General, Model selection for latent variable models, high dimensional spaces, The Curse of Dimensionality, Dimensionality Reduction, Factor analysis, Principal Component Analysis, Probabilistic PCA, Independent components analysis. Neural Networks, Feed forward Network Functions, Error Back, propagation, Regularization , Mixture Density and Bayesian Neural Networks, Kernel Methods, Dual Representations , Radial Basis Function Networks, Ensemble methods, Bagging, Boosting

UNIT IV:

Instance Based Learning:

Nearest neighbor classification, k nearest neighbor, nearest neighbor error probability Machine, Machine learning concepts and limitations: Learning theory, formal model of the learnable, sample complexity, learning in zero bayes and realizable case, VC dimension, fundamental algorithm independent concepts, hypothesis class, target class, inductive bias, Occam's razor, empirical risk, limitations of inference machines, approximation and estimation errors, Tradeoff.

UNIT V:

Support Vector Machine (SVM): Kernel functions, implicit non linear feature space, theory, zero Bayes, realizable infinite hypothesis class, finite covering, margin based bounds on risk, maximal

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Project Report

On

IOT BASED ONLINE ATTENDANCE SYSTEM

Submitted By

Rural S. Barbate
Roshan S. Navdhinge
Abhishek R. Talmale
Preksha Wase
Saurabh A. Tiwari

Guided by

Prof. Priyanka B. Dongre

PRIYADARSHINI COLLEGE OF ENGINEERING

DEPARTMENT OF INFORMATION TECHNOLOGY

PRIYADARSHINI COLLEGE OF ENGINEERING, NAGPUR

SESSION 2019-20

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Certificate

This is to certify that the BE project

entitled

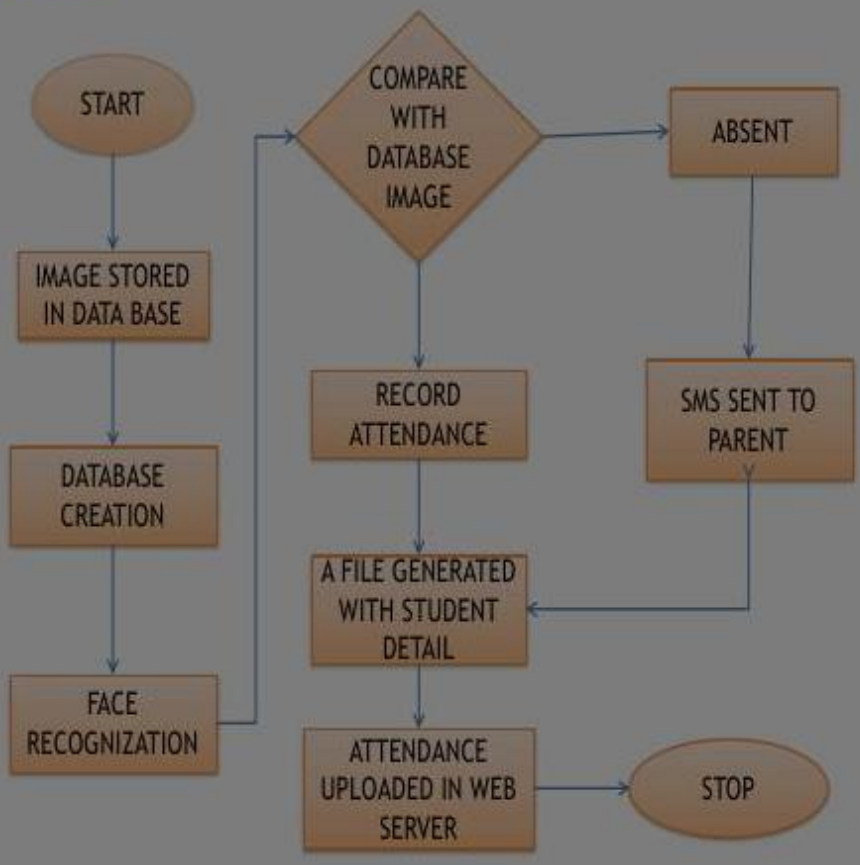
IOT BASED ONLINE ATTENDANCE SYSTEM

Submitted By

Rural S. Barbate **Roshan S. Navdhinge** **Abhishek R.Talmale**
Preksha Wase **Saurabh A. Tiwari**

In the partial fulfillment of the requirement for the degree of
'Bachelor of Engineering' *in* **Information Technology** *of*
Priyadarshini College of Engineering, Nagpur
is bonafide work carried under guidance and supervision.

successful applications of image analysis, has recently gained significant attention. It is due to availability of feasible technologies, including mobile solutions. Research in automatic face recognition has been conducted since the 1960s, but the problem is still largely unsolved. Last decade has provided significant progress in this area owing to advances in face modeling and analysis techniques. Although systems have been developed for face detection and tracking, reliable face recognition still offers a great challenge to computer vision and pattern recognition researchers. There are several reasons for recent increased interest in face recognition, including rising public concern for security, the need for identity verification in the digital world, face analysis and modeling techniques in multimedia data management and computer entertainment. In this chapter, we have discussed face recognition processing, including major components such as face detection, tracking, alignment and feature extraction, and it points out the technical challenges of building a face recognition system.



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Domain-5:- Operating System

Sr. No	Name of the course that include experiential learning through Project work/ Internship	Subject Code
1	Operating Systems	BEIT602T
2	Distributed Systems	BEIT801T/P
3	System Programming	BEIT501T
4	Elective-I-Compiler Design	BEIT704T4

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BEIT602T **OPERATING SYSTEMS**
(Theory Credit: 05)

Teaching Scheme:
Lecture: 4 Hours/week
Tutorial: 1 Hour/week

Examination Scheme:
Theory: T (U): 80 Marks T (I): 20 Marks
Duration of University Exam. : 03 Hours

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UNIT I:
Introduction: What is Operating System(OS), structure of OS, history of OS, Types of OS: Time sharing, real-time, multiprocess (Asynchronous & Synchronous), multiprogramming (loosely coupled, tightly coupled), Distributed, web-based, client-server, peer-to-peer, services of OS, user view & machine view of OS, System calls, Spooling and buffering. **Case Studies:** Android, Linux, Windows 8.

UNIT II:
File Management: File Concept, file attributes, file operations, file system structure, file system implementation, file access methods, Disk Scheduling Algorithms, File protection, free space management on disk.

UNIT III:
Process Management: Process concept, process scheduling, operations on process, interprocess communication, communication between client-server, multithreaded model, process scheduling criteria, scheduling algorithm.

UNIT IV:
Memory Management: Preliminaries, Bare machine, resident monitor, swapping, multiple partitions, paging, segmentations, combined systems. **Virtual Memory:** Overlays, demand-paging performance, of demand paging, page replacement, virtual memory concepts, page replacement algorithms. Allocation algorithm, thrashing.

UNIT V
Process Synchronization: Critical Section problem, semaphores, **classic problems:** Dining Philosopher problem, producer-consumer, reader-writers problem, bounded buffer problem, monitors, Atomic transaction, synchronization examples.

UNIT VI:
Deadlock and Protection: System model, deadlock characterization, methods for handling deadlocks, prevention, detection, recovery, avoidance, Banker's Algorithm. Goal of protection, mechanism & policies, domain protection, access matrix, implementation of access matrix, dynamic protection structures, revocation, existing systems & language based protection, protection problem security.

Text Books:

1. Modern Operating Systems – A. S. Tanenbaum, Pearson Education
2. Operating System- A. S. Godbole, Tata McGraw Hill, third edition
3. Operating System Concepts- Silberchatz and Galvin, Addison Wesley
4. Android application Development for Java Programmers by James c. Sheusi, CENGAGE Learning.

Reference Books:

1. Operating Systems concepts and Design – Milan Milenkovic, Tata McGraw Hill

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BEIT801T **DISTRIBUTED SYSTEMS**

(Theory Credit: 05)

Teaching Scheme:
Lecture: 4 Hours/week
Tutorial: 1 Hour/week

Examination Scheme:
Theory: T(U): 80 Marks T(I): 20 Marks
Duration of University Exam.: 03 Hours

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UNIT I:

Introduction: Distributed Computing Models, Software Concepts, Hardware Concepts, The Client Server model, Issues in design of a distributed operating system.

UNIT II:

COMMUNICATION: Introduction to Message Passing, Advantages and features of message passing, Message format, Message Buffering, Remote Procedure Call, Extended RPC Models, Remote Object Invocation, Message Oriented Communication.

UNIT III:

Processes And Synchronization: Threads, code migration, clock synchronization, logical clocks, global state, Election algorithms, mutual exclusion, Distributed transaction.

UNIT IV:

Distributed Deadlock Detection: System model, Resources vs. communication deadlocks, deadlock prevention, avoidance, detection and resolution, Centralized deadlock detection, distributed deadlock detection, path pushing and edge chasing algorithm

UNIT V:

Distributed Shared Memory: Introduction, General architecture of distributed shared memory, Design and implementation, Issues of DSM, Granularity, structure of shared memory space, consistency models, thrashing, advantages of DSM

UNIT VI:

Distributed File System: Introduction, Desirable features of good distributed file system, file models, file accessing, sharing, caching methods, file replication, fault tolerance, Case Study: CORBA(CORBA RMI and Services)

Text Books:

1. Andrew Tanenbaum, Maarten Van Steen, 'Distributed System Principals Paradigm', PHI Publication.
2. Singhal and Shivratri, 'Advanced Concept in Operating Systems', McGraw Hill.

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ELECTIVE: I

BEIT704T4 **COMPILER DESIGN**

(Theory Credit: 05)

Teaching Scheme: **Examination Scheme:**

Lecture: 4 Hours/week **Theory: T (U): 80 Marks T (I): 20 Marks**

Tutorial: 1 Hour/week **Duration of University Exam. : 03 Hours**

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UNIT I:

Introduction To Compilers:

Compilers and translators, structure of realistic compiler, types of compilers, cross compiler, Bootstrapping, Compiler writing tools, Design of Lexical Analyzer, FLEX tool, Parser generator tool: YACC

UNIT II:

Syntax Analysis:

Specification of syntax of programming languages using CFG, Top Down parser predictive parser, recursive descent parser, design of LL(1) parser, Bottom up parsing techniques, LR parsing algorithm, Design of SLR, LARL, CLR parsers, Examples on LL and LR parsers

UNIT III:

Syntax Directed Translation:

Study of syntax directed definition and syntax directed translation schemes, evaluation orders of SDD's , implementation of SDTS, intermediate: postfix syntax tree, TAC, Translation of expression ,Control structures, declaration procedure calls and array reference

UNIT IV:

Storage Allocation And Error Handling:

Runtime Memory Management – Storage Organization, Storage allocation strategies,symbol table management and organization.

Error Detection And Recovery:

Lexical , syntactic, semantic errors, error recovery for LL and LR parsers

UNIT V:

Code Optimization: Principle sources of optimization, importance code optimization techniques, loop optimization, control flow analysis, data flow analysis, loop invariant compilation, induction variable removal, elimination of common Subexpression.

UNIT VI:

Code Generation: Problem in code generation, simple code generator, code generation algorithm, register allocation and assignment, code generation from DAG, heuristic ordering of DAGs, Labeling algorithm, peephole optimization

immediately informs to the owner through the smart phone as shown in Fig 3. At the moment, if wrong password gets detected more than the specified times, the system catches the picture of the unknown visitant and sends it to the owner through smart device. In this manner, increases the strength of the security function. With help of latest advanced technology, demonstration of an intelligent door system using Internet of Things is given by S. Nazeem Basha et. al. [27]. The system provides notification of intrusion by sending out email notification to the owner. It logs all the intrusion data into Google spread sheet of owners Google drive account. ADXL345 accelerometer detects the change in motion of the door and raspberry pi reads the sensor intrusion data and to communicate to the Amazon Web Services Internet of Things (AWS IoT) console. Similar to the Ardiuno, Raspberry Pi module used mostly as It is an inexpensive computer that uses Linux-based operating system [28]. It is also having open source platform for using devices like GPIO, HDMI, 10/100 Ethernet and USB port etc. It is also having slots for SD cards in which Linux raspberry package can be stored [29]. It has large scope in research and development in the field of automatic door lock systems

9 OTP Based Systems

The proposed method in latest work does not need administrators help to access the facility if the user knows OTP technique and has a registered mobile phone [30]. Likewise the OTP is generated and sent to the proprietors mobile phone whenever user requests to access facility. Then the OTP should enter through keypad on the door [31], the door will open. In case if the mobile is not available or off then the option to open Sthe door is to answer the security question ask by system.

10 Motion Detector Based System

The Motion Detector System [32] working is based on the principle of amount of light falling on the photodiode. At the point when the laser light is falling constantly on the photodiode, its reading is 255 in decimals. But when it"s hindered by deterrent, the voltage falls less than 50 in decimals. This flames the alarm and gives

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Domain-6: Computer Architecture

Sr. No	Name of the course that include experiential learning through Project work/ Internship	Subject Code
1	Computer Architecture And Organization	BEIT404T
2	Elective-III-Embedded Systems	BEIT803T1
3	Digital Electronics And Fundamentals Of Microprocessor	BEIT304T/P
4	Data Communication	BEIT305T
5	Elective-I-Mobile Computing	BEIT704T1

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BEIT404T **COMPUTER ARCHITECTURE AND ORGANIZATION**

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I:

Basic Structure of Computers:

Functional Units, Basic Operational Concepts, Bus Structures, Software, Multiprocessors and Multicomputers.

Machine Instructions:

Memory Locations and Addresses, Memory Operations, Machine program sequencing, addressing modes and encoding of information, Assembly Language ,Stacks, Queues and Subroutine.

UNIT II:

Instruction Sets:

Instruction Format, limitations of Short word- length machines, High level language Considerations, Motorola 68000 architecture.

Processing Unit:

Some fundamental concepts, Execution of a complete instruction, Single, two, three bus organization, Sequencing of control Signals.

UNIT III:

Micro-programmed Control:

Microinstructions, grouping of control signals, Micro program sequencing, Micro Instructions with next Address field, Perfecting microinstruction, Emulation, Bit Slices, Introduction to Microprogramming, Macro Processor.

UNIT IV:

Arithmetic: Number Representation, Addition of Positive numbers, Logic Design for fast adders, Addition and Subtraction, Arithmetic and Branching conditions, Multiplications of positive numbers, Signed Operand multiplication, fast Multiplication, Booth's Algorithm, Integer Division, Floating point numbers and operations.

UNIT V:

The Memory System:

Some Basic Concepts, Semiconductor RAM Memories, Memory system considerations, Semiconductor ROM Memories, Memory interleaving, Cache Memory, Mapping techniques, Virtual memory, Memory Management requirements.

UNIT VI:

Computer Peripherals:

I/O Devices, DMA, Interrupt handling, online storage, File services.

Processors:

Families of microprocessors Chips, Introduction to RISC & CISC Processors, Introduction to Pipelining.

Text Books:

1. Computer Organization 4th Edition, 2001 V. Carl Hamacher Mc GrawHill.
2. Computer Organization and Design (The Hardware/Software Interfaces) 4th Edition

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BEIT304T DIGITAL ELECTRONICS AND FUNDAMENTALS OF MICROPROCESSOR
(Theory Credit: 05)

Teaching Scheme:	Examination Scheme:
Lecture: 4 Hours/week	Theory: T (U): 80 Marks T (I): 20 Marks
Tutorial: 1 Hour /week	Duration of University Exam. : 03 Hours

UNIT I:
Analog Vs. Digital Systems, Boolean Algebra, D' Morgan's Laws. **Types of Number System:** Decimal, Binary, Octal, Hex, **Type of Codes:** Reflected (Gray), Self Complementary (Excess-3), BCD and ASCII codes, Conversion of Codes, Gates and their truth tables.

UNIT II:
Forms of Expression: Sum of products and Product of Sums, Standard Sum of products and Product of Sums, Minterms and Maxterms, Canonical Sum of products and Product of Sums. **Karnaugh map:** simplification of functions using K-map (up to 5 variables) and their implementation using logic gates.

UNIT III:
Combinational Circuits: Decoders, Encoders. Priority Encoder, Multiplexers, Demultiplexers, Code converters. Implementation of Functions using Decoder. **Arithmetic Circuits:** Adder (Half and Full), Subtractor (Half and Full). BCD adder / Subtractor, Concept of ALU.

UNIT IV:
Types Flip Flops: SR, JK, Master Slave JK, D and T. Race around Condition (Racing) and Toggling. Characteristics Table and Excitation Table, Conversion of Flip-Flop. **Sequential Circuits:** Counters, Modulus of Counter, Types- Synchronous Counter and Asynchronous (Ripple) counter.

UNIT V:
8085 microprocessor architecture, addressing modes, instruction sets.

UNIT VI:
Interrupts, Basic memory organization, Timing diagram, Programming in 8085.

Text Books:

1. Modern digital Electronics- R. P. Jain, McGraw Hill.
2. Digital Integrated Electronics- Herbert Taub, McGraw Hill.
3. Digital Logic and Computer Design- Morris Mano (PHI).
4. Digital Integrated Electronics- Herbert Taub, McGraw Hill.
5. Digital Electronics Logic and System – James Bingnell and Robert Donovan, Cengage Learning
6. Digital Circuits & Systems by K.R.Venugopal & K. Shaila
7. 8 bit Microprocessor by Ramesh Gaonkar.
8. 8 bit microprocessor & controller by V. J. Vibhute, Techmak Publication.
9. 8085 Microprocessor & its Applications by A. Nagoor Kani, McGraw Hill.

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ELECTIVE: III

BEIT803T1 **EMBEDDED SYSYTEMS**

(Theory Credit: 05)

Teaching Scheme:	**Examination Scheme:**
Lecture: 4 Hours/week	**Theory: T (U): 80 Marks T (I): 20 Marks**
Tutorial: 1 Hour/week	**Duration of University Exam. : 03 Hours**

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UNIT I: Introduction to Embedded System:

Introduction, Embedded system vs General computing system, History of embedded system, Processor embedded into a system, Embedded hardware units and devices in a system, Embedded software in a system, examples in a embedded system, Embedded SoC, Complex system design and processors, Design process in ES, Formalization of system design, Classification of Es, Skills required in Embedded system design, Characteristics and quality attributes of Embedded system.

UNIT II: Embedded System Design:

Hardware and Software design, Co design, Embedded Software development Tools: In Circuit Emulators, Cross compilers, cross assemblers and tool chain, linker locator, Address resolution, PROM programmer, Rom Emulator. Memories: EPROM, PROM, Flash.

UNIT III: RTOS for Embedded System:

Architecture of the kernel, Tasks and Task Scheduler, Threads , ISR, Multiprocessing and Multitasking, Semaphore and Shared Data, Mutex, Mailboxes, Message Queue, Events, Pipes, Timers, Signals, Memory Management, RTOS Task Scheduling Models, Interrupt Latency, Response of the task, OS Security issues, Introduction to Android.

UNIT IV: Devices and Communication:

Serial Communication devices, Parallel device port, Buses: I^2C, UART, USART, CAN Bus, Devices: Wireless Devices, Timer and Counting Devices, Watch Dog Timer, Real Time Clock, Network Embedded System.

UNIT V: Programming for Embedded System:

Software programming in assembly language (ALP) and High Level language 'C', C program element: Header and Source Files, Preprocessor Directives, Macros and Functions, Data Types, Data Structures, Modifiers, Statements, Loops and Pointers, Object Oriented Programming, Embedded Programming in C++, Embedded Programming in Java

UNIT VI: Microcontroller 8051:

Introduction, Architecture, Memory Management, Addressing Modes and Instruction Sets, I/O Ports, Timers/Counters, Routing Interface with OS, Wireless Communication Protocol, Routing Methodologies