JHARKHAND Rai University
RANCHI

LAB MANUAL

DIPLOMA

(COMPUTER SCIENCE & ENGINEERING)

(2024-2027) onwards

JHARKHAND Rai University RANCHI

Vision

To develop the Department of Computer Science & Information Technology as a Center for Excellence to produce leading Professionals who can serve the society with innovative skills, Computer Experts, Researchers to meet the needs of the software industry in national /global scenario responding to the challenges of ever changing world.

Mission

We endeavor to provide the best possible learning environment to enhance innovations, research capabilities, problem solving skills, leadership qualities, team spirit and ethical responsibilities.

To nurture the talent of the students to be successful, ethical and effective problem solvers who will contribute positively to the economic growth of the nation and prepare to respond to the challenges.

JHARKHAND Rai University
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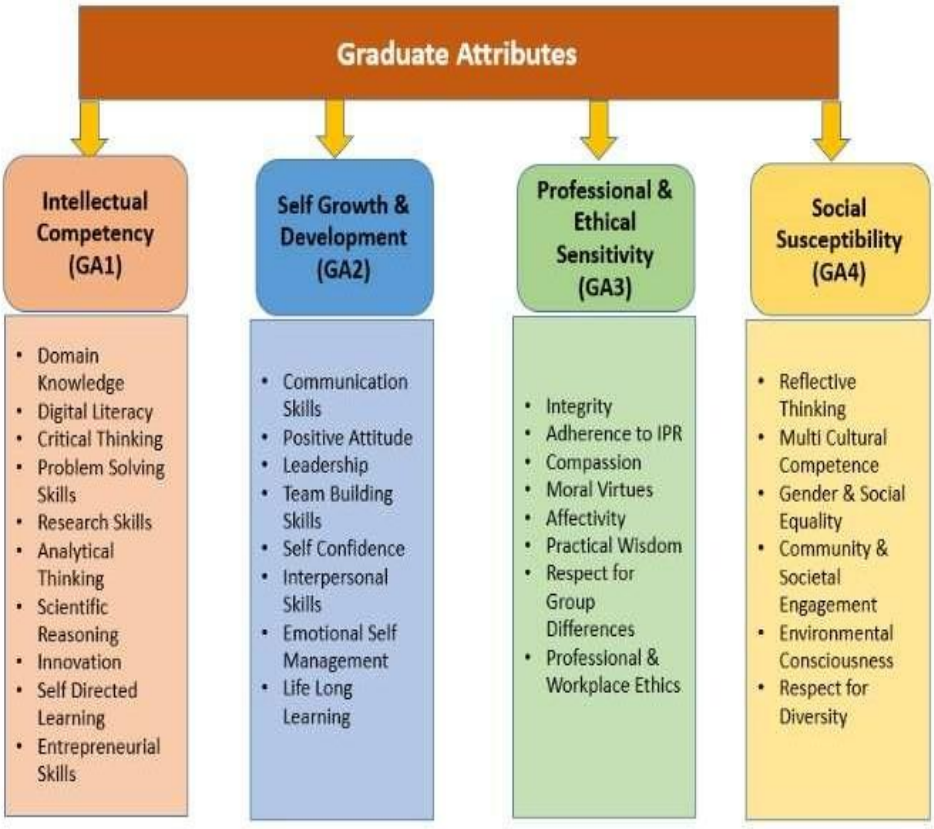
Graduate Attributes

Jharkhand Rai University is a mecca of transformative education which strongly believes in the holistic development of students. The university provides the cutting-edge of holistic learning to develop promising youngsters into leaders of tomorrow with globally relevant, future-ready and actionable intelligence. The objective of the Department is to make each student proficient in synthesizing/analysing information and be ethical, socially responsible, and just when making decisions. JRU ensures inclusive and equitable quality education and promote lifelong learning opportunities for all.

Every graduate of the Department will be developed to possess the following attributes:

1. Intellectual Competency
2. Self-Growth & Development
3. Professional & Ethical Sensitivity
4. Social Susceptibility



Program: Diploma CSE
Semester: I
Course: Basic Chemistry Lab
Course Code: 3DBSC102P

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List of Experiments:

1. Study of Indicator (Methyl Orange)
2. Study of Indicator (Phenolpthalein)
3. To Determine The Strength of NaOH Solution(Standard Oxalic Acid Solution Supplied)
4. Preparation of Copper Sulphate Crystal from Its Impure Sample.
5. Salt Analysis. (Wet Test & Dry Test).

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Program: Diploma CSE
Semester: I
Course: Basic Physics I Lab
Course Code: 3DBSC103P

List of Experiments:

1. To measure the thickness of the given glass plate using Screw Gauge.
2. To measure the length and diameter of the given solid cylinder using Vernier calipers.
3. To measure the thickness of the given glass plate using Spherometer.
4. Find the resistance of a given wire using Meter Bridge.
5. To establish the current voltage relationship for a metallic conductor and find its resistance.

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Program: Diploma CSE
Semester: I
Course: Computer Fundamentals Lab
Course Code: 3DPCC101P

List of Experiments:

Exp- 1:
Identification of different part of computer system and peripherals

Exp – 2: Operations on operating system

1. Create a new folder and do the following:
    a. Make a new folder in it.
    b. Rename the initial folder.
    c. Opening a new file.
    d. Creating document in note pad.
    e. Move the initial folder.
    f. Copy the initial folder.
    g. Delete the initial folder
2. Implement the various well known features of Windows operating system such as Notepad, WordPad,
   Calculator, System tools etc. enclosed in Start→Programs→Accessories.
3. Implement various display properties by right clicking on the Windows Desktop.
4. Explore the taskbar of Windows.
5. Set the wall paper and screen saver.
6. Set the date /time.

Exp.3 Basic operations on MS Word

1. Create a document and
    a. Put Bullets and Numbers
    b. Apply various Font parameters.
    c. Apply Left, Right, and Centre alignments
    d. Apply Hyperlinks
    e. Insert pictures
    f. Insert ClipArt
    g. Show the use of Word Art
    h. Add Borders and shading
    i. Show the use of Find and Replace.
    j. Apply header/footers

Exp- 4 Advance operations on MS Word

2. Create any document and show the use of File→Versions.
3. Create any document and show the difference between paste and paste special.
4. Create any document and show the use of Washout/Watermark.
5. Implement the concept of mail merge.
6. Implement the concept of macros.
7. Implement the concept of importing a file/document.
8. Implement the concept of merging the documents.
9. Create a student table and do the following :
    a. Insert new row and fill data
    b. Delete any existing row.
    c. Resize rows and columns.
    d. Apply merging/ splitting of cells
    e. Apply sort.
    f. Apply various arithmetic and logical formulas.
    g. Apply various arithmetic and logical formulas.
10. Create your resume using General Templates.

Exp- 5 Basic operation on electronic spreadsheet/excel

Computer the division of each and every student of a class.

2. Generation of Electricity Bill
3. Generation of Telephone Bill
4. Generation of Salary statement of an employee 5. Generation of Mark Sheet of a student.
6. To compute mean / median / mode.
7. Generation graph to show the production of goods in a company during the last five years.
8. Compare the cost, overheads and sales figure of a company for last three years through appropriate chart.

Exp – 6 Advance operations on electronic spreadsheet

1. Generation the following worksheet

Roll No.	Marks
2050	67
2051	49
2052	40
2053	74
2054	61
2055	57
2056	45

and do the following:

a. Create chart of the marks.
b. Compute sum of marks using auto sum, auto calculate and sum function.
c. Compute average of marks.
d. Show pass or fail if marks are above 50 or less than 50
e. Put header and footer in the spread sheet.

Importing and exporting data from other files.

Exp – 7 Power Point Presentation preparation

1. Make a presentation of College Education System using

    a. Blank Presentation
    b. From Design Template
    c. From Auto Content Wizard

Exp – 8 Animation and various effect in Power Point Presentation, exporting and importing contents from word/excel

1. Make a presentation on “Wild Life " and apply the following:
    a. Add audio and video effects
    b. Apply various Color Schemes
    c. Apply various animation schemes.
    d. Apply slide show

Exp – 9 Simple program in HTML

1. Create any webpage using following HTML tags:
    a. Background Colour
    b. Font (Colour, Size, Face)
    c. Bold / Italic / Underline
    d. Big / Small
    e. H 1, H 2, etc.
    f. Marquee
    g. Ordered / Unordered List
    h. Data list
2. Create Employee Table and apply various operations on it using HTML. Also put Border around the table.
3. Create Internal and External Hyperlinks in a Webpage.
4. Implement the concept of Frames in a Webpage.
5. Insert an image in a Webpage.
6. Design Home page of your Institute
7. Design Web page for tourism spots in your area
8. Prepare your CV and link on the web page
9. Use animation of image in a web page
10. Insert a table and perform table handling in web page

Exp – 10 Basics of Internet, surfing, email account opening and transactions through email account

Connect the Internet; open any website of your choice and save the Web Pages.

2. Search any topic related to your syllabus using any search engine and download the relevant material.
3. Create your E-Mail ID on any free E-Mail Server.
4. Login your E-Mail ID and do the following:
    a. Read your mail
    b. Compose a new Mail
    c. Send the Mail to one person
    d. Send the same Mail to various persons
    e. Forward the Mail
    f. Delete the Mail
    g. Send file as attachment
5. Surf Internet using Google to find information about yours state college.
6. Surf Internet using Google to find Tourism information about your state.
7. Surf Internet using Yahoo to find Hotel around your state

Program: Diploma CSE
Semester: I
Course: Basic Engineering Graphics Lab
Course Code: 3DESC101P

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Course Objective:

- Student's ability to perform basic sketching techniques will improve.
- Students will be able to draw orthographic projections and sections.
- Student`s ability to use architectural and engineering scales will increase.
- Students will become familiar with auto cad two dimensional drawings.

Unit I

Drawing Instruments and their uses: Letters and numbers (single stroke vertical), Convention of lines and their applications, Scale (reduced, enlarged & full size) plain scale and diagonal scale, Sheet layout, Introduction to AutoCAD (Basic draw and modify Command),Geometrical constructions.

Unit II

Engineering curves & Loci of Points: To draw an ellipse by: Directrix and focus method, Arcs of circle method, concentric circles method. To draw a parabola by: Directrix and focus method, Rectangle method. To draw a hyperbola by: Directrix and focus method. Passing through given points with reference to asymptotes .Transverse Axis and focus method. To draw involutes of circle & polygon (up to hexagon),To draw a cycloid, epi cycloid, hypocycloid ,To draw Helix & spiral ,Loci of Points :Loci of points with given conditions and examples related to simple mechanisms.

Unit III

Orthographic projections: Introduction to Orthographic projections .Conversion of pictorial view into Orthographic Views (First Angle Projection Method Only).Dimensioning technique as per SP-46. Isometric projection. Isometric scale, Conversion of orthographic views into isometric View/projection (Simple objects), Projection of Straight Lines and Planes. (First Angle Projection Method only)

Unit IV

Lines inclined to one reference plane only and limited to both end sin one quadrant. Projection of simple planes of circular, square, rectangular, rhombus, Pentagonal, and hexagonal, inclined tone reference plane and perpendicular to the other.

Suggested Reading:

1. *Engineering Drawing N. D. Bhatt Charotar Publishing House*
2. *Engineering Drawing and Graphics+ AutoCAD K. Venugopal New Age Publication*
3. *Engineering Drawing R. K. Dhawan S. Chand Co.*
4. *Engineering Drawing ---K. R. Mohan Engineering Graphics Dhanpat Rai and Publication Co.*
5. *Engineering Drawing -P S Gill.*

Program: Diploma CSE
Semester: I
Course: Computer Assembly and Repair I Lab
Course Code: 3DPCC102P

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Learning Objective

Students get the knowledge to support and maintain computer systems, desktops, and peripherals. This includes installing, diagnosing, repairing, maintaining, and upgrading all hardware and equipment while ensuring optimal workstation performance.

List of Experiments:

1. **Basic Blocks of a Digital Computer**
   Introduction to computers, classification, generations, applications, Power Supply Unit (PSU) : ATX Power Supply, SFX Power Supply, Buses: Data Bus, Address Bus, Control Bus, Expansion Cards-Graphics Card, Sound Card, Network Interface Card (NIC),Storage Controller Card, Interfaces and Ports : USB Ports, HDMI Port, Ethernet Port, Audio Jacks.
2. **Hardware Identification**
   Introduction to Computer Hardware, Central Processing Unit (CPU), Memory (RAM), RAM - (DIMM, SO-DIMM), DDR types (DDR3, DDR4, DDR5),Capacity, speed, latency, Storage Devices-Hard Disk Drives (HDD),Solid State Drives (SSD), NVMe SSDs, Motherboard- (ATX, Micro ATX, Mini-ITX) ,CPU socket, RAM slots, expansion slots, power connectors, supported RAM types, Power Supply Unit (PSU)-factors (ATX, SFX) ,connectors (24-pin, 8-pin CPU, PCIe, SATA),Wattage, efficiency rating (80 Plus Bronze, Silver, Gold).
3. **Hardware Removal, Testing, Replacement, and Installation**
   Introduction to Hardware Maintenance, Importance of Hardware Maintenance: Safety Precautions, Anti-static measures (ESD protection),Proper tool usage ,Safety protocols for working with electrical components, Tools and Equipment-Screwdrivers (Phillips, flathead),Anti-static wrist straps and mats ,Compressed air canisters, Thermal paste ,Diagnostic Tools: Multimeter, POST (Power-On Self-Test) card Software diagnostic tools (e.g., MemTest86, Crystal Disk Info), Preparing for Hardware Removal: Shutting Down and Unplugging, Opening the Case.
4. **Operating System & Application Software Installation**
   Installing macOS-Creating Installation Media, Installing Linux Operating System-Choosing a Distribution, Dual Boot and Virtualization-Dual Boot Setup, Virtual Machines, Application Software Installation-Types of Application Software, Installation Methods: Configuring and Managing Application Software-Initial Configuration, Updating and

Patching, Uninstalling Software, Troubleshooting Installation Issues-Common Problems and Solutions.

5. **PC Cleaning & Hardware Troubleshooting**
   Cleaning Specific Components, Reassembling and Cable Management-Reassembling Components, Cable Management, Introduction to Hardware Troubleshooting-Understanding Common Issues, Basic Troubleshooting Steps, Troubleshooting Specific Components-Power Supply Issues, CPU and Motherboard Issues, RAM Issues, Storage Issues, GPU Issues, Cooling and Overheating Issues, Advanced Troubleshooting Techniques-Using Diagnostic Software, Using Diagnostic Hardware.
6. **System Utilities and Virus Removal**
   Introduction to System Utilities-Definition and Purpose, Types of System Utilities, Disk Management Utilities-Disk Cleanup, Disk Defragmentation, Disk Partitioning, Performance Optimization Utilities- System Monitoring Tools, Startup Management, System Optimization Tools, Backup and Recovery Utilities-Importance of Regular Backups, Backup Tools, System Recovery Tools.
7. **User Account Customization**
   Introduction to User Accounts-Purpose and Importance, Types of User Accounts, Creating and Managing User Accounts-Creating New User Accounts, Managing Existing Accounts, Using Command-Line Tools, Customizing User Profiles-Personal Information and Settings, Customizing the Desktop Environment, Customizing Taskbar and Dock, Configuring User Preferences-Accessibility Settings, Input Methods, Power and Sleep Settings.
8. **Windows Update, Software Installation & Device Drivers**
   Uninstalling Software- Uninstallation Methods, Cleaning Up Residual Files, Introduction to Device Drivers-Role of Device Drivers, Installing Device Drivers-Automatic Driver Installation, Manual Driver Installation, Updating Device Drivers-Checking Driver Versions, Updating Drivers, Troubleshooting Driver Issues.

References:

1. Dan Gookin, Troubleshooting & Maintaining Your PC ALL-IN-ONE, 3rd Edition,2017, John Wiley & Sons.
2. Mike Meyers, Scott Jernigan, Dan Lachance," CompTIA Fundamentals + Exam Guide (All-in-One), 2nd Edition, 2019, Mc Graw Hill Education.
3. Inside PC Norton
4. Computer Installation and servicing BPB Publication
5. OS Programming Peter Norton
6. Servicing PC and Computers BPB Publication

Web References:

1. https://www.youtube.com/watch?v=ItxwyMR0SnY&list=PLeH4ngtDM7eE-1_mdWuXWyZrI_FMHnyJ0&index=5
2. https://www.cleverfiles.com/howto/crashed-hard-drive-recovery.ht

Program: Diploma CSE
Semester: II
Course: Basic Physics II Lab
Course Code: 3DBSC104P

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List of Experiments:

1 Find the acceleration due to gravity using Simple pendulum.
2 To determine the unknown resistance of given wire using Potentiometer.
3 Find the acceleration due to gravity using Kater's pendulum.
4 Compare the e.m.f of two primary cells using Potentiometer.
5 Determine the elastic constants of the material of a wire using Searle's Method**.**

Program: Diploma CSE
Semester: II
Course: Programming in C Lab
Course Code: 3DPCC103P

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Tutorial and Lab:

Tutorial 1: Problem solving using computers: Lab1: Familiarization with programming environment

Tutorial 2: Variable types and type conversions: Lab 2: Simple computational problems using arithmetic expressions

Tutorial 3: Branching and logical expressions: Lab 3: Problems involving if-then-else structures

Tutorial 4: Loops, while and for loops: Lab 4: Iterative problems e.g., sum of series

Tutorial 5: 1D Arrays: searching, sorting: Lab 5: 1D Array manipulation

Tutorial 6: 2D arrays and Strings, memory structure: Lab 6: Matrix problems, String operations

Tutorial 7: Functions, call by value: Lab 7: Simple functions

Tutorial 8: Recursion, structure of recursive calls: Lab 8: Recursive functions

Tutorial 9: Pointers, structures and dynamic memory allocation Lab 9: Pointers and structures

Program: Diploma CSE
Semester: II
Course: Basic Electrical & Electronics Engineering Lab
Course Code: 3DESC102P

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List of Experiments:

1. A basic introduction to laboratory instrument with its specification.
2. To determine the Resistance value using Color-code.
3. To determine the equivalent Resistance in Series & Parallel.
4. To determine Characteristics of PN Junction diode.
5. To determine Characteristics of Zener diode.
6. To Study the characteristics of BJT in CB configuration.
7. To Study the characteristics of BJT in CE configuration.
8. To study the process of soldering.

Program: Diploma CSE
Semester: II
Course: Computer Assembly and Repair II Lab
Course Code: 3DPCC104P

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Learning Objective

Students get the knowledge to support and maintain computer systems, desktops, and peripherals. This includes installing, diagnosing, repairing, maintaining, and upgrading all hardware and equipment while ensuring optimal workstation performance.

List of Experiments:

1. **Basic Blocks of a Digital Computer**
   Central Processing Unit (CPU), Memory-Primary Memory & Secondary Memory, Input Devices/Output Devices, Storage Devices, Motherboard: CPU Socket, Memory Slots, Expansion Slots (PCIe, PCI), Power Connectors, Chipset.
2. **Hardware Identification**
   Graphics Card (GPU)-GPU brands (NVIDIA, AMD) ,connectors (PCIe, HDMI, Display Port),VRAM capacity, core count, clock speed, Input and Output Devices: Input Devices-(keyboard, mouse, scanner),Output Devices-(monitor, printer, speakers),connectors (USB, PS/2, HDMI, VGA), Expansion Cards-Graphics cards, sound cards, network cards, storage controllers, slots (PCIe, PCI), Interfaces and Ports-USB (Type-A, Type-C),HDMI, Display Port, VGA, DVI, Ethernet (RJ45),Data transfer rates, versions (USB 2.0, USB 3.0, USB 3.1, HDMI 2.0),Hardware Identification-Software tools (CPU-Z, GPU-Z, HW Monitor), Screwdrivers, anti-static wrist straps, magnifying glass.
3. **Hardware Removal, Testing, Replacement, and Installation**
   Removing Hardware Components ,Removing the CPU, Removing RAM, Removing Storage Devices, Removing the GPU, Removing the PSU, Disconnecting all power connectors ,Removing the Motherboard, Testing Hardware Components-Visual Inspection, Using Diagnostic Software, Using Diagnostic Hardware: Replacing Faulty Components-Identifying Replacement Parts, Acquiring Replacement Parts, Installing New Components: CPU,RAM, Storage Devices, Installing the GPU, PSU, Motherboard ,Verifying Installation and Functionality- Initial Power-On, BIOS/UEFI Configuration, Operating System Checks.
4. **Operating System & Application Software Installation**
   Operating System & Application Software Installation, Introduction to Operating Systems -Definition and Purpose, Types of Operating Systems, Pre-Installation Preparation-

System Requirements, Backup and Data Safety ,Partitioning and Formatting, Installing Windows Operating System-Creating Installation Media, Post-Installation Setup.

5. **PC Cleaning & Hardware Troubleshooting**

   Introduction to PC Maintenance -Importance of Regular Maintenance, Safety Precautions, Tools and Supplies for Cleaning-Screwdrivers (Phillips, flathead),Compressed air canisters, Soft brushes and microfiber cloths, Isopropyl alcohol and cotton swabs, Cable ties and management tools, Cleaning the Exterior- ,Cleaning the Interior-Shutting Down and Unplugging, Opening the Case, Removing Dust and Debris.

6. **System Utilities and Virus Removal**

   Security Utilities-Antivirus and Antimalware Software, Firewall Protection, Encryption Tools, Introduction to Computer Viruses and Malware-Types of Malicious Software, How Malware Spreads, Symptoms of Infection, Virus and Malware Detection-Running Antivirus Scans, Using Antimalware Tools, Virus and Malware Removal- Removing Detected Threats, Manual Removal Techniques, Using Bootable Rescue Disks, Preventing Future Infections-Safe Browsing Practices, Email Safety, Regular Software Updates.

7. **User Account Customization**

   Customizing User Account Control (UAC)-Understanding UAC, Configuring UAC Settings, Personalizing Application Settings-Browser Customization, Email Client Customization,, Managing User Files and Folders-Organizing User Data, Using Cloud Storage, Security and Privacy Settings-Password Management, Two-Factor Authentication (2FA):,Privacy Settings, Backup and Recovery of User Accounts-Setting Up Backup Options, Restoring User Accounts.

8. **Windows Update, Software Installation & Device Drivers**

   Importance of Windows Updates-Purpose of Updates, Configuring Windows Update Settings-Automatic Updates, Manual Updates, Managing Windows Update-Viewing Update History, Troubleshooting Update Issues, Software Installation on Windows-Installing Applications, Using Package Managers.

References:

1. Dan Gookin, Troubleshooting & Maintaining Your PC ALL-IN-ONE, 3rd Edition,2017, John Wiley & Sons.
2. Mike Meyers, Scott Jernigan, Dan Lachance," CompTIA Fundamentals + Exam Guide (All-in-One), 2nd Edition, 2019, Mc Graw Hill Education.
3. Inside PC Norton
4. Computer Installation and servicing BPB Publication
5. OS Programming Peter Norton
6. Servicing PC and Computers BPB Publication

Web References:

1. https://www.youtube.com/watch?v=ItxwyMR0SnY&list=PLeH4ngtDM7eE-1_mdWuXWyZrI_FMHnyJ0&index=5
2. https://www.cleverfiles.com/howto/crashed-hard-drive-recovery.html