NAME: GRoUP THREE

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PROGRAM: BSC INFORMATION TECHNOLOGY



UNIVERSITY OF ENERGY AND NATURAL RESOURCES

SCHOOL OF SCIENCES

CREATING AN ERP MINI PROJECT

In today’s highly competitive business environment, efficiency and streamlined operations are key to the success of any manufacturing company. Enterprise Resource Planning (ERP) systems have become integral in enabling companies to integrate various business processes, thereby enhancing productivity and supporting informed decision-making. This project aims to design and implement a robust and scalable ERP system tailored specifically for a mini manufacturing company. The system will address the unique needs of the company by integrating critical business functions such as Inventory Management, Production Planning, Sales and Order Processing, Purchasing, Finance, Human Resources, and Reporting.

1. System Design Document

1.1 Architecture Overview

Objective: The ERP system is designed to integrate various business processes of a mini manufacturing company into a single platform, enhancing operational efficiency, streamlining workflows, and supporting informed decision-making.

System Architecture: The ERP system will follow a modular, service-oriented architecture (SOA) that allows each module to function independently yet seamlessly interact with other modules. This architecture supports scalability and flexibility.

-Data Flow: The system's core modules—Inventory Management, Production Planning, Sales, Purchasing, Finance, HR, and Reporting—will communicate through a centralized database. This database ensures data consistency and real-time updates across the organization.

- Technology Stack:

- Frontend: Angular or React for a dynamic and responsive user interface.

- Backend: Python (Django/Flask) or Java (Spring Boot) for server-side processing.

- Database: PostgreSQL or MySQL for relational data storage.

- API: RESTful APIs to enable communication between the frontend, backend, and third-party applications.

- Deployment Model: The system will be cloud-based, hosted on a platform such as AWS or Azure, to provide scalability, reliability, and security.

1.2 Module Descriptions

1. Inventory Management

-Functionality: Tracks inventory levels, manages reorders, tracks stock across multiple locations, and provides real-time visibility into inventory status.

- Key Features:

- Stock Monitoring: Real-time updates on stock levels with automatic low-stock alerts.

- Reorder Management: Automatic generation of purchase orders when stock falls below predefined levels.

- Inventory Valuation: Calculates inventory value using methods like FIFO, LIFO, or weighted average.

- Integration Points: Links with Sales and Order Processing to update stock after sales; integrates with Purchasing to automate reorders.

2. Production Planning and Control

- Functionality: Manages production schedules, monitors work orders, and optimizes resource utilization.

- Key Features:

- Work Order Management: Tracks the status of work orders from initiation to completion.

- Production Scheduling: Allows managers to allocate resources effectively and schedule production runs.

- Capacity Planning: Ensures production capacity aligns with demand forecasts.

- \*\*Integration Points\*\*: Connects with Inventory Management to ensure raw materials are available; links with Sales for demand forecasting.

3. Sales and Order Processing

- Functionality: Manages customer orders, tracks sales performance, and handles order fulfillment and invoicing.

- Key Features:

- Order Tracking: Tracks the status of customer orders in real-time.

- Sales Analytics: Provides insights into sales trends, customer preferences, and profitability.

- Invoicing and Payment: Automates invoicing and tracks payments received.

- Integration Points: Syncs with Inventory to manage stock after sales; integrates with Finance for revenue tracking.

4. Purchasing and Supplier Management

- Functionality: Manages supplier relationships, purchase orders, and procurement processes.

- Key Features:

- Supplier Database: Maintains a database of suppliers, including contact details, product lists, and contract terms.

- Purchase Order Management: Automates the creation, tracking, and approval of purchase orders.

- Procurement Analytics: Provides insights into supplier performance, procurement costs, and purchasing trends.

- Integration Points: Links with Inventory to manage stock levels; connects with Finance for budget tracking.

5. Finance and Accounting

- Functionality: Tracks financial transactions, manages budgets, and generates financial statements.

- Key Features:

- General Ledger: Records all financial transactions, providing a complete audit trail.

- Budgeting and Forecasting: Helps in planning and managing financial resources.

- Financial Reporting: Generates income statements, balance sheets, and cash flow statements.

- Integration Points: Integrates with all other modules to ensure financial data is accurate and up-to-date.

6. Human Resources Management

- Functionality: Manages employee data, payroll, benefits, and compliance with labor regulations.

- Key Features:

- Employee Database: Stores employee information, including personal details, job roles, and performance records.

- Payroll Management: Automates payroll processing, including tax calculations and deductions.

- Attendance and Leave Tracking: Monitors employee attendance and manages leave requests.

- Integration Points: Connects with Finance for payroll disbursement; integrates with Reporting for HR analytics.

7. Reporting and Analytics

- Functionality: Provides dashboards and reports that enable data-driven decision-making.

- Key Features:

- Customizable Dashboards: Users can create personalized dashboards to monitor key metrics.

- Real-Time Analytics: Offers real-time insights into various aspects of the business.

- Automated Reporting: Generates scheduled reports for stakeholders, including management and external auditors.

- \*\*Integration Points\*\*: Pulls data from all modules to provide comprehensive reports.

1.3 Integration Capabilities

- Third-Party Integration: The ERP system will integrate with existing tools like accounting software (e.g., QuickBooks), CRM systems, and hardware like barcode scanners. This will be achieved through APIs and middleware solutions to ensure smooth data flow.

- Data Migration: A detailed plan for migrating data from legacy systems to the new ERP system will be developed, ensuring no loss of critical information.

1.4 Scalability and Security

- Scalability: The system is designed to scale horizontally by adding more servers to handle increased load, and vertically by upgrading hardware as needed.

- Security:

- Data Encryption: All sensitive data will be encrypted both in transit and at rest.

- Access Control: Role-based access control (RBAC) will be implemented to ensure users only access data and features relevant to their roles.

- Audit Logs: The system will maintain detailed logs of all user activities for monitoring and compliance purposes.

2. Functional Prototype (Using Tableau)

2.1 Key Performance Indicators (KPIs)

1. Inventory Management KPIs:

- Inventory Turnover Ratio: Measures how often inventory is sold and replaced over a period.

- Stockout Rate: Tracks the frequency of stockouts to avoid lost sales.

2. Production Planning KPIs:

- Production Efficiency: Measures the ratio of actual production output to the planned output.

- Cycle Time: Tracks the total time taken from the start to the end of the production process.

3. Sales KPIs:

- Sales Growth Rate: Tracks the increase in sales over a period.

- Order Fulfillment Time: Measures the time taken to complete an order from placement to delivery.

4. Purchasing KPIs:

- Supplier Lead Time: Tracks the time taken by suppliers to deliver goods after a purchase order is placed.

- Procurement Cost Savings: Measures cost savings achieved through negotiations, bulk purchases, or alternative sourcing.

5. Finance KPIs:

- Gross Profit Margin: Measures the company’s financial health by showing the percentage of revenue that exceeds the cost of goods sold.

- Return on Assets (ROA): Indicates how efficient the company is at using its assets to generate earnings.

6. HR KPIs:

- Employee Turnover Rate: Measures the rate at which employees leave the company.

- Average Time to Hire: Tracks the average time taken to fill a vacancy.

2.2 Dashboard Design in Tableau

- Dashboard Layout:

- Main Dashboard: Overview of all key business metrics.

- Inventory Dashboard: Focuses on inventory-related KPIs, with real-time stock levels and turnover rates.

- Sales Dashboard: Displays sales performance, order processing times, and customer trends.

- Production Dashboard: Visualizes production schedules, work order status, and efficiency metrics.

- Finance Dashboard: Financial health indicators such as profit margins, expenses, and cash flow.

-\*HR Dashboard: Employee performance, turnover, and payroll statistics.

- User Interaction:

- Filters: Users can filter data by time period, department, or product category.

- Drill-Downs: The ability to drill down into specific data points for detailed analysis.

- Export Options: Users can export reports in various formats (PDF, Excel) for further analysis or sharing.

3. Implementation Plan

3.1 Deployment Strategy

- Phase 1: Initial Setup

- Server Setup: Configure the cloud environment (e.g., AWS, Azure) and set up the ERP system’s backend infrastructure.

- Database Migration: Migrate existing data from legacy systems to the new ERP system’s database.

- Phase 2: Module Rollouts

- Pilot Testing: Deploy the Inventory Management module in one location as a pilot test. Gather feedback and refine the system.

- Full Rollout: Gradually roll out other modules (Production Planning, Sales, etc.) across all locations.

- Phase 3: Final Integration

- System

Integration: Ensure all modules are fully integrated and operational.

- User Training: Conduct training sessions for employees on how to use the new system.

- Go-Live: Officially launch the ERP system across the company.

3.2 Training and Support

- Training Plan:

- Role-Based Training: Provide tailored training sessions for different user roles (e.g., managers, HR, finance staff).

- Training Materials: Develop user manuals, video tutorials, and quick reference guides.

- Hands-On Workshops: Conduct hands-on workshops to familiarize users with the system’s features and functionalities.

- Support Plan:

- Helpdesk: Set up a helpdesk for troubleshooting and support during and after the deployment.

- Continuous Support: Offer ongoing technical support and system maintenance to address any issues that arise post-implementation.

3.3 Testing and Go-Live Plan

- Testing Phases:

- Unit Testing: Test each module independently to ensure they function as intended.

- Integration Testing: Test how modules interact with each other to ensure seamless data flow.

- User Acceptance Testing (UAT): Involve key users in testing the system to ensure it meets their needs.

- Go-Live Timeline:

- Pre-Go-Live Checklist: Final system checks, data validation, and user training completion.

- Go-Live Date: Set a specific date for the system to go live, with all necessary personnel on standby for support.

- Post-Go-Live Review: Conduct a review after go-live to address any issues and make necessary adjustments.

4. Evaluation Criteria

- Functionality: The system’s ability to meet the specified requirements and effectively integrate various business functions.

- Usability: The user-friendliness and ease of navigation of the system interface.

- Technical Robustness: The reliability, performance, and security of the system.

- Innovation: The incorporation of innovative features or solutions to enhance system effectiveness.

This detailed plan provides a comprehensive guide to developing and implementing the ERP system for your mini manufacturing company project. Each section is tailored to ensure that the system is not only functional but also user-friendly, secure, and scalable. If you need further customization or additional sections, let me know!