**Department of Collegiate & Technical Education**

**Capstone Project**

**Format-4**

**Cost Breakdown Structure**

**Capstone Project Name:** INVENTORY MANAGEMENT SYSTEM

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A cost breakdown structure (CBS) breaks down cost data into different categories, and helps you manage costs efficiently. It is a crucial part of the capstone project planning and management process, as it allows you to gain better insight into how much you spend and what you spend your capstone project budget on. When you have a solid structure in place, you can have better control of your capstone project costs to avoid going over budget.

# Analyse your Work Breakdown Structure

1. **Inventory Planning:**
   * **Demand Forecasting:**
     + Analyze historical data.
     + Consider market trends and promotions.
     + Develop demand forecasts for different items.
   * **Safety Stock Determination:**
     + Analyze lead times and variability.
     + Set safety stock levels to avoid stockouts.
   * **Product Classification:**
     + Categorize items based on demand, value, etc.
     + Develop different inventory management strategies for each category.
2. **Inventory Procurement:**
   * **Supplier Selection:**
     + Evaluate potential suppliers based on price, quality, and reliability.
     + Negotiate contracts and terms.
   * **Purchase Order Management:**
     + Create and manage purchase orders for required inventory.
     + Track order status and deliveries.
3. **Inventory Receiving and Storage:**
   * **Receiving Process:**
     + Inspect incoming inventory for accuracy and damage.
     + Update inventory records.
   * **Storage Management:**
     + Organize inventory for efficient retrieval and space utilization.
     + Implement proper handling and security measures.
4. **Inventory Control and Monitoring:**
   * **Cycle Counting:**
     + Conduct regular physical inventory counts to verify accuracy.
     + Investigate and reconcile discrepancies.
   * **ABC Analysis:**
     + Classify inventory based on value and implement appropriate control measures.
   * **Inventory Turnover Analysis:**
     + Track inventory turnover rates to identify potential inefficiencies.
5. **Inventory Replenishment:**
   * **Reorder Point Calculation:**
     + Determine the point at which to reorder inventory to avoid stockouts.
     + Consider lead times and safety stock.
   * **Replenishment Order Processing:**
     + Generate and manage replenishment orders based on demand and stock levels.
6. **Inventory Reporting and Analysis:**
   * **Inventory Reports:**
     + Generate reports on inventory levels, costs, and turnover.
     + Track key performance indicators (KPIs).
   * **Inventory Analysis:**
     + Identify trends and opportunities for improvement.
     + Evaluate the effectiveness of inventory management strategies.

**Considerations for Analyzing your WBS:**

* **Level of Detail:** Tailor the WBS to your specific needs and complexity.
* **Task Dependencies:** Identify dependencies between tasks to ensure a smooth workflow.
* **Resource Allocation:** Estimate the resources (e.g., time, personnel) required for each task.
* **Cost Estimation:** Use the WBS as a foundation to develop a cost breakdown structure (CBS).
* **Customization:** Adapt the general WBS to your specific inventory management processes and systems.

## **2} Estimate the labour cost of work**

* **Planning and Design:**
* Gather and Document Requirements: 2 hours
* Design Database Schema ::3 hours
* Total labour cost: (2 + 3) \* INR 50 = INR 250
* **Database Development:**
* Create MySQL Database and Create Tables :2hours
* Total labour cost: (2) \* INR 100 = INR 200
* **Front-End Development:**
* Create HTML Templates:4 hours
* Write CSS Stylesheets**:** 6 hours
* Creating front end user interface :5 hours
* Integrate dynamic content using server-side scripting (PHP):8 hours
* Use AJAX for dynamic data updates without page reloads : 5 hours
* Total labour cost: ( 28 ) \* INR 100 = INR 2,800
* **Back-End Development**:
* Write PHP Scripts for CRUD Operations:5 hours
* Implement User Authentication:4 hours
* Develop Inventory Management Logic:3 hours
* Create Reporting Functionality:6 hours
* Total labour cost: ( 18 ) \* INR 100 = INR 1,800
* **Testing and Deployment:**
* Create test cases for all functionalities of the system.:5 hours
* Test user interface, database interactions, and business logic:4 hours
* Deploy the website files and scripts onto the server:3 hours
* Total labour cost: ( 12 ) \* INR 100 = INR 1,200
* **Documentation:**
* Create a user manual for the inventory management system.: 6 hours
* Total labour cost: ( 12 ) \* INR 50 = INR 600
* **Total labour cost = INR 6850**

## **3} Estimate the cost of materials**

As a full stack web development project , the materials needed for inventory management system are primarily computational resources such as a computer, software, and cloud services. Since these materials are not physical, the cost is not directly related to the number of units used. Instead, the cost is based on usage and access to these resources. Here is an estimate of the cost of materials for the project:

* Computer

o Assuming the use of personal computer or laptop

o Cost: N/A (already owned)

* Software

o PHP Programming language: Free

o LARAVEL Framework ,Bootstrap Framework: Free

o Natural Language Toolkit (NLTK) library: Free Cloud Services

o Google Colab for development and testing: Free Amazon Web Services (AWS) or Google Cloud Platform (GCP) for deployment: Estimated at INR 2000 (assuming minimal usage)

Total cost of materials: INR 2000

**3. Overhead costs.**

Inventory management, while crucial for a smooth-running business, incurs various overhead costs beyond the direct cost of the goods themselves. These indirect expenses, often overlooked, can significantly impact your bottom line.

**Let's explore the different types of overhead costs associated with inventory management:**

**1. Storage Costs:**

* **Warehouse rent or lease:** Cost of storing inventory in a dedicated space, including utilities and maintenance.
* **Storage equipment:** Depreciation or rental of shelves, racks, bins, and other storage aids.
* **Security & insurance:** Protecting inventory from theft, damage, and natural disasters.

**2. Personnel Costs:**

* **Salaries and benefits:** Wages for warehouse staff, inventory managers, and administrative personnel.
* **Training and development:** Equipping staff with necessary skills for efficient inventory management.

**3. Technology Costs:**

* **Inventory management software:** Licensing fees and maintenance costs for inventory tracking and optimization tools.
* **Hardware:** Computers, scanners, barcodes, and other technology supporting inventory processes.

**4. Administrative Costs:**

* **Inventory counting and audits:** Costs associated with periodic physical inventory verification.
* **Documentation and reporting:** Expenses for recordkeeping, generating reports, and complying with regulations.
* **Returns processing:** Handling and managing the return of damaged or unwanted inventory.

**5. Opportunity Costs:**

* **Capital tied up in inventory:** Holding inventory represents invested capital that could be used elsewhere.
* **Obsolescence and shrinkage:** Loss of value due to outdated products or product loss through damage or theft.

**Managing Overhead Costs:**

* **Optimizing inventory levels:** Reduce storage costs by maintaining optimal stock levels based on demand forecasts.
* **Negotiating supplier contracts:** Seek better deals on storage, equipment, and technology solutions.
* **Automating inventory processes:** Leverage technology to minimize manual tasks and improve efficiency.
* **Regularly review and update:** Conduct cost analysis to identify cost-saving opportunities and adjust strategies accordingly.

# 4. Build contingency into your CBS

Including contingency in your Cost Breakdown Structure (CBS) for an inventory management system is crucial for managing unexpected situations and protecting your budget. Here are some steps to incorporate contingency:

**1. Identify Potential Risks:**

* **Demand Fluctuations:** Consider unforeseen changes in customer demand leading to overstocking or stockouts.
* **Supply Chain Disruptions:** Account for potential delays, quality issues, or supplier disruptions.
* **Implementation Delays:** Factor in possible setbacks during system implementation.
* **Data Migration Challenges:** Prepare for data loss, errors, or unexpected complexities during data migration.
* **Hidden Costs:** Allow for unforeseen expenses like additional hardware, training, or regulatory compliance.

**2. Estimate Contingency Amounts:**

* **Research historical data:** Analyze past demand fluctuations, supply chain issues, and project delays to understand potential cost impacts.
* **Consult industry benchmarks:** Utilize industry reports and expert advice to estimate typical contingency percentages for inventory management projects.
* **Apply risk assessment:** Allocate higher contingency percentages to risks with greater likelihood or impact.

**3. Allocate Contingency Funds:**

* **Categorize contingencies:** Separate contingency funds for different risk categories (e.g., demand, supply chain, implementation).
* **Reserve funds strategically:** Consider allocating a fixed percentage of the total project budget or using risk-based allocation methods.
* **Maintain transparency:** Communicate contingency allocations and their purposes to stakeholders involved.

**4. Manage and Monitor Contingency:**

* **Track contingency usage:** Monitor how contingency funds are being used and the associated risks addressed.
* **Adjust allocations as needed:** If specific risks materialize, reallocate contingency funds from unused categories.
* **Evaluate contingency effectiveness:** Analyze the impact of contingency funds on mitigating risks and project success.
* **Communicate contingencies openly:** Inform stakeholders about potential risks and the role of contingency funds.
* **Regularly review and update:** Assess the validity of risk assumptions and adjust contingency plans as needed.
* **Seek expert guidance:** Consider consulting with inventory management specialists for tailored risk assessment and contingency planning.

**5. Final-check**

Here are some ways to check the cost estimates against the available budget and

control costs if the CBS comes in higher:

• **Review the estimates:** Once you have estimated the cost of materials, labor,

overheads, and contingency, it's essential to review the estimates and ensure that they are realistic and within the available budget.

• **Identify cost-saving opportunities:** Look for opportunities to save costs without

compromising the project's quality. For example, you can opt for open-source

machine learning libraries instead of paid ones or choose less expensive data storage options.

• **Negotiate with suppliers:** If you have identified cost-saving opportunities, you can negotiate with your suppliers to get better prices. For example, you can negotiate bulk discounts on data storage or machine learning software.

• **Prioritize tasks:** If the cost estimates are higher than the available budget, you can prioritize tasks and focus on critical tasks first. This approach can help you complete the most important parts of the project within the available budget.

Date

Signature of the student Signature of the cohort owner