# Functional Requirement

### Chapter 1: Functional Requirements   
  
#### 1.1 Customer Registration   
\*\*Function ID\*\*: FR-01   
\*\*Description\*\*: Enables new customers to create accounts by providing personal information and credentials. Validates input data and stores details in the Customer entity.   
\*\*Input\*\*: Customer details (Name, Email, Password, Address, PhoneNumber)   
\*\*Output\*\*: New record in Customer data entity; confirmation message.   
  
#### 1.2 Update Customer Information   
\*\*Function ID\*\*: FR-02   
\*\*Description\*\*: Allows authenticated customers to modify their stored personal details. Validates inputs before updating the Customer entity.   
\*\*Input\*\*: Edited details (Address, PhoneNumber, Email) from authenticated customer.   
\*\*Output\*\*: Updated Customer data entity record; confirmation message.   
  
#### 1.3 View Customer Profile   
\*\*Function ID\*\*: FR-03   
\*\*Description\*\*: Displays stored customer information (e.g., contact details, order history) to authenticated users.   
\*\*Input\*\*: Authenticated customer session.   
\*\*Output\*\*: Customer details (Name, Email, Address, PhoneNumber, Order history).   
  
#### 1.4 Add Product   
\*\*Function ID\*\*: FR-04   
\*\*Description\*\*: Allows administrators to create new product entries. Links products to categories and updates inventory.   
\*\*Input\*\*: Product details (ProductName, Description, Price, CategoryID, StockQuantity) from administrator.   
\*\*Output\*\*: New record in Product data entity; updated Inventory record; confirmation message.   
  
#### 1.5 Update Product Details   
\*\*Function ID\*\*: FR-05   
\*\*Description\*\*: Enables administrators to modify product information (e.g., price, stock). Syncs changes to Inventory entity.   
\*\*Input\*\*: Modified product details (Price, Description, StockQuantity, CategoryID).   
\*\*Output\*\*: Updated Product and Inventory records; confirmation message.   
  
#### 1.6 View Product Details   
\*\*Function ID\*\*: FR-06   
\*\*Description\*\*: Displays product information (e.g., name, price, description) to customers or administrators.   
\*\*Input\*\*: Product selection from catalog/search.   
\*\*Output\*\*: Product details (ProductName, Description, Price, Image, Category).   
  
#### 1.7 Remove Product   
\*\*Function ID\*\*: FR-07   
\*\*Description\*\*: Allows administrators to delete products not linked to active orders/carts. Removes associated inventory records.   
\*\*Input\*\*: ProductID selection from administrator.   
\*\*Output\*\*: Deleted Product and Inventory records; confirmation message.   
  
#### 1.8 Place Order   
\*\*Function ID\*\*: FR-08   
\*\*Description\*\*: Converts shopping cart items into a formal order. Validates stock, processes payment, and updates inventory.   
\*\*Input\*\*: Customer’s ShoppingCart items, shipping details, payment method.   
\*\*Output\*\*: New Order record; updated Inventory levels; cleared ShoppingCart; confirmation message.   
  
#### 1.9 View Order Details   
\*\*Function ID\*\*: FR-09   
\*\*Description\*\*: Displays order information (e.g., products, status, total cost) to authenticated customers.   
\*\*Input\*\*: OrderID selection from customer.   
\*\*Output\*\*: Order details (OrderDate, TotalAmount, Product list, Status).   
  
#### 1.10 Update Order Status   
\*\*Function ID\*\*: FR-10   
\*\*Description\*\*: Allows administrators to modify order status (e.g., "Shipped"). Triggers customer notifications if applicable.   
\*\*Input\*\*: New status (e.g., "Processing", "Cancelled") from administrator.   
\*\*Output\*\*: Updated Order status; notification to customer; confirmation message.   
  
#### 1.11 Cancel Order   
\*\*Function ID\*\*: FR-11   
\*\*Description\*\*: Enables customers to cancel eligible orders. Restores inventory stock and updates order status.   
\*\*Input\*\*: OrderID selection from authenticated customer.   
\*\*Output\*\*: Updated Order status ("Cancelled"); restored Inventory levels; confirmation message.   
  
#### 1.12 Add to Shopping Cart   
\*\*Function ID\*\*: FR-12   
\*\*Description\*\*: Adds selected products/quantities to the customer’s cart. Validates stock availability.   
\*\*Input\*\*: ProductID and Quantity from customer.   
\*\*Output\*\*: New CartProductItem record; updated Inventory; confirmation message.   
  
#### 1.13 View Shopping Cart   
\*\*Function ID\*\*: FR-13   
\*\*Description\*\*: Displays cart contents (products, quantities, total cost) to authenticated customers.   
\*\*Input\*\*: Authenticated customer session.   
\*\*Output\*\*: ShoppingCart items, quantities, prices, total cost.   
  
#### 1.14 Modify Shopping Cart Item   
\*\*Function ID\*\*: FR-14   
\*\*Description\*\*: Allows customers to adjust quantities or remove items from their cart. Updates inventory accordingly.   
\*\*Input\*\*: Modified Quantity or removal request for CartProductItem.   
\*\*Output\*\*: Updated CartProductItem/Inventory records; recalculated cart total; confirmation message.   
  
#### 1.15 Process Payment   
\*\*Function ID\*\*: FR-15   
\*\*Description\*\*: Handles payment transactions for confirmed orders. Updates order status and payment history.   
\*\*Input\*\*: Payment details (e.g., card number, expiration date) and OrderID.   
\*\*Output\*\*: Payment record; updated Order status ("Paid"); confirmation message.   
  
#### 1.16 View Payment History   
\*\*Function ID\*\*: FR-16   
\*\*Description\*\*: Displays past payment records (e.g., date, amount, status) to authenticated customers.   
\*\*Input\*\*: Authenticated customer session.   
\*\*Output\*\*: Payment history details (PaymentDate, Amount, Status, OrderID).   
  
#### 1.17 Update Inventory Levels   
\*\*Function ID\*\*: FR-17   
\*\*Description\*\*: Allows administrators to manually adjust stock quantities for products.   
\*\*Input\*\*: ProductID and new StockQuantity from administrator.   
\*\*Output\*\*: Updated Inventory record; confirmation message.   
  
#### 1.18 View Inventory Levels   
\*\*Function ID\*\*: FR-18   
\*\*Description\*\*: Displays current stock levels for all products to administrators.   
\*\*Input\*\*: Administrator request.   
\*\*Output\*\*: Product list with StockLevels.   
  
#### 1.19 Manage Users   
\*\*Function ID\*\*: FR-19   
\*\*Description\*\*: Enables administrators to add, edit, or delete customer accounts.   
\*\*Input\*\*: Customer details (for add/edit) or CustomerID (for delete).   
\*\*Output\*\*: Added/updated/deleted Customer record; confirmation message.   
  
#### 1.20 Install Plugin   
\*\*Function ID\*\*: FR-20   
\*\*Description\*\*: Adds new plugins to the system after validating compatibility and dependencies.   
\*\*Input\*\*: Plugin file or repository selection from administrator.   
\*\*Output\*\*: New Plugin record; system integration; confirmation message.   
  
#### 1.21 Update Plugin   
\*\*Function ID\*\*: FR-21   
\*\*Description\*\*: Modifies existing plugins to new versions. Validates compatibility before updating.   
\*\*Input\*\*: Updated plugin file/version from administrator.   
\*\*Output\*\*: Updated Plugin record; confirmation message.   
  
#### 1.22 Uninstall Plugin   
\*\*Function ID\*\*: FR-22   
\*\*Description\*\*: Removes plugins not in use by active processes.   
\*\*Input\*\*: PluginID selection from administrator.   
\*\*Output\*\*: Removed Plugin record; confirmation message.   
  
#### 1.23 Create Product Category   
\*\*Function ID\*\*: FR-23   
\*\*Description\*\*: Allows administrators to define new product categories.   
\*\*Input\*\*: Category details (CategoryName, Description) from administrator.   
\*\*Output\*\*: New ProductCategory record; confirmation message.   
  
#### 1.24 Update Product Category   
\*\*Function ID\*\*: FR-24   
\*\*Description\*\*: Modifies existing product category details (e.g., name, description).   
\*\*Input\*\*: Modified category details (CategoryName, Description).   
\*\*Output\*\*: Updated ProductCategory record; confirmation message.   
  
#### 1.25 Delete Product Category   
\*\*Function ID\*\*: FR-25   
\*\*Description\*\*: Removes unused product categories not linked to active products.   
\*\*Input\*\*: CategoryID selection from administrator.   
\*\*Output\*\*: Deleted ProductCategory record; confirmation message.   
  
#### 1.26 Manage Payment History   
\*\*Function ID\*\*: FR-26   
\*\*Description\*\*: Allows administrators to filter, view, and export payment records.   
\*\*Input\*\*: Filters (e.g., date range, status); export format (e.g., CSV).   
\*\*Output\*\*: Filtered PaymentHistory data; exported file.   
  
#### 1.27 Manage Order Status History   
\*\*Function ID\*\*: FR-27   
\*\*Description\*\*: Enables administrators to view/export historical status changes for orders.   
\*\*Input\*\*: Filters (e.g., OrderID, date range); export format.   
\*\*Output\*\*: Filtered OrderStatusHistory data; exported file.

# External Description

### Chapter 2: External Interfaces  
  
#### 2.1 User Interface  
  
The system provides a graphical user interface (GUI) through which users interact with the system. This interface includes:  
  
1. \*\*Web-based Graphical User Interface (Web GUI):\*\*  
 - \*\*Description:\*\* The Web GUI is the primary interface for users to interact with the system. It includes forms for input, buttons for actions, and screens to display data.  
 - \*\*Interaction Method:\*\* Users interact with the Web GUI using standard web browsers. The interface includes input forms, navigation menus, and display screens.  
 - \*\*Inputs:\*\* User inputs such as customer details, product information, payment details, and search queries.  
 - \*\*Outputs:\*\* Display of customer profiles, product details, order summaries, payment confirmations, and other relevant information.  
  
2. \*\*Mobile Application Interface:\*\*  
 - \*\*Description:\*\* The system also provides a mobile application interface for users to access the system on mobile devices.  
 - \*\*Interaction Method:\*\* Users interact with the mobile application using touch inputs, similar to the Web GUI but optimized for mobile devices.  
 - \*\*Inputs:\*\* Same as the Web GUI, but optimized for mobile input methods.  
 - \*\*Outputs:\*\* Same as the Web GUI, but optimized for mobile display.  
  
#### 2.2 Hardware Interface  
  
The system interacts with external hardware devices primarily through standard communication protocols. The key hardware interfaces include:  
  
1. \*\*Payment Terminal:\*\*  
 - \*\*Description:\*\* The system integrates with payment terminals to process physical payments in-store.  
 - \*\*Interaction Method:\*\* Communication via industry-standard payment processing protocols (e.g., ISO 8583).  
 - \*\*Inputs:\*\* Payment card details, PIN entries, and transaction amounts.  
 - \*\*Outputs:\*\* Payment confirmation, transaction receipts, and error messages.  
  
#### 2.3 Software Interface  
  
The system interacts with several external software systems to provide its functionality. These interfaces include:  
  
1. \*\*Database Management System (DBMS):\*\*  
 - \*\*Description:\*\* The system uses a relational database management system to store and retrieve data.  
 - \*\*Interaction Method:\*\* SQL queries and transactions.  
 - \*\*Inputs:\*\* Data to be stored (e.g., customer details, product information, orders).  
 - \*\*Outputs:\*\* Retrieved data (e.g., customer profiles, product listings, order history).  
  
2. \*\*Third-Party Payment Gateway:\*\*  
 - \*\*Description:\*\* The system integrates with a third-party payment gateway to process online payments.  
 - \*\*Interaction Method:\*\* RESTful API calls over HTTPS.  
 - \*\*Inputs:\*\* Payment details (e.g., credit card information, transaction amount).  
 - \*\*Outputs:\*\* Payment confirmation, transaction ID, and error codes.  
  
3. \*\*Plugin Management System:\*\*  
 - \*\*Description:\*\* The system allows administrators to install, update, and uninstall plugins.  
 - \*\*Interaction Method:\*\* Plugin API provided by the system.  
 - \*\*Inputs:\*\* Plugin files or repository references.  
 - \*\*Outputs:\*\* Plugin installation, update, or removal confirmation.  
  
4. \*\*Email Service Provider:\*\*  
 - \*\*Description:\*\* The system uses an email service provider to send notifications and confirmations.  
 - \*\*Interaction Method:\*\* SMTP or RESTful API.  
 - \*\*Inputs:\*\* Email content, recipient addresses, and subject lines.  
 - \*\*Outputs:\*\* Email delivery confirmations or error messages.  
  
#### 2.4 Communication Interface  
  
The system communicates with external systems and users through various communication channels. These include:  
  
1. \*\*Web Browsing:\*\*  
 - \*\*Description:\*\* Users access the system through web browsers using HTTP/HTTPS protocols.  
 - \*\*Interaction Method:\*\* Standard web browsing over TCP/IP.  
 - \*\*Inputs:\*\* User requests (e.g., URL navigation, form submissions).  
 - \*\*Outputs:\*\* Web pages, responses to form submissions, and AJAX responses.  
  
2. \*\*Email Notifications:\*\*  
 - \*\*Description:\*\* The system sends email notifications for order confirmations, payment receipts, and other events.  
 - \*\*Interaction Method:\*\* SMTP or email API.  
 - \*\*Inputs:\*\* Email content and recipient information.  
 - \*\*Outputs:\*\* Email delivery status.  
  
3. \*\*SMS Notifications:\*\*  
 - \*\*Description:\*\* The system sends SMS notifications for certain events (e.g., order status updates).  
 - \*\*Interaction Method:\*\* SMS gateway API.  
 - \*\*Inputs:\*\* Message content and recipient phone numbers.  
 - \*\*Outputs:\*\* SMS delivery status.  
  
### Summary  
  
This chapter has outlined the external interfaces of the system, including user interfaces, hardware interfaces, software interfaces, and communication interfaces. Each interface has been described in terms of its interaction method, inputs, and outputs. These interfaces are critical to the system's functionality and must be implemented according to the specifications provided.