# Functional Requirement

1. Functional Requirements  
  
1.1 Email Creation Function   
Function ID: FR-01   
Description: Users can create new emails with specified content and recipient information. Drafting is also supported.   
Input: Subject, body, recipient(s), and optional email template selection.   
Output: A new email stored in the system, either as a draft or sent email, with a confirmation message displayed.  
  
1.2 Email Sending Function   
Function ID: FR-02   
Description: Users can send an email to the specified recipient(s) after confirming the content.   
Input: Valid email content, recipient(s), and confirmation from the user.   
Output: The email is sent to the recipient(s), marked as sent in the database, and a confirmation message is displayed.  
  
1.3 Email Receiving Function   
Function ID: FR-03   
Description: The system receives incoming emails from an external email server and stores them in the user’s inbox.   
Input: Incoming email from an external server with valid sender information.   
Output: The email is stored in the user’s inbox, and a notification is sent to the user or administrator.  
  
1.4 Email Deletion Function   
Function ID: FR-04   
Description: Users can delete an existing email after confirmation. The system retains a log of the deletion.   
Input: Selected email and confirmation from the user.   
Output: The email is removed from the database, and a confirmation message is displayed.  
  
1.5 Email Viewing Function   
Function ID: FR-05   
Description: Users can view the content of an existing email. The system marks the email as read if it was previously unread.   
Input: Selected email from the inbox or another accessible folder.   
Output: The email’s content (subject, body, sender, timestamp) is displayed to the user.  
  
1.6 Email Update Function   
Function ID: FR-06   
Description: Users can update an existing email that is in a draft or saved state.   
Input: Selected email and modified content (subject, body, recipient(s)).   
Output: The email is updated in the database, and a confirmation message is displayed.  
  
1.7 User Management Function   
Function ID: FR-07   
Description: Administrators can create, update, or delete user accounts.   
Input: User account details (username, email, password, role) for creation or modification.   
Output: The user account is updated or deleted in the database, and a confirmation message is displayed.  
  
1.8 User Registration Function   
Function ID: FR-08   
Description: Administrators can register new user accounts with unique credentials.   
Input: New user details (username, email, password, role).   
Output: A new user account is created in the database, and a confirmation email is sent to the user.  
  
1.9 User Deletion Function   
Function ID: FR-09   
Description: Administrators can delete a user account and all associated data.   
Input: Selected user account and confirmation from the administrator.   
Output: The user account and related data are removed from the database, and a confirmation message is displayed.  
  
1.10 Contact Addition Function   
Function ID: FR-10   
Description: Users or administrators can add new contacts with unique email addresses.   
Input: Contact details (name, email, phone number, and any additional information).   
Output: A new contact is stored in the database, and a confirmation message is displayed.  
  
1.11 Contact Update Function   
Function ID: FR-11   
Description: Users or administrators can modify an existing contact’s information.   
Input: Selected contact and updated details (name, email, phone number, etc.).   
Output: The contact is updated in the database, and a confirmation message is displayed.  
  
1.12 Contact Deletion Function   
Function ID: FR-12   
Description: Users or administrators can delete an existing contact after confirmation.   
Input: Selected contact and confirmation from the user or administrator.   
Output: The contact is removed from the database, and a confirmation message is displayed.  
  
1.13 Folder Management Function   
Function ID: FR-13   
Description: Users or administrators can create, update, or delete folders to organize their emails.   
Input: Folder details (name, parent folder, and action type).   
Output: The folder is created, updated, or deleted in the database, and a confirmation message is displayed.  
  
1.14 Inbox Management Function   
Function ID: FR-14   
Description: Users or administrators can organize, filter, or customize the view of their inbox.   
Input: Sorting criteria, filtering conditions, or customization settings.   
Output: The inbox is updated with the new organization, filters, or view settings, and a confirmation message is displayed.  
  
1.15 Email Status Management Function   
Function ID: FR-15   
Description: Users or administrators can update the status of an email (e.g., read, unread, flagged, archived).   
Input: Selected email and new status selection.   
Output: The email status is updated in the database, and the inbox or email list is refreshed accordingly.  
  
1.16 Email Status Viewing Function   
Function ID: FR-16   
Description: Users or administrators can view the current status of an email.   
Input: Selected email from the inbox or another accessible folder.   
Output: The email’s current status (e.g., read, unread, flagged) is displayed in the interface.  
  
1.17 Folder Viewing Function   
Function ID: FR-17   
Description: Users or administrators can view the contents of a folder, including a list of emails.   
Input: Selected folder.   
Output: The folder’s name and list of associated emails are displayed, along with optional folder details.

# External Description

# 2. External Interfaces   
  
This chapter outlines the external interfaces that the system interacts with. These interfaces are essential for enabling the functionalities described in the functional requirements and ensuring smooth data exchange between the system and its external environment. The external interfaces are categorized into four types: user interfaces, hardware interfaces, software interfaces, and communication interfaces.   
  
## 2.1 User Interface   
  
The system interacts with users through a graphical user interface (GUI) that supports various operations related to email and contact management.   
  
- \*\*Email Creation Interface\*\*   
 - \*\*Description\*\*: A GUI form where users can compose a new email by entering the subject, body, and recipient(s). It also allows optional selection of email templates.   
 - \*\*Inputs\*\*: Subject, body, recipient(s), and optional template selection.   
 - \*\*Outputs\*\*: A new email is displayed as a draft or marked as sent with a confirmation message.   
  
- \*\*Email Sending Interface\*\*   
 - \*\*Description\*\*: A confirmation screen or dialog box that allows users to review and confirm the email content before sending.   
 - \*\*Inputs\*\*: Valid email content, recipient(s), and user confirmation.   
 - \*\*Outputs\*\*: A confirmation message is displayed after the email is sent.   
  
- \*\*Email Receiving Interface\*\*   
 - \*\*Description\*\*: The inbox or email list interface where incoming emails are displayed to users.   
 - \*\*Inputs\*\*: None directly from the user; incoming emails are received from an external email server.   
 - \*\*Outputs\*\*: The email content is displayed in the inbox, and a notification is shown to the user.   
  
- \*\*Email Deletion Interface\*\*   
 - \*\*Description\*\*: A dialog box or confirmation screen where users can confirm the deletion of an email.   
 - \*\*Inputs\*\*: Selected email and user confirmation.   
 - \*\*Outputs\*\*: A confirmation message is displayed after the email is deleted.   
  
- \*\*Email Viewing Interface\*\*   
 - \*\*Description\*\*: A detailed view screen where users can see the subject, body, sender, and timestamp of an email.   
 - \*\*Inputs\*\*: Selected email from the inbox or another folder.   
 - \*\*Outputs\*\*: The email content is displayed, and the email is marked as read if it was unread.   
  
- \*\*Email Update Interface\*\*   
 - \*\*Description\*\*: A GUI form where users can modify the subject, body, or recipients of an existing draft or saved email.   
 - \*\*Inputs\*\*: Selected email and modified content.   
 - \*\*Outputs\*\*: Updated email is displayed, and a confirmation message is shown.   
  
- \*\*User Management Interface\*\*   
 - \*\*Description\*\*: A GUI interface for administrators to manage user accounts (create, update, delete).   
 - \*\*Inputs\*\*: User account details (username, email, password, role) for creation or modification.   
 - \*\*Outputs\*\*: Confirmation message after the account is updated or deleted.   
  
- \*\*User Registration Interface\*\*   
 - \*\*Description\*\*: A GUI form for administrators to register new users with unique credentials.   
 - \*\*Inputs\*\*: New user details (username, email, password, role).   
 - \*\*Outputs\*\*: A confirmation message and a confirmation email sent to the user.   
  
- \*\*User Deletion Interface\*\*   
 - \*\*Description\*\*: A GUI interface for administrators to delete a user account and all related data.   
 - \*\*Inputs\*\*: Selected user and administrator confirmation.   
 - \*\*Outputs\*\*: A confirmation message after the user and data are deleted.   
  
- \*\*Contact Management Interface\*\*   
 - \*\*Description\*\*: A GUI interface for users or administrators to manage contacts (create, update, delete).   
 - \*\*Inputs\*\*: Contact details (name, email, phone number, etc.).   
 - \*\*Outputs\*\*: Confirmation message after the contact is added, updated, or deleted.   
  
- \*\*Folder Management Interface\*\*   
 - \*\*Description\*\*: A GUI interface for users or administrators to create, update, or delete email folders.   
 - \*\*Inputs\*\*: Folder name, parent folder, and action type.   
 - \*\*Outputs\*\*: Confirmation message after the folder is modified.   
  
- \*\*Inbox Management Interface\*\*   
 - \*\*Description\*\*: A GUI interface for users or administrators to sort, filter, and customize the inbox view.   
 - \*\*Inputs\*\*: Sorting criteria, filtering conditions, or customization settings.   
 - \*\*Outputs\*\*: Updated inbox view and a confirmation message.   
  
- \*\*Email Status Management Interface\*\*   
 - \*\*Description\*\*: A GUI interface where users or administrators can update the status of an email (e.g., read, unread, flagged, archived).   
 - \*\*Inputs\*\*: Selected email and new status selection.   
 - \*\*Outputs\*\*: The updated status is reflected in the interface, and the email list is refreshed.   
  
- \*\*Email Status Viewing Interface\*\*   
 - \*\*Description\*\*: A GUI interface where users or administrators can view the current status of an email.   
 - \*\*Inputs\*\*: Selected email from the inbox or a folder.   
 - \*\*Outputs\*\*: The current status (e.g., read, unread, flagged) is displayed.   
  
- \*\*Folder Viewing Interface\*\*   
 - \*\*Description\*\*: A GUI interface that displays the contents of a selected folder, including the list of emails within it.   
 - \*\*Inputs\*\*: Selected folder.   
 - \*\*Outputs\*\*: The folder name and list of associated emails are displayed.   
  
## 2.2 Hardware Interface   
  
The system does not directly interact with external hardware devices. Therefore, there are no specific hardware interfaces required for this system.   
  
## 2.3 Software Interface   
  
The system interacts with external software and databases to perform core operations such as email storage, retrieval, and management.   
  
- \*\*Email Database\*\*   
 - \*\*Description\*\*: A database used to store all email-related data, including email content, recipients, status, and timestamps.   
 - \*\*Interaction\*\*: The system stores and retrieves emails from the database based on user actions (e.g., creating, sending, deleting, viewing).   
 - \*\*Inputs\*\*: Email content, status, user information, and folder structure.   
 - \*\*Outputs\*\*: Email data is stored, updated, or deleted in the database.   
  
- \*\*User Database\*\*   
 - \*\*Description\*\*: A database that stores user account information, including usernames, emails, passwords, and roles.   
 - \*\*Interaction\*\*: The system interacts with the user database to manage user registration, updates, and deletions.   
 - \*\*Inputs\*\*: User account details for creation, update, or deletion.   
 - \*\*Outputs\*\*: User account data is stored, updated, or removed in the database.   
  
- \*\*Contact Database\*\*   
 - \*\*Description\*\*: A database for storing contact information, such as names, email addresses, and phone numbers.   
 - \*\*Interaction\*\*: The system retrieves and modifies contact data based on user or administrator actions.   
 - \*\*Inputs\*\*: Contact details for addition, update, or deletion.   
 - \*\*Outputs\*\*: Contact data is stored, updated, or deleted in the database.   
  
- \*\*Folder Database\*\*   
 - \*\*Description\*\*: A database that stores folder information and relationships between folders and emails.   
 - \*\*Interaction\*\*: The system creates, updates, or deletes folders and manages email placement within folders.   
 - \*\*Inputs\*\*: Folder details and action type (create, update, delete).   
 - \*\*Outputs\*\*: Folder data is stored, updated, or deleted in the database.   
  
- \*\*Email Server API\*\*   
 - \*\*Description\*\*: An external API or protocol interface for receiving and sending emails from/to an external email server.   
 - \*\*Interaction\*\*: The system uses this interface to fetch incoming emails and send outgoing emails.   
 - \*\*Inputs\*\*: Email content, recipient(s), and sender information.   
 - \*\*Outputs\*\*: Emails are sent or received via the email server.   
  
- \*\*Email Template Manager\*\*   
 - \*\*Description\*\*: A software module or external tool that provides pre-defined email templates for users to choose from when creating an email.   
 - \*\*Interaction\*\*: The system allows users to select and apply templates to their emails.   
 - \*\*Inputs\*\*: Template selection.   
 - \*\*Outputs\*\*: Email content is populated based on the selected template.   
  
## 2.4 Communication Interface   
  
The system communicates with external systems and users through various communication interfaces, primarily via email.   
  
- \*\*Email Communication Interface\*\*   
 - \*\*Description\*\*: The system communicates with external email servers to send and receive emails.   
 - \*\*Interaction\*\*: The system uses standard email protocols (e.g., SMTP for sending, IMAP/POP3 for receiving) to interface with external email servers.   
 - \*\*Inputs\*\*: Email content and recipient information for sending.   
 - \*\*Outputs\*\*: Emails are delivered to recipients, and incoming emails are retrieved from the server.   
  
- \*\*Email Notification Interface\*\*   
 - \*\*Description\*\*: A communication channel that sends notifications to users or administrators when new emails are received or other system events occur.   
 - \*\*Interaction\*\*: The system uses in-app notifications or emails to inform users about new messages.   
 - \*\*Inputs\*\*: New email arrival or system event.   
 - \*\*Outputs\*\*: A notification is displayed or sent to the user.   
  
- \*\*User Confirmation Interface\*\*   
 - \*\*Description\*\*: A communication interface used to confirm critical actions such as email deletion, user deletion, or email sending.   
 - \*\*Interaction\*\*: The system presents a confirmation dialog or message to the user or administrator.   
 - \*\*Inputs\*\*: User or administrator confirmation.   
 - \*\*Outputs\*\*: The action is executed or canceled based on the confirmation.   
  
- \*\*Email Status Update Interface\*\*   
 - \*\*Description\*\*: A communication interface used to update the status of an email (e.g., read, unread, flagged).   
 - \*\*Interaction\*\*: The system updates the email status in the database and refreshes the inbox view.   
 - \*\*Inputs\*\*: Selected email and new status.   
 - \*\*Outputs\*\*: The email status is updated in the system and reflected in the interface.   
  
- \*\*Folder Content Interface\*\*   
 - \*\*Description\*\*: A communication interface used to display the contents of a folder, including a list of emails and folder metadata.   
 - \*\*Interaction\*\*: The system retrieves folder and email data from the database and presents it to the user.   
 - \*\*Inputs\*\*: Folder selection.   
 - \*\*Outputs\*\*: Folder name and list of emails are displayed.   
  
- \*\*Email Confirmation Interface\*\*   
 - \*\*Description\*\*: A communication channel used to send a confirmation message to users when actions such as email creation, sending, or deletion are completed.   
 - \*\*Interaction\*\*: The system sends a message via GUI or email to inform the user of the action result.   
 - \*\*Inputs\*\*: Action completion status.   
 - \*\*Outputs\*\*: Confirmation message is displayed or sent to the user.   
  
- \*\*User Registration Confirmation Interface\*\*   
 - \*\*Description\*\*: A communication channel used to send a confirmation email to a newly registered user.   
 - \*\*Interaction\*\*: The system sends an email to the user’s registered email address to confirm the account creation.   
 - \*\*Inputs\*\*: New user registration data.   
 - \*\*Outputs\*\*: A confirmation email is sent to the user.   
  
## 2.5 Summary of External Interfaces   
  
| Interface Type | Interface Name | Description | Interaction Method | Inputs | Outputs |  
|----------------|----------------|-------------|--------------------|--------|---------|  
| User Interface | Email Creation Interface | Allows users to create new emails or drafts | GUI form | Subject, body, recipients, template selection | New email as draft or sent with confirmation |  
| User Interface | Email Sending Interface | Allows users to confirm and send an email | GUI confirmation | Email content, recipients, confirmation | Sent email and confirmation message |  
| User Interface | Email Receiving Interface | Displays incoming emails in the inbox | GUI inbox view | Incoming email data | Email displayed with notification |  
| User Interface | Email Deletion Interface | Allows users to delete an email | GUI confirmation dialog | Selected email, confirmation | Email removed with confirmation message |  
| User Interface | Email Viewing Interface | Displays the content of an email | GUI detailed view | Selected email | Email content and status update |  
| User Interface | Email Update Interface | Allows users to update draft or saved emails | GUI form | Selected email, modified content | Updated email with confirmation |  
| User Interface | User Management Interface | Allows administrators to manage user accounts | GUI interface | User account details | Updated or deleted user account |  
| User Interface | User Registration Interface | Allows administrators to register new users | GUI form | New user details | New user account and confirmation email |  
| User Interface | User Deletion Interface | Allows administrators to delete user accounts | GUI interface | Selected user, confirmation | Deleted user and confirmation |  
| User Interface | Contact Management Interface | Allows users or administrators to manage contacts | GUI form | Contact details | Updated or deleted contact |  
| User Interface | Folder Management Interface | Allows users or administrators to manage folders | GUI interface | Folder details | Updated or deleted folder |  
| User Interface | Inbox Management Interface | Allows users or administrators to organize and filter the inbox | GUI settings | Sorting, filtering, customization options | Updated inbox with confirmation |  
| User Interface | Email Status Management Interface | Allows users or administrators to update email status | GUI interface | Selected email, new status | Updated email status and interface refresh |  
| User Interface | Email Status Viewing Interface | Allows users or administrators to view email status | GUI display | Selected email | Current email status displayed |  
| User Interface | Folder Viewing Interface | Allows users or administrators to view folder contents | GUI display | Selected folder | Folder name and email list displayed |  
| Software Interface | Email Database | Stores all email data (content, status, recipients, etc.) | Database read/write | Email content, status, user info | Email data stored, updated, or deleted |  
| Software Interface | User Database | Stores user account data | Database read/write | User account details | User data stored, updated, or deleted |  
| Software Interface | Contact Database | Stores contact information | Database read/write | Contact details | Contact data stored, updated, or deleted |  
| Software Interface | Folder Database | Stores folder and email relationships | Database read/write | Folder details | Folder data stored, updated, or deleted |  
| Software Interface | Email Server API | Interface with external email servers | API calls | Email content, recipients | Emails sent or received via server |  
| Software Interface | Email Template Manager | Provides email templates for use | Template selection | Template choice | Email content populated from template |  
| Communication Interface | Email Communication Interface | Sends and receives emails via external servers | SMTP/IMAP/POP3 | Email content, recipient info | Emails sent or received |  
| Communication Interface | Email Notification Interface | Sends notifications for new emails or system events | In-app or email notification | New email or event trigger | Notification to user |  
| Communication Interface | User Confirmation Interface | Confirms user actions (e.g., deletion, sending) | GUI dialog or email | Confirmation input | Action executed or canceled |  
| Communication Interface | Email Status Update Interface | Updates and reflects email status in the interface | Database update and GUI refresh | Email status input | Updated inbox view |  
| Communication Interface | Folder Content Interface | Displays folder contents to the user | Database query and GUI display | Folder selection | Folder contents displayed |  
| Communication Interface | Email Confirmation Interface | Provides confirmation after an email action | GUI or email | Action result | Confirmation message to user |  
| Communication Interface | User Registration Confirmation Interface | Sends confirmation email after user registration | Email communication | New user data | Confirmation email sent to user |   
  
This section provides a comprehensive overview of the external interfaces the system interacts with, ensuring that all data sources and communication methods are clearly defined and aligned with the functional requirements.