| **Description of Test** | **Test Data to be Used (if Required)** | **Expected Outcome** | **Actual Outcome** | **Comments and Intended Actions** |
| --- | --- | --- | --- | --- |
| **User Registration (Valid Input)** | First Name: John, Last Name: Doe, Address: 123 Green St, Phone: 1234567890, Email: john.doe@example.com, Password: Password123, Confirm Password: Password123 | User is successfully registered, and a flash message "Registration successful. Please log in." is displayed. |  | Ensure proper data validation and check for any system errors during registration. |
| **User Registration - Password Mismatch** | First Name: Jane, Last Name: Smith, Address: 456 Green St, Phone: 9876543210, Email: jane.smith@example.com, Password: Password123, Confirm Password: Password456 | A flash message "Passwords do not match. Please try again." is shown. |  | Verify that password mismatch is properly handled, and error message is correctly shown. |
| **User Registration - Duplicate Email** | First Name: Alice, Last Name: Brown, Address: 789 Green St, Phone: 5556667777, Email: jane.smith@example.com (already registered), Password: Password123, Confirm Password: Password123 | A flash message "Email already registered. Please log in." appears. |  | Test duplicate email scenario to ensure no user can register with an already used email address. |
| **Login with Correct Credentials** | Email: john.doe@example.com, Password: Password123 | User is logged in successfully, redirected to the dashboard with a flash message "Login successful!" |  | Ensure that login functionality works with valid credentials. |
| **Login with Invalid Password** | Email: john.doe@example.com, Password: IncorrectPassword | A flash message "Invalid password. Please try again." is displayed. |  | Verify that invalid password is correctly handled with an appropriate error message. |
| **Login with Non-Existing Email** | Email: non.existing@example.com, Password: SomePassword123 | A flash message "Account does not exist. Please register." is shown. |  | Test the system response when a non-existent email is entered during login. |
| **Access Profile without Login** | N/A | A flash message "You need to log in first." appears, and the user is redirected to the login page. |  | Verify that access to the profile page is restricted without login. |
| **Update Profile Information** | First Name: John, Last Name: Doe, Address: 123 Green St, Phone Number: 1234567890 | User profile is updated in the database, and a flash message "Profile updated successfully." is displayed. |  | Ensure that profile update functionality is working, and the new data is correctly saved. |
| **View Dashboard (Logged-in User)** | User logged in: Yes | Dashboard is displayed with user information, and no error messages are shown. |  | Verify the user can successfully access the dashboard after login. |
| **Logout** | N/A | User is logged out, redirected to the login page, and a flash message "You have been logged out." appears. |  | Ensure the logout functionality works correctly and the user is redirected to the login page. |
| **Calculate Carbon Footprint** | Energy Source: Electricity, Energy Consumed: 100 kWh, Carbon Emission Factor: 0.92, Usage Period: daily | Carbon footprint is calculated and displayed, showing daily, monthly, and yearly values (e.g., 92 kg CO2/day, 2760 kg CO2/month, 33,780 kg CO2/year). |  | Test that the carbon footprint is calculated correctly based on the entered values and displays the expected results. |
| **Schedule Consultation (Valid Input)** | Full Name: Alice Green, Email: alice.green@example.com, Phone: 123-123-1234, Consultation Type: Solar Panel Installation, Preferred Date: 2025-05-01, Message: "Interested in solar panels." | Flash message "Consultation scheduled successfully!" appears, and the user is redirected to the payment page. |  | Verify that the consultation scheduling form works correctly and redirects to the payment page. |
| **Consultation - Invalid Data Entry** | Empty fields or missing required data in the consultation form (e.g., missing full name or email) | A flash message "Please fill in all required fields." appears. |  | Ensure that incomplete forms are correctly validated, and appropriate error messages are displayed. |
| **Credit Card Payment (Valid Credit Card)** | Credit Card Number: 1234567812345678, Expiration Date: 12/23, CVV: 123 | Payment is successfully processed, and a flash message "Payment successful for Solar Panel Installation." is displayed, redirecting to the home page. |  | Test valid credit card payment flow and ensure correct redirection and success message. |
| **Credit Card Payment - Invalid Card Number** | Credit Card Number: 12345678, Expiration Date: 12/23, CVV: 123 | Flash message "Credit card number must be exactly 16 digits." appears. |  | Verify that the system correctly rejects an invalid credit card number with the correct error message. |
| **Credit Card Payment - Invalid Expiration Date** | Credit Card Number: 1234567812345678, Expiration Date: 13/23 (invalid month), CVV: 123 | Flash message "Invalid expiration date. Use MM/YY format." is shown. |  | Ensure the system handles invalid expiration dates properly. |
| **Credit Card Payment - Invalid CVV** | Credit Card Number: 1234567812345678, Expiration Date: 12/23, CVV: 12 (too short) | Flash message "Invalid CVV. It should be 3 digits." is shown. |  | Test the system’s validation for an invalid CVV number. |
| **View Green Products Page** | N/A | Green products list is displayed with product names, prices, and images (if available). |  | Verify that the green products page shows all listed products correctly with the relevant information. |
| **Schedule Consultation - Invalid Consultation Type** | Full Name: Bob Green, Email: bob.green@example.com, Phone: 123-321-1234, Consultation Type: Invalid Type, Preferred Date: 2025-06-01 | Flash message "Invalid consultation type." appears. |  | Ensure that only valid consultation types are selectable and trigger the correct error message for invalid types. |
| **Contact Us Form Submission** | Name: Sam White, Email: sam.white@example.com, Message: "Inquiry about EV charging stations." | Flash message "Your message has been sent successfully." is displayed, and user is redirected to the contact page. |  | Test that the contact form works correctly and the message is submitted successfully with a confirmation. |

**Notes:**

* **Description of Test**: This is the test case description, which outlines the scenario being tested.
* **Test Data to be Used (if Required)**: Here, any specific data required for the test is listed (e.g., user information, product details, or payment information).
* **Expected Outcome**: This defines what should happen if the test case passes. It serves as a baseline for what is being tested.
* **Actual Outcome**: This column is filled in after the test is executed. It records what actually happened during the test.
* **Comments and Intended Actions**: This is where additional notes or next steps (in case of failures or issues) are recorded.

This test plan provides a structured approach to validating the functionalities in the Rolsa Technologies web application based on the scenario.