# Test Cases Table

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| **Module** | **Type** | **TC-ID** | **Scenario** | **Expected Result** |
| Financial Insights & Recommendations | Positive | TC-001-P | User with stable income receives savings tips | Suggests optimal savings amount |
|  | Positive | TC-002-P | High-spending user gets budget warnings | Recommends spending cuts |
|  | Positive | TC-003-P | User with surplus cash sees transfer suggestion | Proposes automated transfer to savings |
|  | Negative | TC-001-N | No transaction history available | Shows 'Insufficient Data' message |
|  | Negative | TC-002-N | Invalid income data (negative value) | Rejects input with error |
|  | Negative | TC-003-N | API failure during analysis | Graceful error message displayed |
|  | Boundary | TC-001-B | Minimum income ($0.01) | Does not suggest savings |
|  | Boundary | TC-002-B | Maximum transaction history (10,000 entries) | Processes without crashing |
|  | Boundary | TC-003-B | 99.9% spending-to-income ratio | Warns of potential overdraft |
|  | Alternative | TC-001-A | User manually overrides suggestion | Transfer executes with user-defined amount |
|  | Alternative | TC-002-A | User has irregular income (freelancer) | Adapts recommendations |
|  | Alternative | TC-003-A | User disables recommendations | No automated insights provided |
| Automated Savings & Transfers | Positive | TC-004-P | Transfers surplus to savings | $200 moved to savings |
|  | Positive | TC-005-P | User sets custom savings goal | Transfers align with goal |
|  | Negative | TC-004-N | Insufficient funds for transfer | Transfer blocked, user notified |
|  | Negative | TC-005-N | Savings account not linked | Error: 'No savings account found' |
|  | Boundary | TC-004-B | Minimum transfer amount ($0.01) | Skips transfer (below threshold) |
|  | Boundary | TC-005-B | Maximum single transfer ($10,000) | Transfer succeeds |
|  | Alternative | TC-004-A | User schedules transfers manually | Transfers execute as scheduled |
|  | Alternative | TC-005-A | Suggestion made but user delays | Notification sent after 24h |
| Bill Prediction & Cash Flow Forecast | Positive | TC-006-P | Predicts recurring bills | Correctly predicts next bill date |
|  | Positive | TC-007-P | Cash flow forecast matches expectations | Forecast shows $1K surplus |
|  | Negative | TC-006-N | Bill payment fails (insufficient funds) | Alert: 'Risk of missed payment' |
|  | Negative | TC-007-N | Unusual spending spike (fraud detection) | Flags as 'Unusual Activity' |
|  | Boundary | TC-006-B | Bill due today | Urgent reminder sent |
|  | Boundary | TC-007-B | Zero-income month | Forecast shows deficit |
|  | Alternative | TC-006-A | User pays bill early | Adjusts future predictions |
|  | Alternative | TC-007-A | User adds manual transaction | Forecast updates in real-time |
| Financial Health Score | Positive | TC-008-P | Score improves after saving more | Score rises next month |
|  | Positive | TC-009-P | Score reflects debt reduction | Score increases |
|  | Negative | TC-008-N | Score drops after missed payment | Score decreases |
|  | Negative | TC-009-N | Invalid score calculation (divide-by-zero) | Handles error gracefully |
|  | Boundary | TC-008-B | Minimum score (0) | Score = 0 |
|  | Boundary | TC-009-B | Maximum score (100) | Score = 100 |
|  | Alternative | TC-008-A | User disputes score | Explains scoring factors |
|  | Alternative | TC-009-A | Score recalculates after data correction | Score updates |
| Security & Error Handling | Positive | TC-010-P | Unauthorized access blocked | Error: 'Access Denied' |
|  | Negative | TC-011-N | Invalid API key used | 403 Forbidden |
|  | Boundary | TC-012-B | SQL injection attempt | Input sanitized |
|  | Alternative | TC-013-A | Network outage during analysis | 'Try Again Later' message |
| Additional Test Cases | Functional | TC-001 | Verify personalized insights based on transaction history | Insights match user spending patterns |
|  | Functional | TC-002 | Test recommendations for excessive spending | Suggests budget adjustments |
|  | Functional | TC-003 | Validate 'Savings Opportunity' detection | Identifies surplus cash correctly |
|  | Functional | TC-007 | Validate predicted bills accuracy | Predicted bills match actual upcoming bills |
|  | Functional | TC-008 | Test cash flow forecast logic | Forecast aligns with income & expenses |
|  | Functional | TC-009 | Verify alerts for potential overdrafts | User receives warning if low balance |
|  | Functional | TC-010 | Verify score calculation (0-100) | Score updates based on financial behavior |
|  | Functional | TC-011 | Test score improvement suggestions | Provides actionable tips |
|  | Functional | TC-012 | Validate score after manual adjustments | Score recalculates correctly |
|  | Security | TC-013 | Test unauthorized access to insights | Access denied without authentication |
|  | Security | TC-014 | Verify data encryption in transit | Transactions are securely encrypted |
|  | Error Handling | TC-015 | Test error handling for missing data | Graceful error message displayed |