

# **Master Team Project Summer 2025**

## **Team - 1**

### **Hand2Hand**



### **Milestone - 1**

Document Version : 1.0  
Created on : 3/5/2025

#### **History Revision Table:**

Version	Revised on
1.0	3.5.2025

## **TABLE OF CONTENTS**

<b>SR NO</b>	<b>TITLE</b>	<b>PAGE NO</b>
1	Executive Summary	<a href="#"><u>3</u></a>
2	Personae and Use Cases	<a href="#"><u>5</u></a>
3	List of Main Data items and Entities	<a href="#"><u>7</u></a>
4	Initial list of Functional requirements	<a href="#"><u>11</u></a>
5	List of Non-functional requirements	<a href="#"><u>13</u></a>
6	Competitive Analysis	<a href="#"><u>14</u></a>
7	High Level System Architecture and Technologies used	<a href="#"><u>15</u></a>
8	Teams and Roles	<a href="#"><u>16</u></a>
9	Checklist	<a href="#"><u>16</u></a>

# CONTENT

## 1. EXECUTIVE SUMMARY

### **1.1 Hand2Hand: A Dynamic Marketplace for Buying, Selling, and Exchanging**

Our team is developing *Hand2Hand*, a dynamic web application designed to streamline the buying, selling, and exchanging experience for users. Unlike conventional marketplaces such as eBay, *Hand2Hand* enhances functionality with unique features that boost user convenience and engagement, all in a single unified platform.

One of our standout features is the *Wanted Items Page*, where users can list products they're actively seeking. As soon as a matching item is posted, they receive an *instant email notification*, reducing search time and ensuring they never miss out. Plus, with our *same-day delivery* option, users can enjoy a faster, more convenient shopping experience.

Understanding the challenges of multilingual communities, we have integrated an *in-app translation feature* that allows users to translate messages between German and English, ensuring clear and effective communication between buyers and sellers from diverse backgrounds.

To further enhance the transaction experience, *Hand2Hand* offers an optional **delivery service**, enabling users to arrange product drop-offs seamlessly through the app. Users signing up can also **opt to become delivery agents**, allowing them to earn extra income while studying. This ensures that transactions are not only efficient but also convenient and hassle-free. Additionally, to boost ongoing user engagement, Hand2Hand incorporates a gamification and rewards system. Users earn badges for actions like buying, selling, receiving positive reviews, and helping others. This system motivates continued participation and helps build user reputation and trust within the platform.

### **1.2 Key Features**

- **Product Listings:** Users can easily list and browse products for sale or exchange.
- **Bidding System:** A transparent bidding feature where customers can bid and track product auctions.
- **Messaging:** Users can communicate directly within the app.

- **Multilingual Messaging:** Automatic translation of messages between German and English within chats.
- **Wanted Items Alerts:** Users get notified when products they seek are listed, ensuring quick access.
- **Search Functionality:** A powerful search feature allows users to quickly find products based on keywords, categories, and filters.
- **User-Friendly Interface:** Optimized for mobile and desktop for a smooth and intuitive experience.
- **Notifications & Alerts:** Real-time notifications for bids, messages, and wanted item matches.
- **Favorites:** Save products to a personal favorites list for easy future reference.
- **Optional Delivery Service:** Users can choose to arrange delivery for products directly through the app.
- **Gamification and Rewards:** Users can earn badges for positive actions, enhancing engagement and trust

### 1.3 Key Advantages, Novelty, and Value

*Hand2Hand* offers a unique blend of marketplace features, setting it apart from traditional buy-sell apps. The *Wanted Items Alert System* directly addresses a key user pain point: the challenge of constantly searching for specific products. Our *bidding system* and *built-in translation feature* further elevate user experience by promoting inclusivity and real-time, competitive interactions.

Unlike other platforms, *Hand2Hand* focuses on simplifying goods trading and adds value with an **integrated delivery option** that makes completing transactions even easier and more reliable.

### 1.4 Why Fund Hand2Hand

Investing in *Hand2Hand* means supporting a next-generation digital marketplace that not only facilitates transactions but also strengthens local commerce by offering smart tools and optional delivery support. Funding will allow us to enhance security, scale features like bidding and translation, and optimize performance for a growing user base. This project offers high potential for sustainable growth and community impact, particularly in regions with diverse populations and evolving marketplace needs.

## **2. PERSONAE AND MAIN USE CASES**

### **2.1 Personae**

#### **Persona 1: Carina – The Student Hustler**

**Age:** 22

**Role:** Final-Year Computer Science Student

**Tech Skills:** Really good with tech

**Goals:** Make extra money, find good deals.

**Pain Points:** Too little time, people who flake, no simple way to do side gigs

Carina's always on the move — selling her stuff and bidding on second-hand gadgets. She wants things done fast and without drama. Listings should be easy, auctions should be smooth, and everything should be crystal clear — no surprises.

#### **Persona 2: Jenny – The Single Mom Superwoman**

**Age:** 34

**Role:** Admin Staff + Part-Time Student

**Tech Skills:** Decent with apps

**Goals:** Find trusted services on campus, sell old baby stuff, get help fast

**Pain Points:** Always busy, too many apps, hard to trust strangers

Jenny's juggling kids, work, and studies. She doesn't have time for slow apps or shady people. She needs one easy app that helps her find good help, fair prices, and trusted people, with reviews she can actually rely on.

#### **Persona 3: Harsh – The Side-Gig Enthusiast**

**Age:** 27

**Role:** Engineering Grad Student + Delivery Guy on Campus

**Occupation:** Engineering Grad Student + Delivery Guy on Campus

**Tech Skill:** High

**Goals:** Get consistent gig work, build reputation as a service provider, earn rewards

**Pain Points:** Too many users, unfair ratings, work that's not consistent

Harsh is the go-to guy for delivery and odd jobs. He wants the app to recognize his hard work, like showing off his reviews and giving him better chances at good-paying tasks. He's serious about his hustle and wants the app to be just as serious about helping him grow.

#### **Persona 4: Riya – The Budget Hunter**

**Age:** 20

**Role:** Second-Year Psychology Student

**Tech Skills:** Comfortable with apps, not technical

**Goals:** Find good-condition stuff cheap, avoid overpaying, get things delivered easily

**Pain Points:** Marketplace overwhelm, no easy way to ask for exactly what she wants, worried about being ghosted

Riya's not trying to scroll through endless listings. She knows what she needs — a lamp, a fan, a yoga mat — and wants to just post a budget and get offers.

## **2.2 Use Cases**

### **01: The Speedy Side-Hustle Post**

Carina just upgraded to a new smartwatch and wants to sell the old one through an auction. She opens the app, quickly takes some pictures, and selects "**Auction Mode**". Product details are filled, and she enters her starting price. The auction goes live in minutes. Notifications alert her to every new bid. She replies to messages from buyers on the go, finalizes the deal, and either ships it or hands it off to a nearby delivery partner — all within one short break between lectures.

### **02: On-Demand Delivery Gig**

Harsh checks his app and sees a new delivery job — Carina just sold her smartwatch to another student. He accepts it, sees where to pick it up and drop it off, and follows the map in the app. Once delivered, he takes a photo for proof, and the buyer gets a notification. Harsh gets another 5-star review, some reward points, and moves up the rankings.

### **03: Wanted Post Turns into a Win for All**

Carina needs a microwave for her dorm but doesn't want to spend a ton. She posts a "**Wanted**" ad with her budget. Jenny sees it and remembers she's got one collecting dust. Harsh handles the delivery. Carina saves money, Jenny clears space, and Harsh earns some cash.

### **04: Product Delivery Matching**

Carina, a final-year CS student, buys a second-hand study table through the campus app. At checkout, she selects Delivery and chooses a time slot for the next day, 3–5 PM. The system checks for delivery agents who are available at that time, have delivery mode turned on, and accept furniture deliveries. Harsh, a grad student and regular delivery agent, appears as a match. Carina selects him. Harsh gets an instant notification and accepts the job. Carina receives his contact details, and they coordinate through in-app chat. Harsh picks up and delivers the table on time. Carina confirms the delivery, leaves a review, and Harsh earns delivery points for future gigs.

### **3. LIST OF MAIN DATA ITEMS AND ENTITIES**

This section defines all the system's key data elements, users, and entities. Each item includes its name, meaning, and intended use. These terms will remain consistent across future documentation, UI design, and software development.

#### **3.1 User Types (Entities with Behavior and Privileges)**

##### **1. Registered User**

- **Meaning:** Registered university student/staff member with a verified campus email.
- **Usage:** Can participate fully in the platform by listing or purchasing products/services, requesting items, engaging in community features, and earning gamification rewards.
- **Privileges:**
  - Create, edit, or delete product listings
  - Purchase items and hire services
  - Post requests on the Need Board
  - Chat with other users (e.g., sellers, service providers)
  - Rate and review transactions
  - Earn badges and points through platform activity
  - Apply to become a Delivery Agent.

##### **2. Guest**

- **Meaning:** A non-logged-in user or any individual accessing the platform without a registered account. This includes the general public or unregistered university members.
- **Usage:** Can search and view product or service listings, explore categories, and read public user reviews.
- **Privileges:**
  - Browse available products and services.
  - View limited seller profiles and ratings.
  - No ability to purchase, list, message, or participate in community boards.

##### **3. Administrator**

- **Meaning:** Authorized platform management personnel responsible for overseeing and maintaining the integrity and operation of the application.
- **Usage:** Monitors user activity, handles reported content or users, manages platform-wide listings, and ensures compliance with community guidelines.
- **Privileges:**
  - View, edit, or delete any product, service, or user data

- Approve or reject user verification requests (e.g., sellers or service providers)
- Moderate user-reported issues (e.g., abuse, fraud, or policy violations)
- Suspend or ban user accounts
- Manage categories, subcategories, and system-wide content
- Access system analytics and user activity logs

### 3.2 Core Data Entities and Structures

#### 1. Product

- **Meaning:** An item being sold on the platform.
- **Fields:** *ProductID, Name, Description, Price, Condition, Images, SellerID, Category, Stock, isAuction, AuctionID(FK to Auction), CreatedAt, UpdatedAt, Status.*
- **Usage:** Viewable by users, searchable, and filterable.

#### 2. UserProfile

- **Meaning:** Profile of a student or staff user.
- **Fields:** *UserID, LastName, FirstName, Email, UserType (Student/Staff), isVerified, Reviews, isDeliveryAgent, Badges, SellCount, BuyCount Level, Bio, JoinedDate, ProfilePicUrl.*
- **Usage:** Displays the user's details, activity, reputation, and badges.

#### 3. Cart

- **Meaning:** A temporary storage area for items that a registered user intends to purchase. It allows users to collect and review products before proceeding to checkout.
- **Fields:** *CartID, UserID, CreatedAt, UpdatedAt, Items<Products, Integer>*
- **Usage:** Displays the user's details, activity, reputation, and badges.

#### 4. DeliveryAgent

- **Meaning:** Profile of a student or staff user.
- **Fields:** *UserID, JoinedDate, Category, Price, isAvailable, PhoneNumber, Reviews, DeliveriesCompleted.*
- **Usage:** Displays the user's details, activity, reputation, and badges.

#### 5. Order

- **Meaning:** Represents a finalized checkout by a user, including products or services.



- **Fields:** *OrderID, UserID, ProductIDs, ServiceIDs, TotalAmount, Status, PaymentStatus, CreatedAt, ShippingAddressID, Notes*
- **Usage:** Tracks confirmed purchases and bridges between Cart and Transaction.

## 6. Category

- **Meaning:** Classification used to organize products and services.
- **Fields:** *CategoryID, Name, Description, Products*
- **Usage:** Helps users filter, search, and explore listings.

## 7. Transaction

- **Meaning:** Record of a product/service purchase.
- **Fields:** *TransactionID, BuyerID, SellerID, ProductIDs, Amount, PaymentMethod, Timestamp, DeliveryStatus, AuctionID.*
- **Usage:** Used for payment confirmation, history, and analytics.

## 8. DeliveryRequest

- **Meaning:** A request for someone to deliver a purchased product.
- **Fields:** *RequestID, OrderID, AssignedDeliveryAgentID, PickupLocation, DropLocation, Status.*
- **Usage:** Managed between the buyer, seller, and delivery agent.

## 9. WantedProduct

- **Meaning:** A post asking for a specific product or service that users are seeking.
- **Fields:** *PostID, UserID, Title, Description, Category, Status, CreatedAt.*
- **Usage:** Visible to all users who can respond with offers.

## 10. Review

- **Meaning:** Feedback mechanism for transactions.
- **Fields:** *ReviewID, ReviewerID, RevieweeID, ProductID, Rating, Comment, Timestamp.*
- **Usage:** Builds trust and reputation for buyers, sellers, and service providers.

## 11. User Engagement Profile

- **Meaning:** Tracks user engagement for a gamified experience.
- **Fields:** *UserID, Badges.*
- **Usage:** Encourages continued use and interaction.

## 12. Address

- **Meaning:** Stores delivery or pickup addresses for users or orders.
- **Fields:** *AddressID, UserID, HouseNumber, Street, City, ZipCode*
- **Usage:** Used for delivery coordination when requesting or fulfilling orders.

### 13. Message

- **Meaning:** Communication between users.
- **Fields:** *MessageID, SenderID, ReceiverID, Text, Timestamp, IsRead.*
- **Usage:** Enables private negotiation and communication.

### 14. Auction

- **Meaning:** Represents an auction event for a specific product.
- **Fields:** *AuctionID, ProductID (FK to Product), SellerID, StartTime, EndTime, StartingPrice, CurrentHighestBid, BidIncrement (optional minimum increment), Status (Active, Ended, Cancelled), WinnerID (nullable)*
- **Usage:** Defines the auction rules, time period, and keeps track of the highest bid.

### 15. Bid

- **Meaning:** Represents a bid made by a user on an auction.
- **Fields:** *BidID, AuctionID (FK to Auction), BidderID (FK to User), BidAmount, Timestamp*
- **Usage:** Tracks each user's bid for audit and competition purposes.

### 16. Report

- **Meaning:** Used to report inappropriate content or users.
- **Fields:** *ReportID, ReporterID, TargetType (User/Product/Service), Reason, Timestamp, Status.*
- **Usage:** Sent to admin for review and action.

### 17. Notification

- **Meaning:** Alerts to user about relevant actions.
- **Fields:** *NotificationID, UserID, Type, Message, ReadStatus, Timestamp.*
- **Usage:** Keeps the user updated on transactions, delivery, and replies.

### 18. Badge

- **Meaning:** Virtual achievements earned by users.
- **Fields:** *BadgeID, Name, Criteria, Description.*
- **Usage:** Enhances profile with achievements.

## **4. INITIAL LIST OF FUNCTIONAL REQUIREMENTS**

### **4.1 Common Features**

**1. User Registration and Authentication**

The system allows university users to register with a verified campus email and log in securely. Guest access is allowed for limited browsing.

**2. Profile Management**

Users can manage their profiles, including viewing, editing personal info, uploading a profile picture, and displaying badges, reviews, and activity stats and finally delete the profile after use.

**3. Product Listing and Management**

Users can create, edit, or delete listings for products. Listings include photos, descriptions, and optional auction settings.

**4. Product Search**

Users can search by keywords and filter by category, rating, price, availability, or delivery options.

**5. Wanted Post Creation**

Users must be able to create wanted posts specifying the item or service they are looking for, including details like category, description, budget, and urgency. These posts should be saved to the system and visible to relevant sellers or service providers.

**6. Matching Wanted page**

The system must automatically match wanted posts with available listings or sellers based on relevance, category, and location. Users should receive notifications when potential matches are found.

**7. Messaging Between Buyers and Sellers**

Registered users can message each other to negotiate sales, schedule calls for discussion, and coordinate deliveries.

**8. Order Placement and Checkout**

Users can add items or products to a cart and place orders. Orders include product details, total price, and notes.

**9. Delivery Mode Management**

The system must allow users to select from multiple configurable delivery modes (e.g., standard, express, local pickup), with pricing, estimated delivery time, and availability based on the user's location, and notify users of the selected delivery details.

**10. Delivery Request and Matching**

Users can request delivery at checkout. The system matches available delivery agents based on time, capacity, and delivery type.

**11. Delivery Fulfillment and Tracking**

Delivery agents accept jobs, view pickup/drop-off info, and mark deliveries complete with proof of delivery.

**12. Ratings**

Users must be able to rate each other on a standard scale (e.g., 1 to 5 stars) after a completed transaction. These ratings should be stored securely and factored into the user's overall reputation score on the platform.

**13. Reviews**

Users must be able to write descriptive reviews about their transaction experience, including comments on the product or service quality. Reviews should be publicly visible on user profiles.

**14. Gamification and Reputation System**

Users earn points, badges, and levels for platform activity like sales, deliveries, and positive reviews.

**15. Notifications and Alerts**

Users receive alerts for messages, bids, orders, delivery updates, reviews, and admin actions via in-app notifications.

**16. Admin Management Tools**

Admins can monitor users, manage content, approve verification, handle reports, and oversee the platform's operation.

**17. Reporting and Moderation**

Users can report inappropriate content or behavior. Admins review reports and take necessary moderation actions.

**18. Guest Browsing Access**

Guests can browse listings, categories, and public reviews but cannot post, message, or purchase.

**19. Secure Payments**

Transactions must be encrypted during transmission and storage, with access restricted to authorized users only through secure authentication methods.

**20. Transaction Logging**

All transactions must be logged with key details (payment status, participants, delivery info) and stored securely for future reference, ensuring immutability and compliance with retention policies.

## **4.2 Unique Features**

**1. Bidding**

Users must be able to place real-time bids on products, with bid status updated instantly, and receive notifications for bid status changes. The auction should automatically close when the set duration ends.

**2. Auction Posting**

Users must be able to post products for auction, including setting a starting price, auction duration, and product details. The system should ensure the posted auction is visible to potential bidders.

**3. Multilingual Interface Support**

The application shall support switching the interface language for core

navigation, buttons, and labels to accommodate users of different linguistic backgrounds limited to German and English Language.

4. **Receive Alerts for Matching Listings**

The system shall notify users when a new product listing matches their Wanted post criteria.

5. **Integrated Delivery Matching:**

System shall match users with available delivery agents based on item type, time slot, and location. The system shall support in-app coordination, tracking, and delivery confirmation.

## **5. LIST OF NON-FUNCTIONAL REQUIREMENTS**

1. Application shall be developed, tested and deployed using tools and servers approved by Class CTO and as agreed in Milestone 0. Application delivery shall be from chosen cloud server.
2. Application shall be optimized for standard desktop/laptop browsers e.g. must render correctly on the two latest versions of two major browsers
3. All or selected application functions must render well on mobile devices
4. Data shall be stored in the database on the team's deployment cloud server.
5. Full resolution free media shall be downloadable directly, and full resolution media for selling shall be obtained after contacting the seller/owner
6. No more than 50 concurrent users shall be accessing the application at any time
7. Privacy of users shall be protected, and all privacy policies will be appropriately communicated to the users.
8. The language used shall be English (no localization needed).
9. Application shall be very easy to use and intuitive.
10. Application should follow established architecture patterns.
11. Application code and its repository shall be easy to inspect and maintain
12. Google analytics shall be used (optional for Fulda teams)
13. No e-mail clients shall be allowed.
14. Pay functionality, if any (e.g. paying for goods and services) shall not be implemented nor simulated in UI.
15. Site security: basic best practices shall be applied (as covered in the class) for main data items.
16. Application shall be media rich (images, video etc.). Media formats shall be standard as used in the market today.
17. Modern SE processes and practices shall be used as specified in the class, including collaborative and continuous SW development.
18. For code development and management, as well as documentation like formal milestones required in the class, each team shall use their own GitHub to be set-up by class instructors and started by each team during Milestone 0.

19. The application UI (WWW and mobile) shall prominently display the following exact text on all pages "Fulda University of Applied Sciences Software. Engineering Project, Summer 2025 For Demonstration Only" at the top of the WWW page. (Important to not confuse this with a real application).

## 6. COMPETITIVE ANALYSIS

Feature	eBay	Kleinanzeigen	Facebook Marketplace	Vinted	Hand2Hand (Planned)
Buying & Selling	✓	✓	✓	✓	✓
Product Bidding	✓	✗	✗	✗	✓
In-App Messaging	✓	✓	✓	✓	✓
Multilingual Translation (German-English)	✗	✗	✗	✗	✓
Integrated Delivery Feature(same day delivery)	✗	✗	✗	✗	✓
Wanted Items Alerts	✗	✗	✗	✗	✓
Mobile & Web Compatibility	✓	✓	✓	✓	✓

Hand2Hand is positioned to **bridge gaps in the current marketplace ecosystem** by offering a unique blend of features that competitors don't fully provide. While eBay supports bidding, it lacks multilingual messaging and robust local delivery in many regions. Kleinanzeigen and Facebook Marketplace focus on simple local trading but **miss key functionalities like bidding, translation, and proactive alerts**. Hand2Hand stands out by integrating a **bidding system, in-app translation between German and English, a reliable delivery feature, and a unique Wanted Items Alert System**—ensuring users enjoy a seamless, inclusive, and highly responsive buying and selling experience. These enhancements make Hand2Hand a **compelling next-generation marketplace** tailored to both local and multilingual user communities.

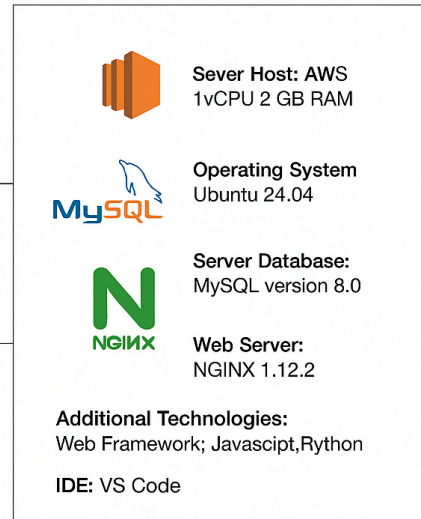
## 7. HIGH-LEVEL SYSTEM ARCHITECTURE AND TECHNOLOGIES USED

- ❖ Server Host: AWS 1vCPU 2 GB RAM
- ❖ Operating System: Ubuntu 24.04
- ❖ Server Database: MySQL version 8.0
- ❖ Web Server: NGINX 1.28.0
- ❖ Server-Side Language: Python 3.13

### **Additional Technologies:**

- ❖ Web Framework: React 19
- ❖ Tailwind CSS: Tailwind CSS 3.2.x
- ❖ IDE: VS Code: 1.79.x
- ❖ Web Analytics: AWS Analytics Studio
- ❖ Trello: Latest version
- ❖ Google Chat: Latest version
- ❖ GitHub Actions: Used for CI/CD

## SYSTEM ARCHITECTURE



## 8. TEAM AND ROLES

NAME	EMAIL	ROLE	MATRICULATION NUMBER	GITHUB USERNAME
Rachna Tiwari	rachna-vivek.tiwari@informatik.hs-fulda.de	Team Lead, Document Master	1568192	rachna-hs-fulda
Shambhavi Santosh Hupare	shambhavi-santosh.hupare@informatik.hs-fulda.de	Fronted Lead	1534137	Shambhavi-0506
Yapa Puwakdandawage Ridma Kaveendra	ridma-kaveendra.yapa-puwakdandawage@informatik.hs-fulda.de	Backend Lead	1533862	ridmakaveendra7
Aishwarya Ravi	aishwarya.ravi@informatik.hs-fulda.de	GitHub Master, Backend Developer	1540215	aishwaryaravi1302
Bindu Laksmanappa	bindu.lakshmanappa@informatik.hs-fulda.de	FrontEnd	1511297	BinduLakshmanappa

## 9. CHECKLIST

Item	Status
Team found a time slot to meet (online) outside of the class	Done ▾
Github master chosen	Done ▾
Team decided and agreed together on using the listed SW tools and deployment server	Done ▾
Team ready and able to use the chosen back and front end frameworks and those who need to learn are working on learning and practicing	On Track ▾
Team lead ensured that all team members read the final M1 and agree/understand it before submission	Done ▾
Github organized as discussed in class (eg. master branch, development branch, folder for milestone documents, etc.)	On Track ▾