Cookie Barrel POS — Semester Project Specification (v1.0)

**Author:** Student (Your Name, Student ID)  
**Audience:** Lecturer/Marker, Teaching Team, Peers  
**Project Type:** Academic case study & design specification (no live deployment)  
**Context:** Semester project to design a wholesale bakery POS that unifies sales, production, delivery, and accounts using publicly available business information.  
**Environment:** Australia/Perth (AWST).

**Categories and Pricing List:** <https://docs.google.com/spreadsheets/d/19B8IWm8OLRJaaJkT0i_YiveUIbDmeHnL8IWHPVYVRWI/edit?usp=sharing>

# 1. Scope & Objectives

**In scope (semester version):** POS (staff-facing) with ordering, invoicing, production/packing views, delivery run management, AR, reporting, and admin. System enforces GST-exclusive pricing, delivery zones and fees, free-delivery threshold, and weekday cut-offs by product group. Includes diagrams, test plan, prototype scope, and academic references.

**Out of scope (v1, academic):** Live integration to real payment gateways/accounting; production data migration; advanced inventory costing (FIFO/LIFO); route optimisation; organisational change management. Prototypes/data are hypothetical and sourced from public pages for demonstration only.

**Learning Objectives:**

* Apply software engineering methods to elicit and formalise requirements (functional & non-functional).
* Model the system with UML and data schemas.
* Plan validation via structured test cases and acceptance criteria.
* Reflect on ethics, privacy, and risk management.

# 2. Business Rules & Assumptions (Case Study)

1. **Pricing & Tax**: Prices are GST-exclusive; GST (10%) added at checkout/invoice. Invoices are Tax Invoices (with ABN & GST breakdown).
2. **Delivery Coverage & Fees**: Primary area: Perth Metro. Additional areas configurable (e.g., Bunbury Fridays, regional freight). Free delivery when subtotal (ex‑GST) ≥ AUD $50; otherwise apply zone fee.
3. **Delivery Days**: Deliveries Monday–Friday per zone schedule.
4. **Order Cut‑offs (for next scheduled delivery day)**: 12:00 noon for Muffins, Vanilla Slices, Loaves/Banana Breads, Savouries; 16:00 for all other products. Mixed baskets follow the earlier cut‑off.
5. **Standing Orders**: Recurring wholesale orders honouring cut‑offs.
6. **POD**: Signature or photo at delivery; stored on order.
7. **Returns & Credits**: Permitted with reasons; credit notes flow to AR.

**Assumption:** This is a **hypothetical academic design** based on publicly available information; no confidential data is used.

# 3. Roles & Permissions Matrix

| Module / Page | Admin | Sales/Counter | Production/Kitchen | Dispatch/Driver | Accounts |
| --- | --- | --- | --- | --- | --- |
| Login / Switch Location | ✓ | ✓ | ✓ | ✓ | ✓ |
| Dashboard | ✓ | ✓ | ✓ | ✓ | ✓ |
| Orders – List/Detail | ✓ | ✓ (create/edit) | R | R | R |
| Orders – Create | ✓ | ✓ | – | – | – |
| Returns / Credits | ✓ | ✓ | – | – | ✓ |
| Customers – List/Detail | ✓ | ✓ | – | – | R |
| Catalog – Products/Variants | ✓ | R | – | – | – |
| Inventory – Movements/Adjustments | ✓ | R | R | – | – |
| Production – Today/Tickets/Packing | ✓ | R | ✓ | R | – |
| Delivery – Zones/Runs/POD | ✓ | R | R | ✓ | – |
| Invoices & Payments | ✓ | R | – | – | ✓ |
| Statements & Aging | ✓ | – | – | – | ✓ |
| Reports | ✓ | R | R | R | ✓ |
| Settings (Taxes/Cut‑offs/Zones/Users/Hardware/Integrations) | ✓ | – | – | – | – |
| Audit Log | ✓ | – | – | – | – |

# 4. Page Inventory (POS)

Each page lists **Purpose, Key UI Blocks, Primary Actions, Validations/Rules, Error States**.

## 4.1 Login & Switch Location

* **Purpose:** Secure entry; pick store/warehouse context if multi‑location.
* **UI:** Username/PIN; role shown on success; optional biometric on tablets; location selector.
* **Actions:** Login; Switch Location.
* **Validation:** Strong password/PIN; lockout after 5 failures; role-based landing.
* **Errors:** Invalid credentials; user disabled; device not registered (if hardware binding enabled).

## 4.2 Dashboard (Today)

* **Purpose:** Operational snapshot for the day.
* **UI:** KPIs (orders due today, in production, packed, out for delivery, delivered, exceptions); quick links; alerts (missed cut‑offs, low stock).
* **Actions:** Create Order; Print Picklist; Open Delivery Runs; End-of-Day.
* **Validation:** Counts reflect filters by location/date; permissions gate action buttons.
* **Errors:** None beyond data fetch errors.

## 4.3 Orders – List

* **Purpose:** Find and manage orders.
* **UI:** Filters (status, date range, customer, channel), table (Order #, customer, delivery date, status, total), quick chips for statuses.
* **Actions:** Create New; Open; Duplicate; Cancel; Export CSV.
* **Validation:** Cancel only if not yet in production/packed; duplication preserves items but resets delivery slot.
* **Errors:** Prevent cancel when already dispatched.

## 4.4 Order – Create (Sales Entry)

* **Purpose:** Enter a new order.
* **UI Blocks:** Customer lookup; delivery address/zone; delivery date picker (rule‑constrained); item add (search/scan/grid); cart lines (qty, notes, discounts); totals (ex‑GST, GST, fees, grand total); payment block (on account/card/bank); order notes.
* **Primary Actions:** Save as Draft; Confirm Order; Take Payment; Print/Email Quote.
* **Validations & Rules:**
  + **Customer & Pricing:** Price tier from customer; volume discounts if configured.
  + **Cut‑offs:** If cart contains any **noon-group** product, date picker only allows next scheduled day if now ≤ 12:00; otherwise push to the subsequent valid day. Otherwise allow next day if now ≤ 16:00.
  + **Delivery Days:** Only show dates matching selected address’s zone schedule.
  + **Free Delivery:** Apply when subtotal ex‑GST ≥ $50; otherwise apply zone fee.
  + **GST:** Compute per line then sum; display ex‑GST subtotal + GST + fees.
  + **Payment:** On Account requires customer within credit limit; capture card via integrated gateway; bank transfer marks as Unallocated until reconciled.
* **Errors & Edge Cases:**
  + Cut‑off missed → inline blocker with reason and **next available date suggestion**.
  + Out‑of‑stock item (if inventory enforced) → backorder prompt or quantity cap.
  + Credit limit exceeded → override requires Admin.

## 4.5 Order – Detail

* **Purpose:** Manage lifecycle from confirm → production → dispatch → POD.
* **UI:** Header (status timeline, customer/contact, delivery date/slot); item list; payments; docs (invoice, picklist, labels); activity log.
* **Actions:** Edit (until production); Send to Production; Print Picklist; Assign to Run; Mark Packed; Mark Out for Delivery; Capture POD; Issue Credit; Re‑send Invoice.
* **Validations:** Status transition guards; editing locked after packing unless Admin; POD required before setting Delivered.
* **Errors:** Prevent status move if required step missing (e.g., cannot “Out for Delivery” if not packed).

## 4.6 Returns & Credits

* **Purpose:** Process returns and issue credit notes.
* **UI:** Search order; select items/qty; reason (damaged, short shipped, quality issue, customer cancelled, other); notes; credit total.
* **Actions:** Create Credit Note; Print/Email; Restock goods (optional flag); trigger refund if payment captured.
* **Validation:** Qty ≤ delivered qty; reason mandatory; refund path depends on original payment method.

## 4.7 Customers – List & Detail

* **Purpose:** Maintain customer master data and AR controls.
* **UI:** List with search/filters; Detail: profile, ABN, contacts, addresses, price tier, terms, credit limit, notes, AR snapshot (balance, aging), order history.
* **Actions:** Create/Edit; Set credit limit; Download Statement; Send invite to App/WhatsApp.
* **Validation:** Unique ABN + primary email/phone; zone assignment required for delivery addresses.

## 4.8 Catalog – Products & Variants

* **Purpose:** Manage sellable items.
* **UI:** Products table; filters by category/tags; Product detail tabs: General, Variants, Pricing (by tier), Allergens/Tags, Media.
* **Actions:** Create/Edit product; add variants (SKU, pack size, barcode); set group tag for cut‑off logic; bulk import/export.
* **Validation:** Unique SKU; define **Group Tag** = {Muffins | Vanilla Slice | Loaves | Savouries | Other}.

## 4.9 Inventory – Movements & Adjustments (optional strictness)

* **Purpose:** Track stock where relevant.
* **UI:** On‑hand by variant; low‑stock alerts; movement history; adjustment form.
* **Actions:** Receive stock; consume to production; adjust; set reorder point.
* **Validation:** Negative on‑hand warning (unless allowed); role-gated adjustments.

## 4.10 Production – Today / Tickets / Packing

* **Purpose:** Give kitchen/packing clarity on what to make and pack.
* **UI:** **Today’s Production** aggregated by category (e.g., Muffins total 420) with drill‑down to orders; **Tickets** per order/item; **Packing List** grouped by run.
* **Actions:** Mark Made; Mark Packed; print labels; record shortage/substitution.
* **Validation:** Cannot mark Packed if not Made; shortages require customer consent (flag on order) or substitution list.

## 4.11 Delivery – Zones, Runs & POD

* **Purpose:** Plan and execute deliveries.
* **UI:** **Zones** (name, days, fee, free threshold); **Runs** (date, zone, assigned orders, sequence); **Driver View** with stop list & maps; **POD** capture.
* **Actions:** Create Run; Auto‑assign by zone/day; reorder stops; print run sheets; mark Out for Delivery; capture signature/photo; mark Delivered; report exception.
* **Validation:** Only orders with matching delivery date/zone can be added to a run; POD required for Delivered.

## 4.12 Invoices & Payments

* **Purpose:** AR lifecycle.
* **UI:** Invoice list; invoice detail (PDF preview); payment records; reconciliation status.
* **Actions:** Issue invoice (on confirm or on dispatch per config); email invoice; record payment (card/transfer); void/reissue with reason.
* **Validation:** Tax invoice format compliance; prevent delete if payments exist; credit note links to invoice.

## 4.13 Statements & Aging

* **Purpose:** Credit control.
* **UI:** Aging buckets; customer balances; statement generator.
* **Actions:** Email statements; export CSV; place account on hold.
* **Validation:** On‑hold blocks new orders or forces prepayment.

## 4.14 Reports

* **Purpose:** Operational & financial insight.
* **Reports:** Sales by day/week/month; by customer; by category/product; GST summary; delivery performance (OTIF); production variance; returns/credits; top 20 items.
* **Actions:** Filters; export; schedule email.

## 4.15 Settings & Admin

* **Sections:** Business Profile (ABN, addresses), Taxes (GST 10%), Price Tiers, **Cut‑off Rules** (group and time), Delivery Zones (days, fee, free threshold), Users/Roles, Hardware (printers, scanners, card readers), Integrations (Xero/QuickBooks, Stripe, WhatsApp), Notifications (email/SMS templates), Audit Log.
* **Validation:** Guardrails for changes impacting live orders; audit every change.

# 5. Core Workflows

## 5.1 Order‑to‑Cash (OTC)

1. Sales creates order → system validates zone/dates and **cut‑off** rules.
2. Order confirmed → **Invoice issued** (or on dispatch per config) → payment captured or AR.
3. Order sent to **Production** → items **Made** → **Packed**.
4. Dispatcher assigns to **Run** → **Out for Delivery** → **POD** captured → status **Delivered**.
5. If any return → **Credit Note** issued → AR updated.

## 5.2 Cut‑off Enforcement

* On **Confirm** or when selecting **Delivery Date**, evaluate basket group tags:  
  + If any item ∈ {Muffins, Vanilla Slices, Loaves, Savouries} → apply **12:00** rule.
  + Else → apply **16:00** rule.
* If now past applicable cut‑off for “next scheduled day,” suggest the **next valid delivery day** for the zone.

## 5.3 Delivery Scheduling

* Each delivery address belongs to a **Zone** with configured delivery **days of week**.
* Date picker only exposes valid days. Free delivery auto‑applies at ≥ $50 ex‑GST.

## 5.4 Standing Orders

* Recurrence via RRULE (e.g., FREQ=WEEKLY;BYDAY=TU).
* Generated N days ahead (configurable), observing cut‑offs.

## 5.5 Production Aggregation & KDS

* Aggregate open orders by product/variant for the target production day.
* Show totals (e.g., Muffins Blueberry: 180), with drill‑down to which orders.

## 5.6 Dispatch & POD

* Auto‑group orders into runs by **zone + delivery date**; allow manual re‑sequence.
* Driver app captures **signature or photo**; offline caching allowed; sync on reconnect.

## 5.7 Returns & Refunds

* Partial/whole return with reason; **Credit Note** issued; optional inventory restock; refunds processed via original payment method where applicable.

# 6. Data Model (Entity Definitions)

*(No code—IDs shown as patterns for implementation.)*

* **Customer** {cust\_id (CB‑CUST‑00001), name, ABN, tier\_id, credit\_limit, terms, status}
* **Contact** {contact\_id, cust\_id, name, phone, email, is\_primary}
* **Address** {addr\_id, cust\_id, type{billing,delivery}, line1.., suburb, state, postcode, zone\_id}
* **Zone** {zone\_id (ZONE‑PERTH), name, days\_mask, delivery\_fee, free\_threshold}
* **Product** {prod\_id, name, category\_id, allergens, group\_tag}
* **Variant** {var\_id (SKU), prod\_id, barcode, pack\_size, uom, price\_by\_tier{tier\_id→price\_ex\_gst}}
* **Inventory** {var\_id, location\_id, on\_hand, reserved, reorder\_point}
* **Order** {order\_id (CB‑ORD‑2025‑000001), cust\_id, status, channel{POS,App,WA}, delivery\_date, addr\_id, zone\_id, subtotal\_ex\_gst, gst, delivery\_fee, total\_inc\_gst, payment\_status}
* **OrderItem** {order\_item\_id, order\_id, var\_id, qty, unit\_price\_ex\_gst, discount, notes}
* **StandingOrder** {so\_id, cust\_id, rrule, items\_json, next\_gen\_date}
* **Invoice** {inv\_id (CB‑INV‑2025‑000001), order\_id, issue\_date, due\_date, ex\_gst, gst, total, status}
* **Payment** {pay\_id, inv\_id, method, amount, txn\_ref, settled\_at}
* **Run** {run\_id (RUN‑2025‑09‑19‑ZONE‑PERTH‑01), date, zone\_id, driver\_id, status}
* **RunStop** {stop\_id, run\_id, order\_id, sequence, pod\_signature\_url, pod\_photo\_url, delivered\_at}
* **User** {user\_id, name, role, email, status}
* **Audit** {audit\_id, actor\_user\_id, entity, entity\_id, action, before, after, ts}

# 7. Enumerations / Lookups

* **Roles:** Admin, Sales/Counter, Production/Kitchen, Dispatch/Driver, Accounts.
* **Order Status:** draft → confirmed → in\_production → packed → out\_for\_delivery → delivered → partial → cancelled → returned → refunded.
* **Payment Methods:** cash, card, account, bank\_transfer, pay\_link.
* **Return Reasons:** damaged, short\_shipped, quality\_issue, customer\_cancelled, other.
* **Units of Measure (UOM):** ea, pk3, pk6, pk12, pk24, pk48, kg.
* **Cut‑off Groups:** Muffins, Vanilla Slice, Loaves, Savouries, Other.

# 8. ID & Slug Conventions

* Use **stable, readable IDs** for cross‑system logging (e.g., CB‑ORD‑YYYY‑NNNNNN).
* Slugs lower‑kebab (e.g., banana-breads). SKUs are canonical for variants.
* Time fields stored UTC; display in **Australia/Perth**.

# 9. Integrations (Not Necessary)

* **Payments:** Stripe (card present via terminal SDK optional; card‑not‑present via hosted pay link). No raw PAN storage (PCI‑DSS).
* **Accounting:** Xero/QuickBooks—sync contacts, invoices, payments, tax codes; reconciliation remains in accounting suite.
* **Messaging:** Email (SendGrid)/SMS; WhatsApp handover (future phases) shares the same order backend.
* **Printing:** Network/USB receipt & A4 printers; label printers for packing.

# 10. Reporting & Analytics (Minimum Set)

* **Sales:** by date, customer, product, category, channel.
* **Finance:** GST summary, AR aging, payments received, outstanding balances.
* **Ops:** delivery performance (OTIF), production totals, returns/credits by reason.
* **Inventory:** on‑hand, low‑stock, movements.

# 11. Non‑Functional Requirements

* **Observability:** Centralised logs, metrics, alerting; error codes documented.

# 12. Acceptance Criteria & Test Scenarios

**Cut‑off Logic** —

* Basket with only “Other” items at **15:30** allows next scheduled day; at **16:05** pushes to next valid day.
* Basket containing any Muffin/Loaf/Savoury/Vanilla Slice at **11:50** allows next day; at **12:05** pushes to next valid day.

**Free Delivery Threshold** —

* Subtotal **49.99** ex‑GST → fee applies; **50.00** ex‑GST → free delivery.

**Delivery Zoning** —

* Address in Zone A only shows Zone A delivery days.

**AR & Invoicing** —

* Invoice shows ex‑GST subtotal, GST 10%, total inc‑GST, ABN, “Tax Invoice.”
* Credit note reduces AR balance and ties to source invoice.

**POD** —

* Cannot set Delivered without signature/photo; exception required otherwise.

**Permissions** —

* Sales cannot change Cut‑off Rules; Admin only.

**Audit** —

* Changing delivery date on confirmed order writes audit entry with before/after.

# 13. Glossary

* **AR:** Accounts Receivable.
* **Cut‑off:** Latest time an order can be placed for the next delivery day.
* **POD:** Proof of Delivery (signature/photo).
* **Zone:** Delivery area with a weekly schedule and fee rules.
* **Group Tag:** Category used to apply cut‑off rules to items.