UNIVERSITY OF AGRICULTURE, FAISALABAD

Department of Computer Science

DATABASE DESIGN DOCUMENT

CampusBridge UAF

Centralized Student E-Services
& Workflow Routing Platform

13 tables | 15 foreign keys | Version 2.0

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DATABASE	MySQL 8 / MariaDB 10.4+, InnoDB, utf8mb4
CONTENT	ER diagram, table groups, relationships, data dictionary of all 13 tables, scripts and upgrade path
SOURCE	Generated from the live schema (database/schema.sql plus the manageable_statuses migration), checked against 2_Database/campusbridge_uaf_schema.sql

1 Overview

The database **campusbridge_uaf** stores accounts, campuses, services, applications and settings for the Student E-Services Portal. It has **13 tables** and 15 foreign keys. Three design choices shape it:

- **Services are data.** Form fields, completion fields and allowed roles are JSON in service_configurations, so a new service needs no table change.
- **Campuses are data.** Students and requests carry a campus_id; staff are linked to campuses through staff_campuses; one query rule limits every list and report.
- **Security state is in the database.** Login lockout (auth_throttle), reset codes and verification codes are stored hashed with expiry.

Group	Tables
Access	users, roles, staff_campuses
Campus model	campuses, departments
Services and requests	service_configurations, service_requests, credentials_dispatch
Security	auth_throttle, password_resets, email_verifications
System	site_settings, audit_logs

2 Entity Relationship Diagram

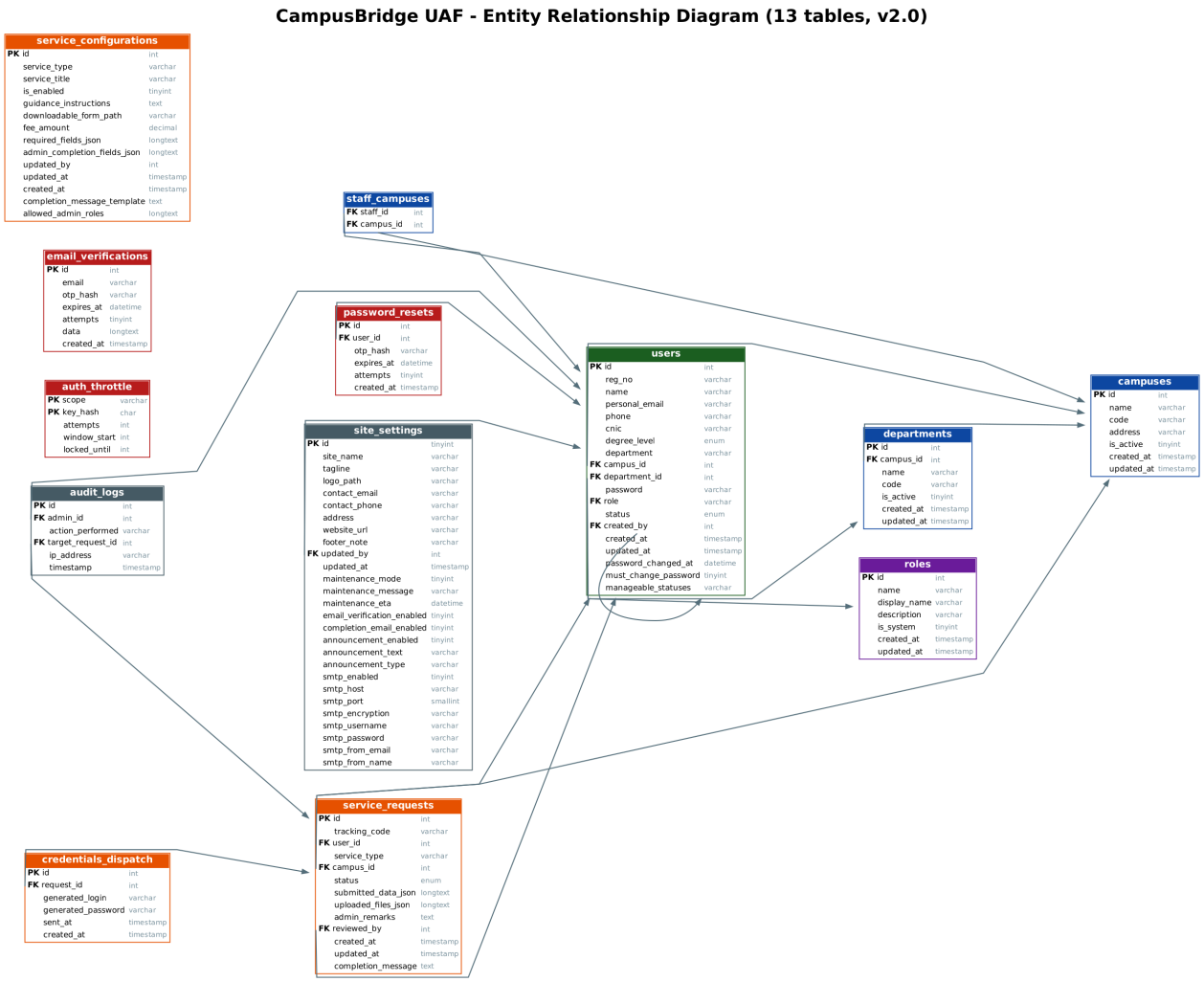

Fig. 1 - ER diagram of the 13 tables (PK = primary key, FK = foreign key). A larger copy is in CampusBridge_UAF_ERD.pdf / .png.

3 Relationships

Child table	Column	References
audit_logs	admin_id	users
audit_logs	target_request_id	service_requests
staff_campuses	campus_id	campuses
staff_campuses	staff_id	users
departments	campus_id	campuses
password_resets	user_id	users
service_requests	reviewed_by	users
service_requests	user_id	users
service_requests	campus_id	campuses
credentials_dispatch	request_id	service_requests
site_settings	updated_by	users
users	campus_id	campuses
users	created_by	users
users	department_id	departments
users	role	roles

users.role also refers to roles.name by value. Deleting a user sets audit and reviewer references to NULL; deleting a request removes its credentials_dispatch rows.

4 Data Dictionary

audit_logs

Important actions: who, what, optional target request, IP address and time.

Column	Type	Null	Key	Default	Comment
id	int(10) unsigned	NO	PK	-	
admin_id	int(10) unsigned	YES	INDEX	-	
action_performed	varchar(255)	NO		-	
target_request_id	int(10) unsigned	YES	INDEX	-	
ip_address	varchar(45)	YES		-	
timestamp	timestamp	NO		current_timestamp()	

auth_throttle

Counters for login and chatbot lockout. Keys are hashed; one row per scope and key.

Column	Type	Null	Key	Default	Comment
scope	varchar(40)	NO	PK	-	
key_hash	char(64)	NO	PK	-	
attempts	int(10) unsigned	NO		0	
window_start	int(10) unsigned	NO		0	
locked_until	int(10) unsigned	NO		0	

campuses

Campuses of the university with a short code and an address.

Column	Type	Null	Key	Default	Comment
id	int(10) unsigned	NO	PK	-	
name	varchar(150)	NO		-	
code	varchar(20)	NO	UNIQUE	-	
address	varchar(255)	YES		-	
is_active	tinyint(1)	NO		1	
created_at	timestamp	NO		current_timestamp()	
updated_at	timestamp	NO		current_timestamp()	

credentials_dispatch

Login details created when a Wi-Fi, email or LMS request is completed, and when they were emailed.

Column	Type	Null	Key	Default	Comment
id	int(10) unsigned	NO	PK	-	
request_id	int(10) unsigned	NO	INDEX	-	
generated_login	varchar(150)	NO		-	
generated_password	varchar(100)	NO		-	plaintext shown once, then emailed - not the account password hash
sent_at	timestamp	YES		-	
created_at	timestamp	NO		current_timestamp()	

departments

Departments, each belonging to one campus, with a short code.

Column	Type	Null	Key	Default	Comment
id	int(10) unsigned	NO	PK	-	
campus_id	int(10) unsigned	NO	INDEX	-	
name	varchar(150)	NO	INDEX	-	
code	varchar(20)	YES		-	
is_active	tinyint(1)	NO		1	
created_at	timestamp	NO		current_timestamp()	
updated_at	timestamp	NO		current_timestamp()	

email_verifications

Hashed one-time codes for registration, with the pending registration data.

Column	Type	Null	Key	Default	Comment
id	int(10) unsigned	NO	PK	-	
email	varchar(150)	NO		-	
otp_hash	varchar(255)	NO		-	
expires_at	datetime	NO		-	
attempts	tinyint(3) unsigned	NO		0	
data	longtext	NO		-	Stores pending registration data
created_at	timestamp	NO		current_timestamp()	

password_resets

Hashed one-time codes for forgot-password, with expiry and attempt counter.

Column	Type	Null	Key	Default	Comment
id	int(10) unsigned	NO	PK	-	
user_id	int(10) unsigned	NO	INDEX	-	
otp_hash	varchar(255)	NO		-	password_hash() of the 6-digit OTP -- never stored in plaintext
expires_at	datetime	NO		-	
attempts	tinyint(3) unsigned	NO		0	
created_at	timestamp	NO		current_timestamp()	

roles

Role names and display names. System roles (is_system = 1) are protected from deletion; custom roles can be created.

Column	Type	Null	Key	Default	Comment
id	int(10) unsigned	NO	PK	-	
name	varchar(50)	NO	UNIQUE	-	e.g., it_admin, super_admin
display_name	varchar(100)	NO		-	e.g., IT Admin
description	varchar(255)	YES		-	
is_system	tinyint(1)	NO		0	1 = protected from deletion
created_at	timestamp	NO		current_timestamp()	
updated_at	timestamp	NO		current_timestamp()	

service_configurations

One row per e-service: title, fee, guidance, downloadable form, form fields (JSON), completion fields (JSON), completion message template and allowed roles (JSON).

Column	Type	Null	Key	Default	Comment
id	int(10) unsigned	NO	PK	-	
service_type	varchar(50)	NO		-	
service_title	varchar(150)	NO		-	
is_enabled	tinyint(1)	NO		1	
guidance_instructions	text	YES		-	
downloadable_form_path	varchar(255)	YES		-	admin-uploaded PDF/DOCX template
fee_amount	decimal(10,2)	YES		-	informational only; display next to guidance
required_fields_json	longtext	YES		-	JSON array describing ALL admin-defined form fields (text/number/date/
admin_completion_fields_json	longtext	YES		-	

Column	Type	Null	Key	Default	Comment
updated_by	int(10) unsigned	YES		-	
updated_at	timestamp	NO		current_timestamp()	
created_at	timestamp	NO		current_timestamp()	
completion_message_template	text	YES		-	
allowed_admin_roles	longtext	YES		-	

service_requests

One application: tracking code, student, service, campus, status, answers and uploaded file names (JSON), remarks, reviewer and completion message.

Column	Type	Null	Key	Default	Comment
id	int(10) unsigned	NO	PK	-	
tracking_code	varchar(20)	NO	UNIQUE	-	e.g. CB-WIFI-000123
user_id	int(10) unsigned	NO	INDEX	-	
service_type	varchar(50)	NO	INDEX	-	
campus_id	int(10) unsigned	YES	INDEX	-	
status	enum('Pending','Under_Review','Completed','Rejected','Returned')	NO	INDEX	'Pending'	
submitted_data_json	longtext	YES		-	JSON: dynamic text/number/date/select/textarea field answers
uploaded_files_json	longtext	YES		-	JSON object {field_name: stored_relative_path} for every admin-defined
admin_remarks	text	YES		-	
reviewed_by	int(10) unsigned	YES	INDEX	-	
created_at	timestamp	NO		current_timestamp()	
updated_at	timestamp	NO		current_timestamp()	
completion_message	text	YES		-	

site_settings

Single row (id = 1): branding, contact, banner, maintenance mode, email switches and SMTP settings.

Column	Type	Null	Key	Default	Comment
id	tinyint(3) unsigned	NO	PK	1	
site_name	varchar(150)	NO		'CampusBridge UAF'	
tagline	varchar(200)	YES		-	
logo_path	varchar(255)	YES		-	admin-uploaded logo, shown in header/footer/print forms

Column	Type	Null	Key	Default	Comment
contact_email	varchar(150)	YES		-	
contact_phone	varchar(30)	YES		-	
address	varchar(255)	YES		-	
website_url	varchar(255)	YES		-	
footer_note	varchar(255)	YES		-	short line shown in the site + form footer, e.g. office hours
updated_by	int(10) unsigned	YES	INDEX	-	
updated_at	timestamp	NO		current_timestamp()	
maintenance_mode	tinyint(1)	NO		0	
maintenance_message	varchar(500)	YES		-	
maintenance_eta	datetime	YES		-	
email_verification_enabled	tinyint(1)	NO		1	1 = require OTP on student registration
completion_email_enabled	tinyint(1)	NO		1	1 = send completion/status emails on review
announcement_enabled	tinyint(1)	NO		0	
announcement_text	varchar(500)	YES		-	
announcement_type	varchar(10)	NO		'info'	
smtp_enabled	tinyint(1)	NO		1	
smtp_host	varchar(190)	YES		-	
smtp_port	smallint(5) unsigned	NO		587	
smtp_encryption	varchar(10)	NO		'tls'	
smtp_username	varchar(190)	YES		-	
smtp_password	varchar(255)	YES		-	
smtp_from_email	varchar(190)	YES		-	
smtp_from_name	varchar(150)	YES		-	

staff_campuses

Many-to-many link: which campuses a staff member or Campus Admin may work with.

Column	Type	Null	Key	Default	Comment
staff_id	int(10) unsigned	NO	PK	-	
campus_id	int(10) unsigned	NO	PK	-	

users

Every account: students, staff, Campus Admins and the Super Admin. The role column holds the role name. cnic is unique; must_change_password forces a new password at the next login; manageable_statuses is a JSON list of the request statuses a staff member may set (NULL = all).

Column	Type	Null	Key	Default	Comment
id	int(10) unsigned	NO	PK	-	
reg_no	varchar(20)	NO	UNIQUE	-	e.g. 2023-ag-10110, NULL pattern enforced in app for staff
name	varchar(120)	NO		-	
personal_email	varchar(150)	NO	UNIQUE	-	
phone	varchar(20)	YES		-	
cnic	varchar(15)	YES	UNIQUE	-	Format: 12345-1234567-8
degree_level	enum('BS','MS','MPhil','PhD','N/A')	NO		'N/A'	
department	varchar(120)	YES		-	
campus_id	int(10) unsigned	YES	INDEX	-	
department_id	int(10) unsigned	YES	INDEX	-	
password	varchar(255)	NO		-	password_hash() output
role	varchar(50)	NO	INDEX	'student'	
status	enum('active','inactive')	NO		'active'	
created_by	int(10) unsigned	YES	INDEX	-	super admin who provisioned this staff account
created_at	timestamp	NO		current_timestamp()	
updated_at	timestamp	NO		current_timestamp()	
password_changed_at	datetime	YES		-	
must_change_password	tinyint(1)	NO		0	
manageable_statuses	varchar(255)	YES		-	JSON list of request statuses this staff member may manage; NULL = all

5 Starter Data

Table	Rows in the script
roles	8 default roles: super_admin, it_admin, dsa_admin, library_admin, exam_admin, student, lms_admin, campus_admin
service_configurations	7 services: wifi, email, student_card, library_card, dmc, fees, lms
campuses, departments	3 sample campuses (FSD, BWL, TTS) and 9 sample departments; edit from the Campuses page
users	One Super Admin placeholder with an invalid password hash. Set the real password with scripts/reset_admin_password.php
site_settings	One row with defaults; SMTP user and password are entered in Site Settings

6 Scripts and Upgrade Path

File	Use
campusbridge_uaf_schema.sql	Clean install: creates the database, 13 tables and starter data. Import in phpMyAdmin or with mysql.
update_campuses_departments.sql	Only for databases older than the campus feature: adds campuses, departments, staff_campuses and the campus columns.
update_to_v2.sql	Upgrade an existing database to version 2.0: new tables, new columns, Campus Admin role. Safe to run more than once.
sql-viewer.html	Read and copy the install script in a browser.

Checked. The install script was imported into MariaDB 10.11 and its columns compared with the live site schema (identical). The upgrade script was run on a database with the version 2.0 parts removed and then again, and ended with the same columns.

Note. users.cnic is unique in the live schema. On a database upgraded from an older version, add the unique index after checking that no two students share a CNIC.