# School of Technology, Design and Computer Application

Silver Oak College of Engineering and Technology Bachelor of Technology - Computer Engineering Semester: 5 | Academic Year: 2025-2026

Course: Software Engineering & Methodology (1010043342)

Library Management System — DFD, ER & UML Diagrams

Name: Desai Hitanshree Rajendrakumar | Enrollment: 2301031800023

Roll No: 44 | Class: C

Date: September 04, 2025

# DFD — Level 0

Student

Admin

**Library**■**System**

|  |  |
| --- | --- |
| D1: Library DB |  |
|  |  |

**DFD — Level 1 (Issue & Return)**

1.0 Search Books Admin

2.0 Issue Book

Student

3.0 Return Book

D1: Library DB

# ER Diagram

STUDENT (student\_id, name, email) BOOK (book\_id, title, author, isbn, copie

borrows

1..\*

1..\*

ADMIN (admin\_id, name, email) TRANSACTION (txn\_id, issue\_date, due

manages / records

# UML — Use Case Diagram

Library System

**Student**

Search Books

Borrow Book

Reports

Return Book

Manage Books

Reserve Book

Pay Fine

**Admin**

# UML — Sequence Diagram (Issue Book)

**Student UI LibraryService DB**

search(query)

searchBooks(query)

SELECT ...

results

render(results)

borrow(bookId)

issueBook(bookId, studentId)

INSERT txn; UPDATE copies

ok

show confirmation

**UML — Activity Diagram (Return Book)**

Start

Scan Transaction / Book

Validate Record

Compute Fine (if overdue)

Update DB & Close Transaction

End

**UML — Class Diagram**

|  |  |  |
| --- | --- | --- |
| **Book** | borrows | **User** |
| * bookId: int * title: string * author: string * isbn: string * copies: int | * userId: int * name: string * email: string * role: enum   / reserves |
| isAvailable() decrementCopy() incrementCopy() | borrowBook() returnBook() reserveBook() |
|  |