**ABSTRACT**

In today's digital age, the efficiency and effectiveness of library management systems play a crucial role in facilitating seamless access to information resources. This abstract presents the development and implementation of a modernized Library Management System (LMS) utilizing Barcode technology tailored specifically for an engineering college library environment. Traditional library systems often face challenges such as manual book check-in/check-out procedures, inventory management issues, and difficulty in tracking book locations. To address these challenges, our project focuses on leveraging Barcodes to streamline library operations and enhance user experience. The proposed system integrates Barcodes into every physical book within the library's collection. Each book is assigned a unique Barcode containing information such as its title, author, category, and location within the library. Additionally, user accounts are created for students and staff, allowing them to interact with the system through a dedicated mobile application.

**Key features of the Barcode-based LMS include:**

1. Efficient Book Transactions: Users can easily scan Barcodes using their smartphones to perform various transactions, including borrowing and returning books. This eliminates the need for manual data entry and reduces waiting times at the circulation desk.

2. Real-Time Inventory Management: The system maintains an up-to-date inventory of all books in the library. Librarians can track book movements, identify missing items, and replenish stock efficiently.

3. Personalized User Experience: Students and faculty members can access their borrowing history, receive reminders for overdue books, and place requests for book reservations through the mobile application.