

# **Brunta Technical Implementation Plan**

## **Phase 1: Core Development (Months 1-3)**

### **Week 1-4: Foundation**

- Database design
- API architecture
- Authentication system
- Basic UI/UX

### **Week 5-8: Core Features**

- School management module
- User management
- Basic exam system
- Content management

### **Week 9-12: Testing**

- Unit testing
- Integration testing
- Security testing
- Performance testing

## **Phase 2: Advanced Features (Months 4-6)**

### **Week 13-16: Examination System**

- Exam creation
- Automated grading
- Result analysis
- Report generation

### **Week 17-20: Content Management**

- Resource library
- Study materials
- Video integration
- Assignment system

### **Week 21-24: Mobile Development**

- Mobile app design
- Core features
- Offline mode
- Push notifications

## **Phase 3: Integration & Enhancement (Months 7-9)**

### **Week 25-28: Analytics**

- Performance tracking
- Usage analytics
- Predictive analysis
- Reporting tools

### **Week 29-32: Security**

- Data encryption
- Access control
- Backup systems
- Disaster recovery

### **Week 33-36: Optimization**

- Performance tuning
- UI/UX improvements
- Feature enhancements
- Bug fixes

## **Technical Stack**

### **Frontend**

- React.js
- Tailwind CSS
- Redux for state management
- React Router for navigation
- Chart.js for analytics
- React Big Calendar for scheduling

### **Backend**

- Node.js
- Express.js
- MongoDB for database
- Redis for caching
- JWT for authentication
- Socket.io for real-time features

### **Mobile**

- React Native
- Redux for state management
- React Navigation

- Offline storage
- Push notifications

### **Infrastructure**

- AWS/Azure cloud services
- Docker containers
- CI/CD pipeline
- Load balancing
- CDN for static content

## **Security Measures**

### **1. Authentication & Authorization**

- Multi-factor authentication
- Role-based access control
- Session management
- Password policies

### **2. Data Security**

- End-to-end encryption
- Secure data storage
- Regular backups
- Data privacy compliance

### **3. Network Security**

- SSL/TLS encryption
- DDoS protection
- Firewall configuration
- Regular security audits

## **Performance Optimization**

### **1. Frontend Optimization**

- Code splitting
- Lazy loading
- Image optimization
- Caching strategies

### **2. Backend Optimization**

- Database indexing
- Query optimization
- Caching implementation

- Load balancing

### **3. Mobile Optimization**

- Offline functionality
- Battery optimization
- Data usage optimization
- Push notification optimization

## **Monitoring & Maintenance**

### **1. System Monitoring**

- Performance metrics
- Error tracking
- User analytics
- Resource utilization

### **2. Regular Maintenance**

- Security updates
- Bug fixes
- Feature updates
- Database maintenance

### **3. Backup & Recovery**

- Automated backups
- Disaster recovery plan
- Data retention policy
- Recovery testing

## **Development Workflow**

### **1. Version Control**

- Git repository
- Branch management
- Code review process
- Merge strategies

### **2. Testing Strategy**

- Unit testing
- Integration testing
- UI testing
- Performance testing

### **3. Deployment Process**

- Staging environment
- Production deployment
- Rollback procedures
- Version management

## **Documentation**

### **1. Technical Documentation**

- API documentation
- Database schema
- Architecture diagrams
- Security protocols

### **2. User Documentation**

- User guides
- Admin manuals
- API guides
- Troubleshooting guides

### **3. Development Documentation**

- Setup guides
- Coding standards
- Best practices
- Deployment guides