# Android Developer Intern

## Brief Internship Report

Submitted for the partial fulfillment of the degree of

## Bachelor of Technology

In

## Computer Science & Design


**Submitted By**

**Harsh Kachhway**

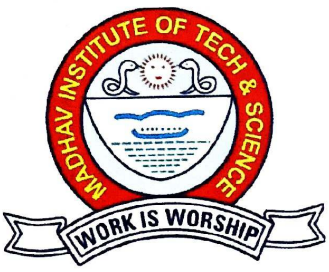
**0901CD211027**

**UNDER THE SUPERVISION AND GUIDANCE OF**

**Dr. Kuldeep Narayan Tripathi**

**Assistant Professor**

**Department of Computer Science & Engineering**



**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR (M.P.), INDIA**
**माधव प्रौद्योगिकी एवं विज्ञान संस्थान, ग्वालियर (म.प्र.), भारत**
**(Deemed to be University)**
**NAAC ACCREDITED WITH A++ GRADE**


**January-May 2025**

# Internship certificate

Certificate ID: SIXZ

CIN U72900MP2019PTC050487

YEAR OF 2025

CRYSTALTECH
Services Private Limited

CERTIFICATE
OF INTERNSHIP

This certificate awarded to

**Harsh Kachhway**

HAS SUCCESSFULLY COMPLETED AN INTERNSHIP AS

**Android Developer Intern**

Conducted from 01 Jan 2025 – 31 May 2025

We appreciate your Hard Work & Contributions.

31-MAY-2025

DATE

#startupindia

ISO

GOURAV MOURYA

SIGNATURE

*Please verify on our website with the ID to confirm if the document is genuine. If it's not available, then the document is fake.

## DECLARATION BY THE CANDIDATE

I hereby declare that the work entitled **Android Developer Intern** is my work, conducted under the supervision of **Dr. Kuldeep Narayan Tripathi, Assistant Professor ,** during the session Jan-May 2025. The report submitted by me is a record of bonafide work carried out by me.

I further declare that the work reported in this report has not been submitted and will not be submitted, either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

---

**Harsh Kachhway**

**0901CD211027**

**Date: 21 - May - 2025**
**Place: Gwalior**

---

This is to certify that the above statement made by the candidates is correct to the best of my knowledge and belief.

**Guided By:**

21/05/25

**Dr. Kuldeep Narayan Tripathi**
**Assistant Professor**
Computer Science and Engineering
MITS, Gwalior

21/05/25

**Departmental Internship Coordinator**

21/05/25

**Dr. Kuldeep Narayan Tripathi**
**Assistant Professor**
Computer Science and Engineering
MITS, Gwalior

**Approved by HoD:**

Dr. Manish Dixit
Professor & HOD
Department of CSE
M.I.T.S. Gwalior

**Dr. Manish Dixit**
**Head of the Department**
Computer Science and Engineering
MITS, Gwalior

# PLAGIARISM CHECK CERTIFICATE

This is to certify that I, a student of B.Tech. in **Computer Science and Engineering** have checked my complete report entitled **Android Developer Intern** for similarity/plagiarism using the "Turnitin" software available in the institute.

This is to certify that the similarity in my report is found to be 22% which is within the specified limit (30%).

The full plagiarism report along with the summary is enclosed.

---

**Harsh Kachhway**

**0901CD211027**

**Checked & Approved By:**

---

**Prof. Mahesh Parmar**
**Assistant Professor**
**Computer Science & Engineering**
MITS, Gwalior

# ABSTRACT

The development of an online shopping application using cutting-edge Android technologies, such as Kotlin, Jetpack Compose, Ktor Framework, Kotlin Multiplatform, and Android Studio, is demonstrated in this internship report. The main goal of the project was to create a user-friendly, responsive mobile application that enables integrated shopping cart management, item browsing, and transaction processing. I gained practical experience with cross-platform development methodologies, UI/UX design, API integration, and mobile application development during my internship at CrystalTech Services. By enabling digital trade, supporting local organizations, and making shopping more accessible to a larger population, the app not only demonstrates technical proficiency but also has significant social significance. The project's objectives, technologies used, development outcomes, and social impact are all covered in detail in this report.

# ACKNOWLEDGEMENT

The full semester Internship has proved to be pivotal to my career. I am thankful to my institute, **Madhav Institute of Technology and Science** to allow me to continue my disciplinary/interdisciplinary Internship as a curriculum requirement, under the provisions of the Flexible Curriculum Scheme (based on the AICTE Model Curriculum 2018), approved by the Academic Council of the institute. I extend my gratitude to the **Vice Chancellor** of the institute, **Dr. R. K. Pandit** and **Dean Faculty of Engineering & Technology**, **Dr. Manjaree Pandit** for this.

I would sincerely like to thank my department, **Department of Computer Science and Engineering**, for allowing me to explore this Internship. I humbly thank **Dr. Manish Dixit**, Professor and **Head, Department of Computer Science and Engineering**, for his continued support during the course of this engagement, which eased the process and formalities involved.

I am sincerely thankful to my faculty mentors.Grateful to the guidance of **Dr. Kuldeep Narayan Tripathi ,Computer Science and Engineering**, for his continued support and guidance throughout the Internship. I am also very thankful to the faculty and staff of the department

---

**Harsh Kachhway**

**0901CD211027**

## CONTENT

# Table of Contents

# ACRONYMS

| Acronym | Full Form |
|---|---|
| API | Application Programming Interface |
| IDE | Integrated Development Environment |
| UI | User Interface |
| UX | User Experience |
| KMP | Kotlin Multiplatform |
| HTTP | HyperText Transfer Protocol |

# NOMENCLATURE

**Term Meaning**

Kotlin A modern programming language used for Android development.

Jetpack Compose A toolkit for building native Android UIs declaratively.

Ktor A framework for building connected client-server applications.

Android Studio Official IDE for Android development.

Shopping Cart A feature that allows users to collect multiple products before checkout.

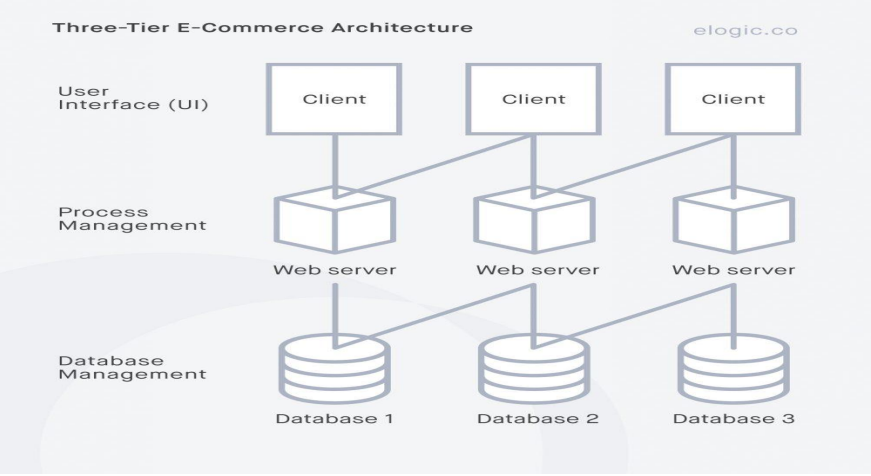
Cross-platform Ability of software to run on multiple operating systems (Android, iOS).

# LIST OF FIGURES

# CHAPTER 1: INTRODUCTION

Online shopping apps have revolutionized the way people buy goods in the current digital era by providing a vast array of options and unmatched convenience. The creation of an online shopping application during the internship at Crystal Tech Services is described in this report. Utilizing cutting-edge technologies like Kotlin, Jetpack Compose, Ktor Framework, Kotlin Multiplatform, and Android Studio, the project's goal was to design and implement a cross-platform, scalable, and user-friendly mobile shopping experience.

Users can easily browse products, add items to their cart, and finish purchases with the help of the application. The backend services were powered by the Ktor Framework for effective API communication, while the frontend was created with Jetpack Compose for dynamic and responsive user interfaces. Kotlin Multiplatform made it possible for iOS and Android to share business logic.



# CHAPTER 2: LITERATURE SURVEY/BACKGROUND/TECHNOLOGY

Many online shopping applications have been developed as a result of the e-commerce industry's explosive growth over the last ten years. By providing features like simple navigation, safe payment, tailored suggestions, and effective cart management, apps like Amazon, Flipkart, and Myntra have raised the bar. Modern apps need to concentrate on offering smooth user experiences, cross-platform accessibility, and real-time data synchronization in order to remain competitive.

New technologies like Kotlin, Jetpack Compose, and Kotlin Multiplatform have become effective tools for creating complex shopping apps with minimal effort and maximum code reuse, in response to the need for faster development cycles and scalable solutions.

Overview of Technology

1. Kotlin

Google officially supports Kotlin, a contemporary statically-typed programming language, for Android development. It decreases boilerplate code, increases code readability, and improves.

2. Jetpack composition

Jetpack Composes is a announcement -UI tool kit that was launched by Google for manufacturing the original Android interface. This allows developers to create responsible, dynamic and flexible user interfaces with high efficiency using low codes and higher than XML-based layouts.

3. KTOR Framework

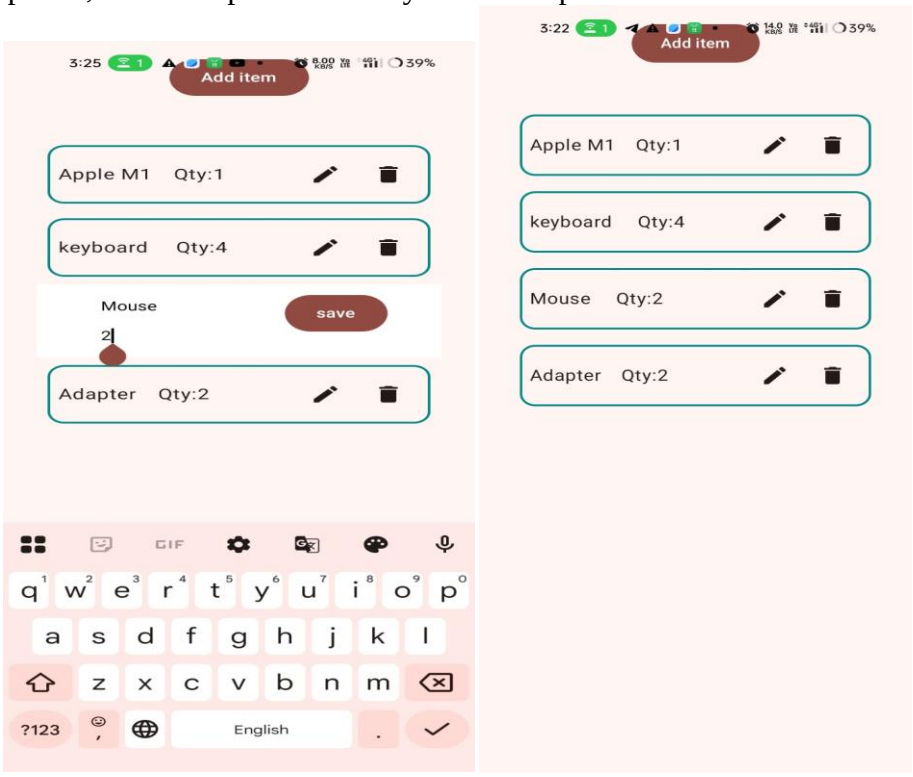
Ktor is an excessive structure designed with Kotlin to create a connected system, especially APIs. In this project, KTOR is used to effectively handle client-server communication, ensuring fast and secure data exchange between mobile applications and servers.

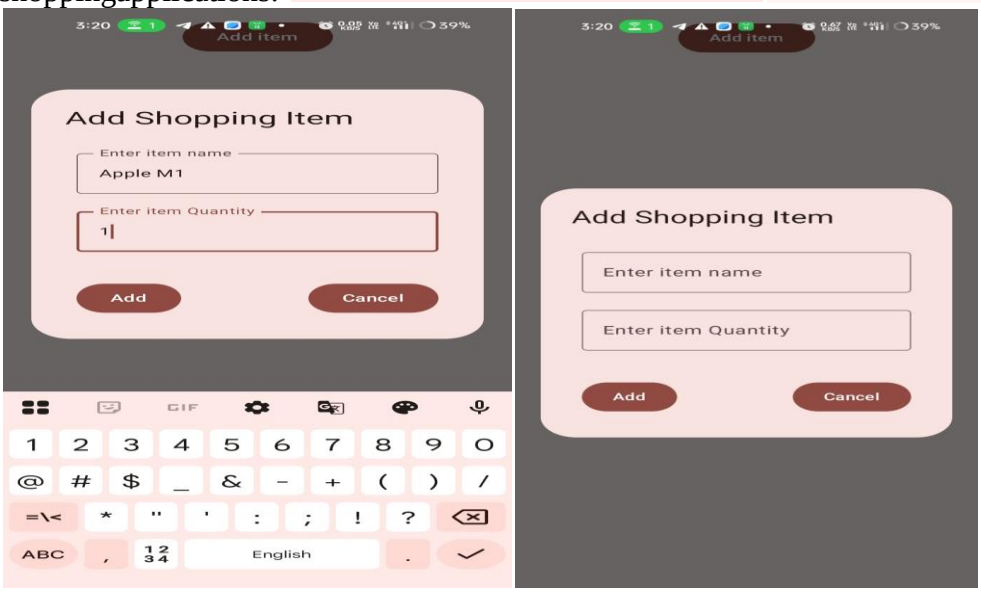
4. Kotlin Multiplate form

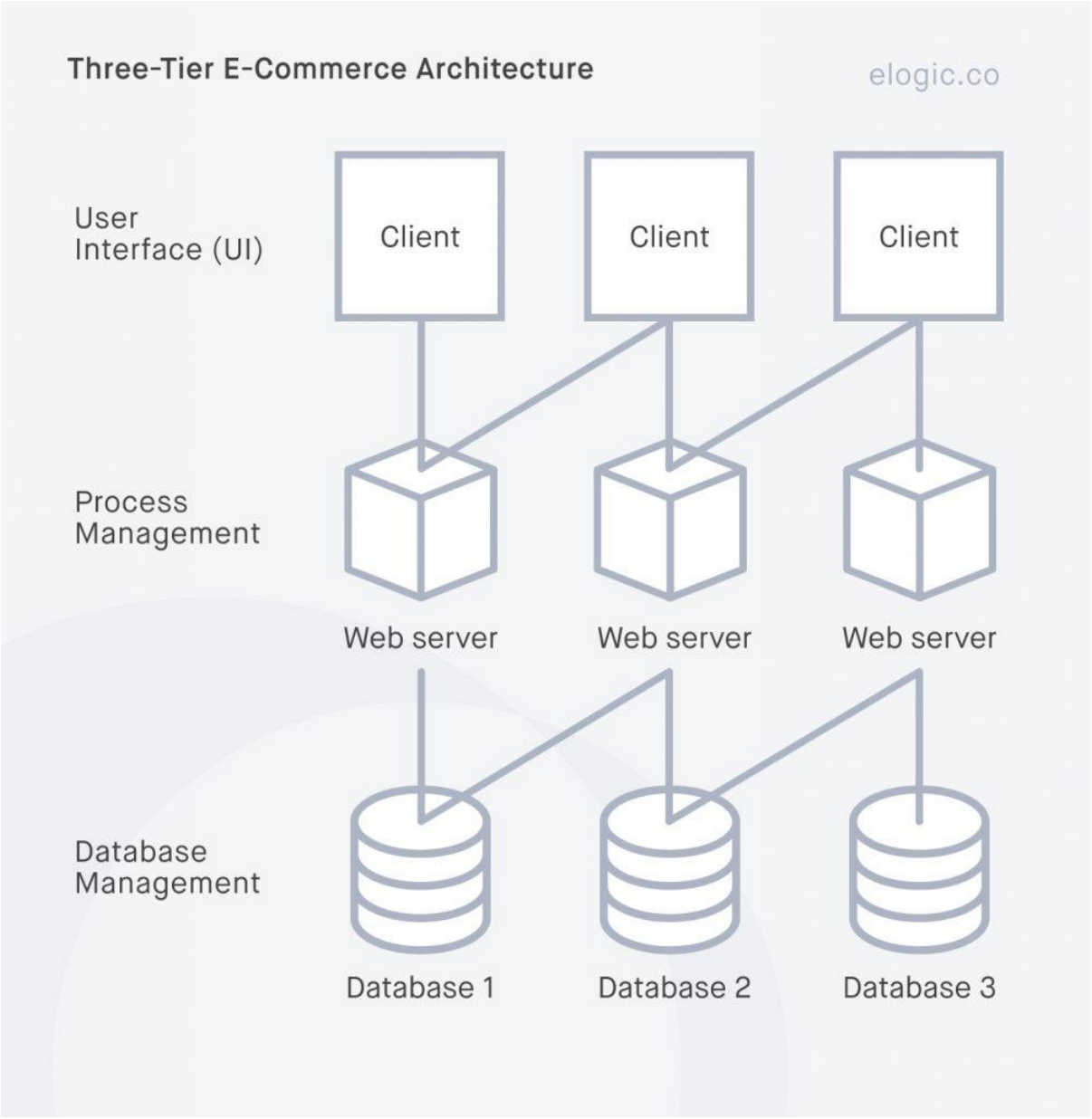
Kotlin Multiplate form enables the sharing of the business logic code into many platforms (Android and iOS), and keeps the platform -specific user interface separately. This reduces the time and efforts for growth for across platform applications.

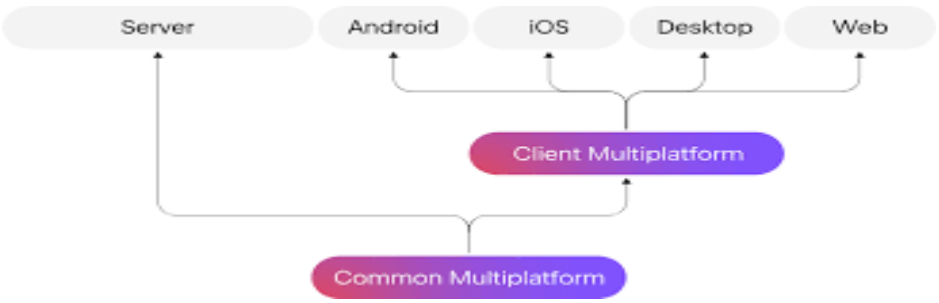
5. Android Studio

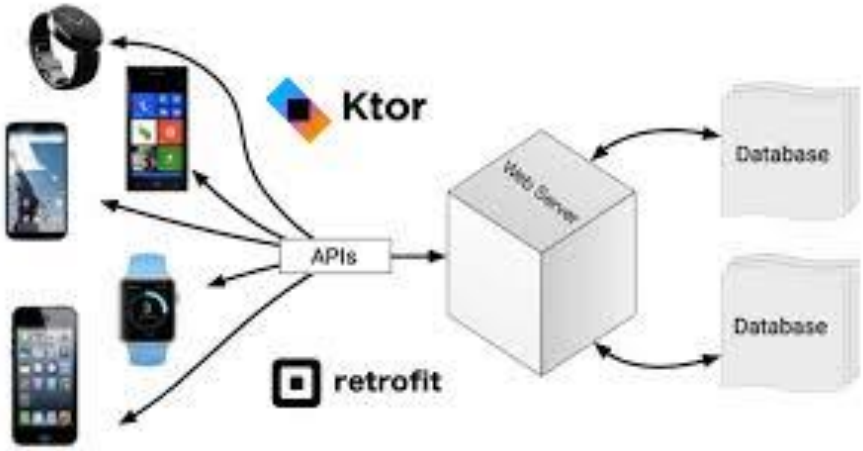
Android Studio is the official integrated Development Environment (idea) for Android App Development. It offers powerful tools such as Intelligent Code Editor, Ui Designer, Emulator and Troubleshooting Options, which helped effectively the development of online shoppingapplications.




Three-Tier E-Commerce Architecture
elogic.co
User Interface (UI)
Client
Client
Client
Process Management
Web server
Web server
Web server
Database Management
Database 1
Database 2
Database 3


Server
Android
iOS
Desktop
Web
Client Multiplatform
Common Multiplatform


Ktor
APIs
Web Server
Database
Database
retrofit

# CHAPTER 3: OBJECTIVES OF INTERNSHIP

The main goals of this internship at Crystal Tech Services were:

**1. Hands-on Skill Use:**

To put book knowledge about coding mobile app creation, and software design into practice on a real project.

**2. Building an Online Shopping App**:

To plan, make, and launch a working online shopping app for phones using new tech like Kotlin, Jetpack Compose, Ktor Framework, and Kotlin Multiplatform.

**3. Getting Good at New Dev Tools:**

To work with pro tools and frameworks including Android Studio, Ktor API building, and ways to share code across platforms.

**4. Improving UI/UX Design Abilities**:

To learn and use the best ways to create easy-to-use interfaces with Jetpack Compose.

**5. Understanding Client-Server Communication**:

To build APIs that enable safe and quick data sharing between the mobile app and backend servers using Ktor Framework.

**6. Cross-Platform Application Development:**

To check out and use Kotlin Multiplatform to share business logic between Android and iOS platforms. This helps reuse code and cuts down on development time.

**7. Professional Growth and Industry Exposure:**

To get used to how the industry works learn about software development processes get better at talking and working with others, and prepare for future job roles.

# CHAPTER 4: TASK AND RESPONSIBILITIES

While interning at Crystal Tech Services, I took on these jobs and duties for the Online Shopping Application project:

**1. Requirement Analysis and Planning**

- Collected and examined the needs to build the online shopping application.
- Grasped what the client wanted and the business goals for the app.
- Drew up a project plan and schedule for each stage of development.

**2. Application Design**

- Crafted easy-to-use and adaptable UI/UX screens with Jetpack Compose.
- Made wireframes and mockups for user paths like product browsing, cart additions, and buying.

**3. Frontend Development**

- Built user interfaces for the home screen, product lists, cart control, and order placement using Kotlin and Jetpack Compose.
- Put in place state management and flexible layouts to make the user experience better.

**4. Backend Integration**

- We built and connected REST APIs with the Ktor Framework. These APIs handle user logins, fetch product info, and manage orders.
- The app and deals with API requests and responses.

**5. Cross-Platform Code Sharing**

- We used Kotlin Multiplatform to share key parts of our code (like data models and API handlers) between Android and future iOS versions.
- This keeps core features the same across different platforms.

6. **Testing and Debugging**

- We ran lots of unit tests and UI tests to make sure the app works well and doesn't crash.

**7. Team Collaboration**

- Collaborated with mentors, designers, and backend developers for seamless integration.

# CHAPTER 5: KEY LEARNINGS

My internship at Crystal Tech Services gave me a chance to pick up many technical and professional skills as I worked on the Online Shopping Application. Here's what I learned:

**1. Technical Skill Enhancement**

- I got hands-on practice in building mobile apps with Kotlin and Jetpack Compose.
- I saw how the Ktor Framework works to create safe and quick API connections.
- I grasped the basics of Kotlin Multiplatform and how to use it for apps that work on different platforms and share business logic.
- I got better at using Android Studio as a main tool to design, build, fix, and test mobile apps.

**2. UI/UX Design Skills**

- I figured out how to make modern, responsive, and easy-to-use interfaces with Jetpack Compose's declarative UI methods.
- I learned ways to make the user experience (UX) better through good layout management, navigation design, and testing how easy it is to use.

**3. Project and Code Management**

- Improved my ability to write clean easy-to-maintain, and modular code.
- Learned how important it is to document, control versions, and review code in a professional setting where software is made.

**4. Problem-Solving and Debugging**

- Got better at thinking and fixing issues while solving bugs and making the app run faster at different points in its creation.

**5. Industry Exposure and Teamwork**

Saw firsthand how a real software company operates day-to-day.

# CHAPTER 6:CHALLENGES FACED & SOLUTIONS

Let's dive into the challenges we faced and the solutions we found along the way!

- UI Complexity with Jetpack Compose**

**Challenge:** One of the hurdles was designing responsive user interfaces for different screen sizes, especially since we were still getting the hang of Jetpack Compose's declarative approach.

**Solution:** We took the time to study the official documentation and tutorials, and we practiced hands-on to really grasp layouts and animations.

- Cross-Platform Code Sharing with Kotlin Multiplatform**

**Challenge:** We needed to share business logic between Android and iOS, all while navigating the unique quirks of each platform's UI and sensors.

**Solution:** We dug into best practices, implemented shared business logic, and made good use of expect/actual declarations for the platform-specific code.

- API Integration and Data Synchronization**

**Challenge:** Another challenge was managing API integrations and ensuring that data synchronization ran smoothly, especially when dealing with network errors and latency.

**Solution:** We leveraged the Ktor Framework for asynchronous tasks, applied error handling strategies like retries and caching, and optimized our API calls to minimize network usage.

- Performance Optimization and Debugging**

**Challenge:** We noticed performance lags when loading large product lists or during complex UI transitions.

**Solution:** We profiled the app to pinpoint bottlenecks, optimized memory usage, improved RecyclerView rendering, and tackled memory leaks using the tools available in Android Studio.

- Collaborating with a Remote Team**

**Challenge:** Working with a remote team spread across different locations posed some coordination challenges.

**Solution:** We relied on tools like Slack, Trello, and Git for communication and task management, ensuring we held regular virtual meetings and conducted thorough code reviews.

# CHAPTER 7: CONCLUSION

My internship at Crystal Tech Services was an incredibly rewarding experience. Working on the Online Shopping Application gave me the chance to put my technical skills to the test and improve them in Kotlin, Jetpack Compose, Ktor Framework, Kotlin Multiplatform, and Android Studio. As I navigated the development process, I gained a deeper insight into mobile application architecture, UI/UX design, API integration, and sharing code across platforms.

Tackling real-world challenges really highlighted the importance of problem-solving, adaptability, and the need for continuous learning. Collaborating with the team remotely not only sharpened my communication skills but also introduced me to the ins and outs of professional software development workflows and best practices.

This internship was a crucial step in bridging the gap between what I learned in school and what's expected in the industry. It set me up for future opportunities in mobile and cross-platform development, reigniting my passion for creating scalable, user-friendly applications and boosting my confidence to take on bigger, more complex projects down the line.

All in all, this experience played a significant role in my technical growth, professional development, and readiness for my career.

# REFERENCES

**Please Follow Standard Format such as IEEE Format**


[1] JetBrains, "Kotlin Programming Language," [Online]. Available: https://kotlinlang.org/. [Accessed: 18-Apr-2025].

[2] Google Developers, "Jetpack Compose – Modern toolkit for building native UI," [Online]. Available: https://developer.android.com/jetpack/compose. [Accessed: 18-Apr-2025].

[3] JetBrains, "Ktor Framework for Asynchronous Server and Client Applications," [Online]. Available: https://ktor.io/. [Accessed: 19-Apr-2025].

[4] JetBrains, "Kotlin Multiplatform – Share Code Between Platforms," [Online]. Available: https://kotlinlang.org/lp/mobile/. [Accessed: 20-Apr-2025].

[5] Android Developers, "Android Studio IDE Overview," [Online]. Available: https://developer.android.com/studio. [Accessed: 21-Apr-2025].

[6] Crystal Tech Services, "About Crystal Tech Services," [Online]. Available: https://www.crystaltechservices.com/. [Accessed: 22-Apr-2025].

# Harsh

## (0901CD211027)Internship-Major project _Report CSD (very_Final).docx

Madhav Institute of Technology & Science

### Document Details

Submission ID
trn:oid:::28506:96982326

Submission Date
May 21, 2025, 12:12 PM GMT+5:30

Download Date
May 21, 2025, 12:14 PM GMT+5:30

File Name
0901CD211027)Internship-Major project _Report CSD (very_Final).docx

File Size
.0 MB

27 Pages

2,496 Words

14,947 Characters

# 22% Overall Similarity

Submission ID trn:oid:::28506:96982326

The combined total of all matches, including overlapping sources, for each database.

## Filtered from the Report

- Bibliography
- Quoted Text
- Cited Text

## Match Groups

21 Not Cited or Quoted 22%
Matches with neither in-text citation nor quotation marks

0 Missing Quotations 0%
Matches that are still very similar to source material

0 Missing Citation 0%
Matches that have quotation marks, but no in-text citation

0 Cited and Quoted 0%
Matches with in-text citation present, but no quotation marks

## Top Sources

19% Internet sources
2% Publications
20% Submitted works (Student Papers)

## Integrity Flags

**0 Integrity Flags for Review**

No suspicious text manipulations found.

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

# MPRS (IF APPLICABLE)

माधव प्रौद्योगिकी एवं विज्ञान संस्थान, ग्वालियर (म.प्र.), भारत
MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR (M.P.), INDIA
(Declared under Distinct Category by Ministry of Education, Government of India)
NAAC ACCREDITED WITH A++ GRADE

Centre for Internet of Things

## Fortnightly Progress Report (FPR) From Industry Mentor

| Name of student | Harsh Kachhway | | Department | IT | |
|---|---|---|---|---|---|
| Industry/Organization | Crystaltech Services Private Limited | | Date/Duration | Department | |
| **Criterion** | **Poor** | **Average** | **Good** | **Very Good** | **Excellent** |
| Punctuality/Timely completion of assigned work | | | | | ✓ |
| Learning capacity / Knowledge upgradation | | | | ✓ | |
| Performance / Quality of work | | | | | ✓ |
| Behavior/Discipline/Team work | | | | | ✓ |
| Sincerity/Hard work | | | | | ✓ |
| Comment on the nature of workdone /Area/Topic | Backend working on goining projects.<br>CMS Updation with API's Working and Training | | | | |
| **OVERALL GRADE** | **POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT** ✓ | | | | |
| **Name of Industry Mentor** | Gourav Mourya | | | | |
| **Signature of Industry Mentor** | | | | | |

| **Receiving Date** | | **Name of Faculty Mentor** | Dr. Kuleep Narayan Tripathi | **Sign** | |
|---|---|---|---|---|---|

# MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute, Affiliated to RGPV, Bhopal)

**NAAC Accredited with A++ Grade**

## MONTHLY PROGRESS REPORT (MPR) FROM FACULTY MENTOR

| | | | | | |
|---|---|---|---|---|---|
| Name of student | Harsh Kachhway | | Department | IT | |
| Industry/Organization | Crystaltech Services Pvt. Ltd | | Date/Duration | 15/02/2025 – 15/03/2025 | |
| Criterion | Poor | Average | Good | Very Good | Excellent |
| Punctuality/Timely completion of assigned work | | | | ✓ | |
| Learning capacity/Knowledge up-gradation | | | | ✓ | |
| Performance/Quality of work | | | | | ✓ |
| Behavior/Discipline/Teamwork | | | | | ✓ |
| Sincerity/Hard work | | | | | ✓ |
| Comment on nature of work done/Area/Topic | • Project Overview<br>• Technologies Used<br>• Work Completed<br>• UI/UX Design<br>• Backend Integration<br>• Challenges Faced<br>• Testing & Debugging<br>• Performance Optimization<br>• Pending Work<br>• Learnings & Conclusion | | | | |
| OVERALL GRADE (Anyone) | POOR/ AVERAGE/ GOOD/ VERY GOOD/ EXCELLENT | | | | |
| Name of Industry Mentor | Gourav Mourya | | | | |
| Signature of Industry Mentor | CRYSTALTECH SERVICES PVT. LTD. Director | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Receiving Date | | Name of Faculty Mentor | Dr. Kuldeep Narayan Tripathi | Sign | |

# MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute, Affiliated to RGPV, Bhopal)

***NAAC Accredited with A++ Grade***

## MONTHLY PROGRESS REPORT (MPR) FROM FACULTY MENTOR

| | | | | | |
|---|---|---|---|---|---|
| Name of student | Harsh Kachhway | | Department | CSE | |
| Industry/Organization | Crystaltech Services Pvt. Ltd. | | Date/Duration | 15/03/2025 – 15/04/2025 | |
| Criterion | Poor | Average | Good | Very Good | Excellent |
| Punctuality/Timely completion of assigned work | | | | ✓ | |
| Learning capacity/Knowledge up-gradation | | | | ✓ | |
| Performance/Quality of work | | | | | ✓ |
| Behavior/Discipline/Teamwork | | | | | ✓ |
| Sincerity/Hard work | | | | | ✓ |
| Comment on nature of work done/Area/Topic | • Future Scope & Enhancements<br>• Team Collaboration & Roles<br>• Version Control & Code Management (e.g., Git)<br>• Third-Party APIs or Libraries Used<br>• Security Measures Implemented<br>• Database Design & Schema Overview<br>• Deployment Details (Platform, Process)<br>• User Feedback & Iterations (if any)<br>• Screenshots & Interface Walkthrough<br>• Appendix & References | | | | |
| OVERALL GRADE (Anyone) | POOR/ AVERAGE/ GOOD/ VERY GOOD/ EXCELLENT | | | | |
| Name of Industry Mentor | Gourav Mourya | | | | |
| Signature of Industry Mentor | CRYSTALTECH SERVICES Pvt. Ltd. Director | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Receiving Date | | Name of Faculty Mentor | Dr. Kuldeep Narayan Tripathi | Sign | |