**SOAP and REST Web Services**

**Introduction to Web Services**

Web Services are software components that allow applications to communicate over a network (usually the internet).

They enable interoperability between different platforms, languages, and systems.

What are APIs (Application Programming Interfaces)?

APIs are rules and protocols that let two software systems interact.

A Web API exposes certain functionalities of an application over the web.

Example: Google Maps API lets apps embed maps.

HTTP Methods (used in REST APIs)

1. GET – Retrieve data (e.g., get user details).

2. POST – Create new data (e.g., add a new user).

3. PUT – Update existing data fully.

4. PATCH – Update partially.

5. DELETE – Remove data.

**SOAP vs REST**

SOAP (Simple Object Access Protocol)

Protocol-based, XML messages only.

Heavy, secure, supports transactions.

Used in enterprise systems.

REST (Representational State Transfer)

Architecture style, lightweight.

Supports JSON, XML, text, etc.

Faster, easier, widely used for web/mobile apps.

**JSON vs XML Payloads**

JSON (JavaScript Object Notation)

Lightweight, human-readable, widely used.

Example:

{ "id": 1, "name": "Ruchitha" }

XML (eXtensible Markup Language)

Heavier, tag-based, supports attributes.

Example:

<user id="1"><name>Ruchitha</name></user>

**HTTP Status Codes**

200 OK → Success

201 Created → Resource created

400 Bad Request → Invalid request

401 Unauthorized → Authentication required

403 Forbidden → No access rights

404 Not Found → Resource not found

500 Internal Server Error → Server failed

**Testing Tools for Web Services**

Postman – Popular for REST API testing.

SoapUI – Good for SOAP and REST.

JMeter – Performance and load testing.

Swagger – API documentation and testing.

Katalon Studio – Automated API testing.