**Full Breakdown of Weekly Learning & Implementation**

**Project: Movie Recommendation System (Angular + Node.js + MongoDB + Machine Learning)**

**Prerequisites (Before Week 1)**

Before starting, you should be comfortable with:  
✅ **JavaScript (ES6+)** – Arrow functions, Promises, Async/Await  
✅ **Basic TypeScript** – Interfaces, Types, Classes  
✅ **Basic HTML & CSS** – Flexbox, Grid, Media Queries  
✅ **Basic Python (for ML part)** – Pandas, NumPy, Scikit-learn  
✅ **REST API Concepts** – HTTP Methods (GET, POST, PUT, DELETE)

**Week 1: Angular Basics & Component Lifecycle**

**Topics to Learn:**

1️⃣ **Introduction to Angular & Setup**

* Installing Angular CLI
* Creating a new Angular project
* Folder structure explanation

2️⃣ **Angular Components & Lifecycle Hooks**

* Creating and structuring components
* Lifecycle hooks (ngOnInit(), ngOnChanges(), ngOnDestroy())

3️⃣ **Data Binding & Directives**

* Interpolation, Property binding, Event binding
* \*ngIf, \*ngFor, [ngClass], [ngStyle]

4️⃣ **Routing in Angular**

* RouterModule setup
* Creating **Home, Movie Details, and Recommended Movies pages**

**Project Implementation:**

✅ Set up Angular project  
✅ Create **Movie List & Movie Details pages**  
✅ Implement **data binding & routing**

**Week 2: API Integration & Movie Data Handling**

**Topics to Learn:**

1️⃣ **Fetching Data from an API**

* Using HttpClientModule
* Making API calls to TMDB API

2️⃣ **Observables & Promises**

* Handling asynchronous data with RxJS

3️⃣ **Pagination & Infinite Scrolling**

* Implement infinite scrolling for movies

4️⃣ **Routing & Movie Search**

* Implement a **search bar**

**Project Implementation:**

✅ Fetch movie data from **TMDB API**  
✅ Display **movie details dynamically**  
✅ Implement **search functionality**

**Week 3: Authentication & User Profiles**

**Topics to Learn:**

1️⃣ **User Authentication Basics**

* JWT-based authentication

2️⃣ **Angular Forms (Template-driven & Reactive Forms)**

* Implementing login & signup

3️⃣ **User Profiles & Watchlist**

* Saving favorite movies

4️⃣ **Route Guards & User Roles**

* Restricting access to certain pages

**Project Implementation:**

✅ Implement **user authentication**  
✅ Store **favorite movies in MongoDB**  
✅ Implement **route guards**

**Week 4: Movie Recommendation System (Machine Learning)**

**Topics to Learn:**

1️⃣ **Introduction to Movie Recommendation Systems**

* **Content-based filtering**
* **Collaborative filtering**

2️⃣ **Building a Content-Based Recommendation Model**

* Using **TF-IDF Vectorization**
* Cosine similarity for movie recommendations

3️⃣ **Building a Collaborative Filtering Model**

* Matrix Factorization (SVD)
* User-item interaction matrix

4️⃣ **Deploying ML Model as a Flask API**

* Creating REST API with Flask
* Deploying on **Render/Heroku**

**Project Implementation:**

✅ Build **Movie Recommendation Model using ML**  
✅ Deploy ML model as an **API**  
✅ Integrate **recommendation API with Angular frontend**

**Week 5: Backend Integration (Node.js & MongoDB)**

**Topics to Learn:**

1️⃣ **Setting up a Node.js & Express Backend**

* Connecting to **MongoDB**

2️⃣ **CRUD Operations**

* Store **user ratings & watchlist**

3️⃣ **Integrating ML Recommendation API**

* Fetch recommended movies for a user

4️⃣ **Secure Authentication with JWT**

**Project Implementation:**

✅ Implement **backend for user authentication & movie storage**  
✅ Connect **Angular frontend to Node.js backend**  
✅ Fetch **movie recommendations dynamically**

**Week 6: UI & UX Enhancements**

**Topics to Learn:**

1️⃣ **Styling with Angular Material / Tailwind CSS**  
2️⃣ **Adding Animations & Responsive Design**  
3️⃣ **Improving Recommendation UI**

**Project Implementation:**

✅ Improve **movie recommendation UI**  
✅ Implement **dark mode toggle**

**Week 7: Deployment & Final Testing**

**Topics to Learn:**

1️⃣ **Deploying Angular App (Netlify/Vercel)**  
2️⃣ **Deploying Backend (Render/Heroku)**  
3️⃣ **Testing API with Postman**

**Project Implementation:**

✅ Deploy **Movie Recommendation System**  
✅ Test **final functionality**

**Final Summary: What You’ll Have Built**

✅ **Full-Stack Movie Recommendation System** (Angular + Node.js + MongoDB + ML)  
✅ **User Authentication & Personalized Recommendations**  
✅ **Search & Filtering, Dark Mode, Responsive UI**  
✅ **Fully Deployed Web App**

By the end, you'll have a **real-world movie recommendation project** for your **portfolio**! 🚀