Session	ClassName	Topics	Notes	Assignment to Discuss in Class
1	SQL Basics	Core Topics: Database concepts, tables, relationships Basic SQL: SELECT, INSERT, UPDATE, DELETE WHERE, ORDER BY, LIMIT Data types and constraints		
2	SQL Joins & Relationships	Primary/Foreign keys INNER JOIN, LEFT JOIN GROUP BY, HAVING Aggregate functions (COUNT, SUM, AVG) Simple subqueries		
3	MongoDB Fundamentals	NoSQL concepts MongoDB CRUD operations Basic queries and filtering When to use SQL vs NoSQL Simple data modeling		
4	Express.js Fundamentals	Core Topics: What is Express? Creating a server Routing basics (GET, POST) Request/Response cycle Middleware concept Cors	Use Javascript to Call these apis: Suggested Projects: Calculator API Welcome API Info API Mock data API	
5	Express CRUD - In Memory	Core Topics: RESTful principles CRUD operations (no database) Request body, params, query Status codes Error handling basics Postman testing	Use Javascript to Call these apis: Suggested Projects: Todo API (array) Notes API Contacts API Shopping cart API	
6	React Setup & JSX	Core Topics: React with Vite setup JSX in depth Components introduction Rendering elements Project structure	Suggested Projects: Portfolio header Card components Navigation bar Hero section	
7	Components & Props	Core Topics: Functional components Props in detail Children props Prop destructuring Default props	Suggested Projects: Product cards User profiles Blog previews Testimonials Gallery items	
8	State Basics (useState)	useState introduction State with primitives State With Object Event handling Forms with input	Suggested Projects: Counter variations Toggle switches Color picker Temperature converter Tabs component	
9	Complex State Management	Complex State Update Multiple states Controlled and Uncontrolled	Suggested Projects: Todo list Contact manager Shopping list Expense tracker Quiz application	
10	Lifting State Up	Lifting state pattern Parent-child communication Sibling components Props vs State Data flow	Suggested Projects: Shopping cart Seat selector Multi-step form Filter system Game scoreboard	
11	useEffect Basics	useEffect introduction Dependency array Common use cases API calls introduction Loading states	Suggested Projects: Timer component Data fetcher Window resize tracker Local storage sync Title updater	
12	useEffect Advanced	Core Topics: Cleanup functions Multiple useEffects Race conditions Async in useEffect Common pitfalls	Suggested Projects: Countdown timer with cleanup Search with debounce Auto-save form Clock with cleanup API call cancellation	
13	Project Sessions	Minor Project	Project Options: E-commerce Product Page Product gallery with image selection Size/color options Add to cart functionality Cart sidebar with items Total calculation All in one page, no routing Task Management Dashboard Add/edit/delete tasks Filter by status Search functionality Drag between columns (without library) All state management Restaurant Menu & Order System Menu with categories Add items to order Quantity management Order summary Total with tax calculation	
14	React Router	Core Topics: React Router setup Routes and Links Dynamic routing useParams, useNavigate Nested routes Protected routes basics	Suggested Projects: Portfolio site Blog with pages E-commerce routing Dashboard layout Documentation site	

15	Context API Basics	Prop drilling problem Creating context Provider pattern useContext hook When to use context	Suggested Projects: Theme switcher Language selector User context Settings manager
16	Context API Advanced	Multiple contexts Context composition Performance considerations Context vs props useRef	Suggested Projects: Auth context Cart context Notification system Modal manager Form context
17	Use Ref	useRef for DOM access useRef for persistent values When to use useRef vs useState Common useRef patterns	UseRef Part: Video player controls Form focus manager Scroll controller Canvas drawing Stopwatch
18	Authentication Project - Frontend	Full Project Session Build Complete Auth UI: Login/Signup forms Password validation Remember me checkbox Forgot password flow Protected routes Profile page Logout functionality Using Context for auth state Using useRef for form focus Use Localstorage to Store Token API: Mock API provided and localStorage	
19	Basic Backend Authentication	User registration endpoint Password hashing with bcrypt Login endpoint Simple token generation (UUID) Verify token middleware Protected routes Connect to frontend project	
20	Cookies Introduction	Problems with simple tokens (can't verify, no expiry) What is JWT - self-contained tokens JWT structure explained Replace simple token with JWT Add expiration Verify without database lookup	
21	Sessions & Advanced Auth	Problems with localStorage (XSS) What are cookies? express cookie-parser Convert token to cookie storage httpOnly flag Cookie vs localStorage comparison Update frontend to work with cookies CORS with credentials	
22	JWT Implementation	Problems with simple tokens JWT structure and benefits Replace UUID with JWT Token expiration JWT in cookies Verify JWT middleware Update auth project with JWT	Skipping: Passport and Social Logins , Firebase , Clerk etc We could share a youtube video if they want to explore them.
23	File Uploads & Email	Topics: Multer for file uploads Profile picture upload Image validation (size, type) Storing image paths/URLs Basic email sending (nodemailer) Welcome email after registration Simple email templates	Practice (45 min): Add profile picture to auth project Send welcome email on signup and Email Validation
24	Remaining React Topics & Advanced Patterns	useReducer deep dive useMemo for expensive calculations useCallback for function optimization React.lazy and Suspense Error Boundaries Code splitting basics forwardRef (briefly)	Practice: Optimize existing components Implement useReducer for complex state
25	Project Day 1	Frontend Of Projects	
26	Project Day 2	Frontend Of Projects	
27	Project Day 3	Backend of Project	
28	Project Day 4	Backend of Projects	
29	Redux Core Concepts	Redux in vanilla JS Store, actions, reducers Subscribe, dispatch Pure Redux examples	Counter with History Increment/decrement Undo/redo functionality Action log display Todo List (No UI) Console-based Add, remove, toggle Filter actions Shopping Cart Add items Update quantities Calculate total Apply discount

30	Redux with React	React-Redux integration useSelector, useDispatch Provider setup Same examples in React	Counter with History + UI Visual counter History timeline Time travel debugging Todo App with Filters Full UI Multiple filters Stats display Shopping Cart with UI Product cards Cart sidebar Real-time total
31	Redux Toolkit	Modern Redux with RTK Slices Simplified syntax Better developer experience	Advanced Counter Multiple counters with RTK Async increment (setTimeout) Step configuration Todo with Categories createSlice for todos createSlice for categories Related data management Mini E-commerce Products slice Cart slice Wishlist slice Filter slice
32	Redux Toolkit With Apis	createAsyncThunk deep dive Handling loading, success, error states Extra reducers API call patterns Error handling in Redux	Mini Projects: Weather App with Redux Fetch weather data Loading states Error handling Cache results User Search with Redux GitHub API integration Search with debounce Pagination Loading indicators News Feed Fetch articles Infinite scroll Categories Refresh functionality
33	Apply Redux to Project	Replace Context with Redux	
34	Node.js Core Modules	File System (fs) - read, write, streams Path module for file paths Crypto for hashing/encryption OS module for system info Readline for CLI inputs URL and querystring modules	Mini Projects: File manager CLI tool Log analyzer Bulk file processor CSV reader/writer
35	Advanced Node.js	Streams and pipes in depth Child processes (spawn, exec, fork) Clusters for multi-core Event emitters pattern Worker threads basics	Mini Projects: Video processing with child process Multi-core server Custom event system Stream-based file upload
36	Backend Jobs & Scheduling	Cron jobs with node-cron Background job processing Queue systems (Bull basics) Scheduled tasks (newsletters, cleanup) Long-running tasks handling	Mini Projects: Email newsletter scheduler Database backup automation Expired data cleanup Report generation system Scoket io and chat app => Youtube video recsource if any one needs it
		Provide YouTube videos for: for those who want to explore: TypeScript basics Testing introduction Next.js overview GraphQL basics Docker basics Socket.io	