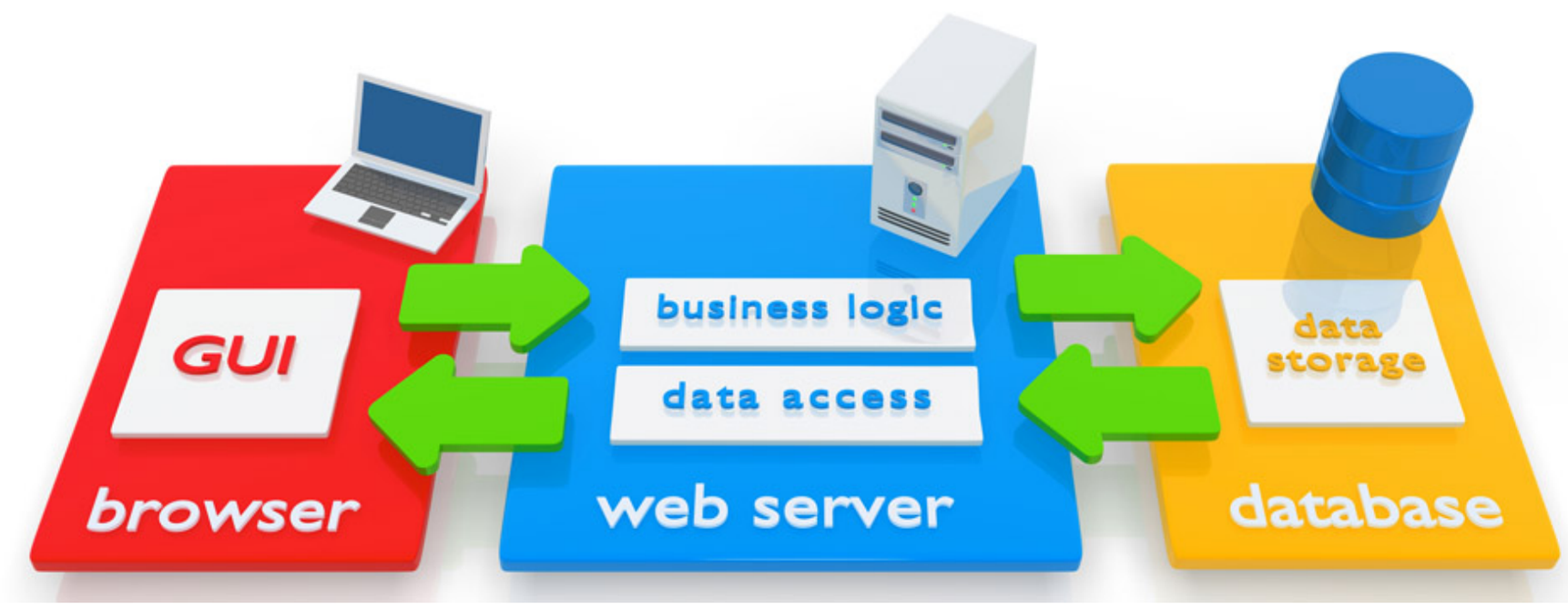
Building Modern Web Applications & Services using Node.js

Waterford Institute *of* Technology
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

Eamonn de Leastar
edeleastar@wit.ie
https://wit-oth-regensburg-2017-dmas.github.io

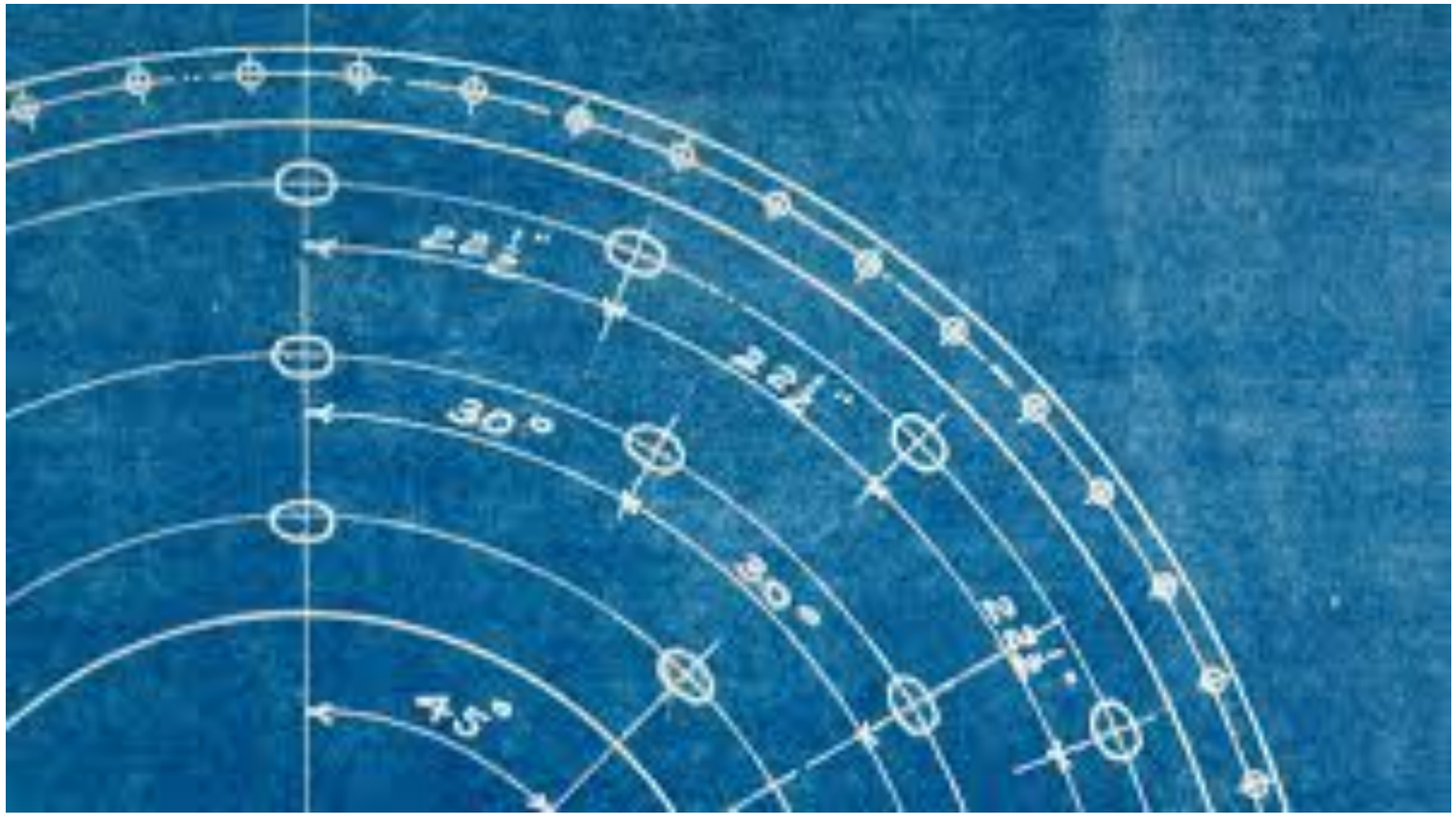
Course Mission

Transfer a set of foundation skills to enable you to design, build, secure, test and deploy a modern web application + API.



Agenda

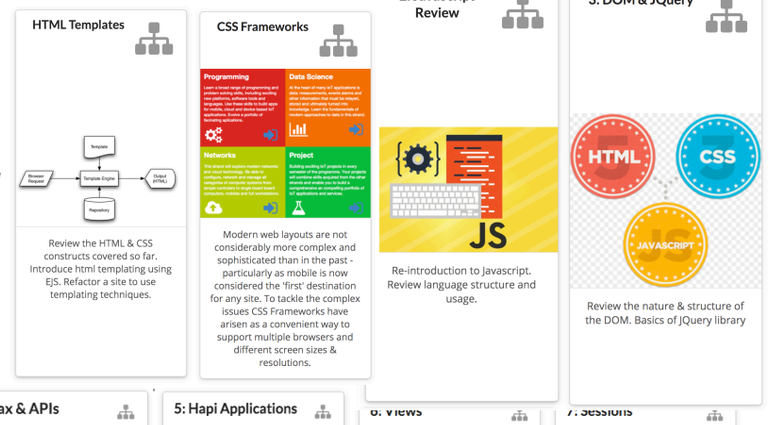
- Prerequisites
- Preparing for the course
- Brief Overview
- Lab Requirements
- Assessment Guidelines
- Schedule



Perquisites

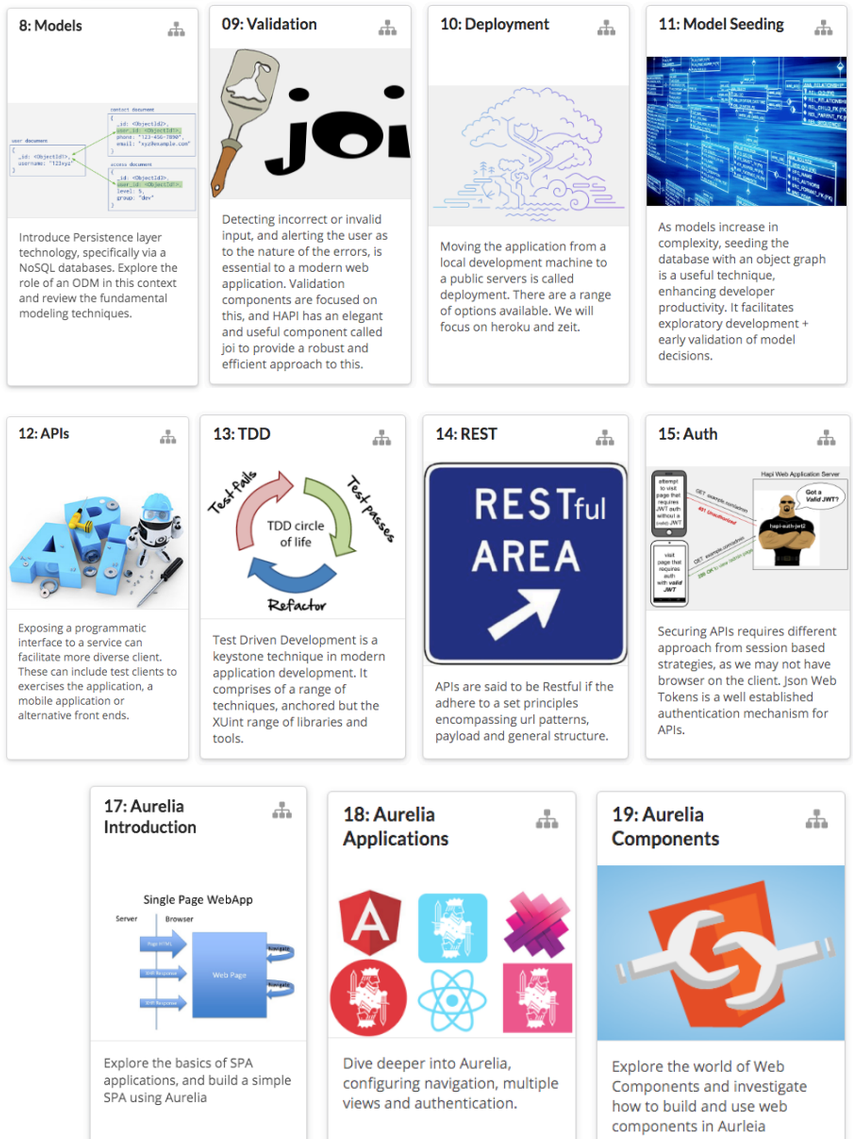
- Foundation level skills in:
  - HTML: Ability to effectively structure the html content of a small to medium static site, including the use of templates
  - CSS: Understand the fundamentals of CSS, and be able to realise simple layouts and designs
  - Javascript: Be familiar with the building blocks of the language and be able to compose realise algorithms to accomplish simple tasks.

5 Topics Top Level Topics



(1) Front End Foundation (+JS)

(2) Apis, Node & Hapi Applications



(3) Models, Persistence & Deployment

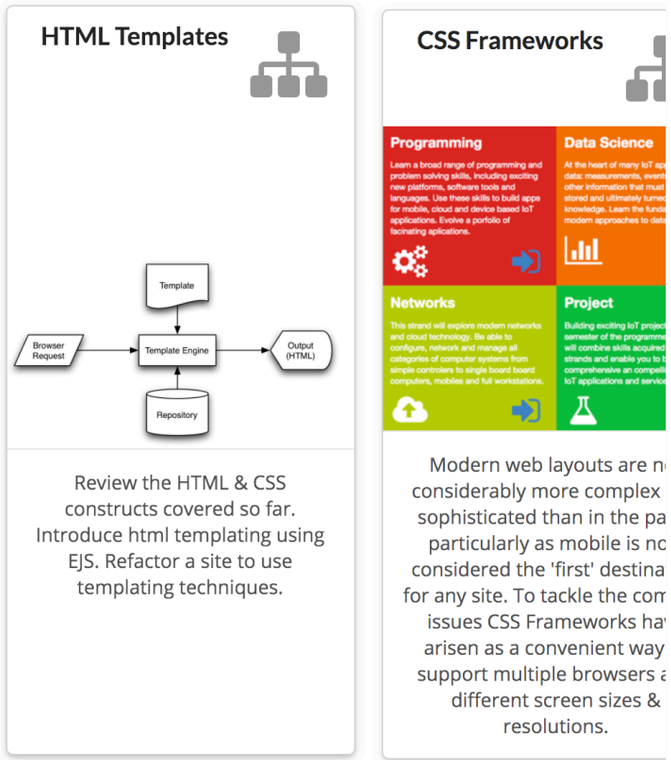
(4) Test Driven API Development

(5) Single Page Applications (Typescript)

(1) Front End Foundation (+JS)

- Be able to structure and style a simple web site using html5, templating + a CSS framework.

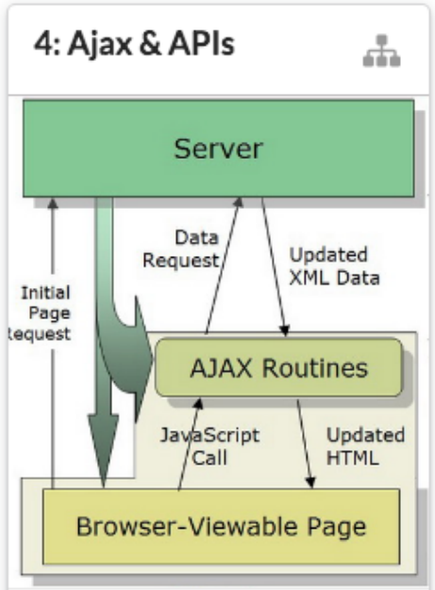
- Understand the fundamentals of Javascript & JQuery

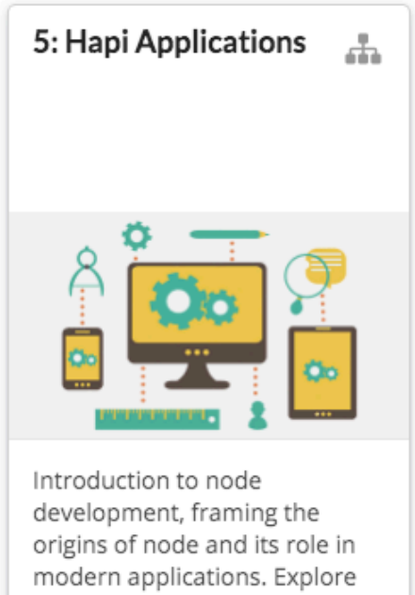


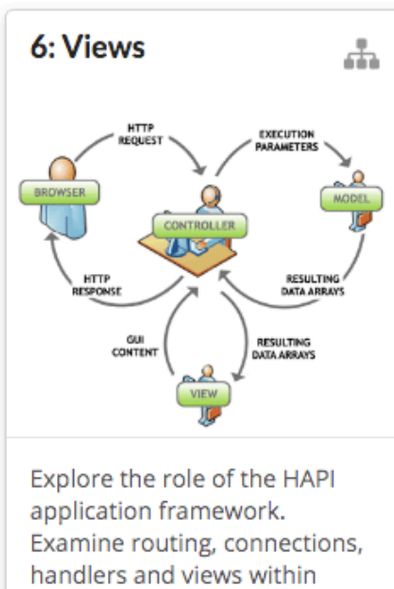
Concepts	Tools:
• Review Html + Css, focusing on templates + css frameworks • Crash course in Javascript Fundamentals • Learn basics of JQuery	• Html5 • Semantic-ui • jQuery • Chrome dev tools • DOM • WebStorm IDE

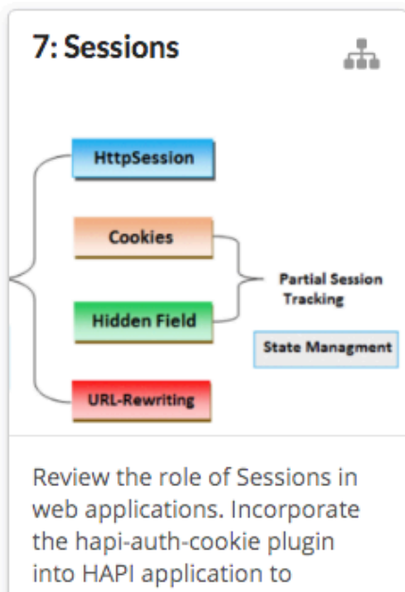
(2) Apis, Node & Hapi Applications

- Be able to build a simple Node application incorporating templates views
- Understand and use the fundamentals of session management in the application









Concepts

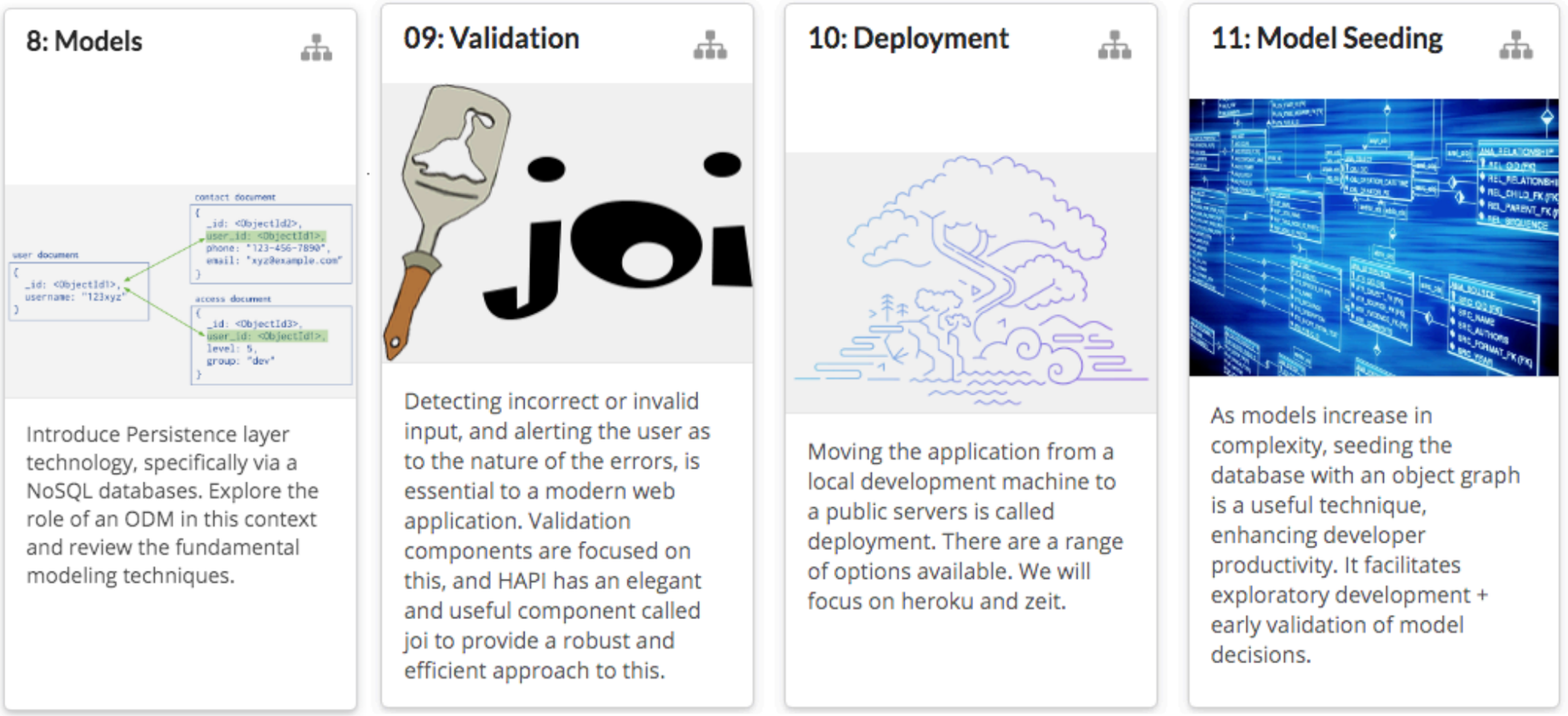
- Accessing APIs in Javascript
- Node.js Fundamentals
- Structure of a Hapi application
- Rendering views & templates
- Session Management

Tools:

- node & npm
- hapi.js
- inert, vision, handlebars, hapi-auth-cookie

(3) Models, Persistence & Deployment

- Introduce persistence mechanisms into an hapi application and be able to employ data validation, seeding.
- Be able to deploy a hapi application



Concepts

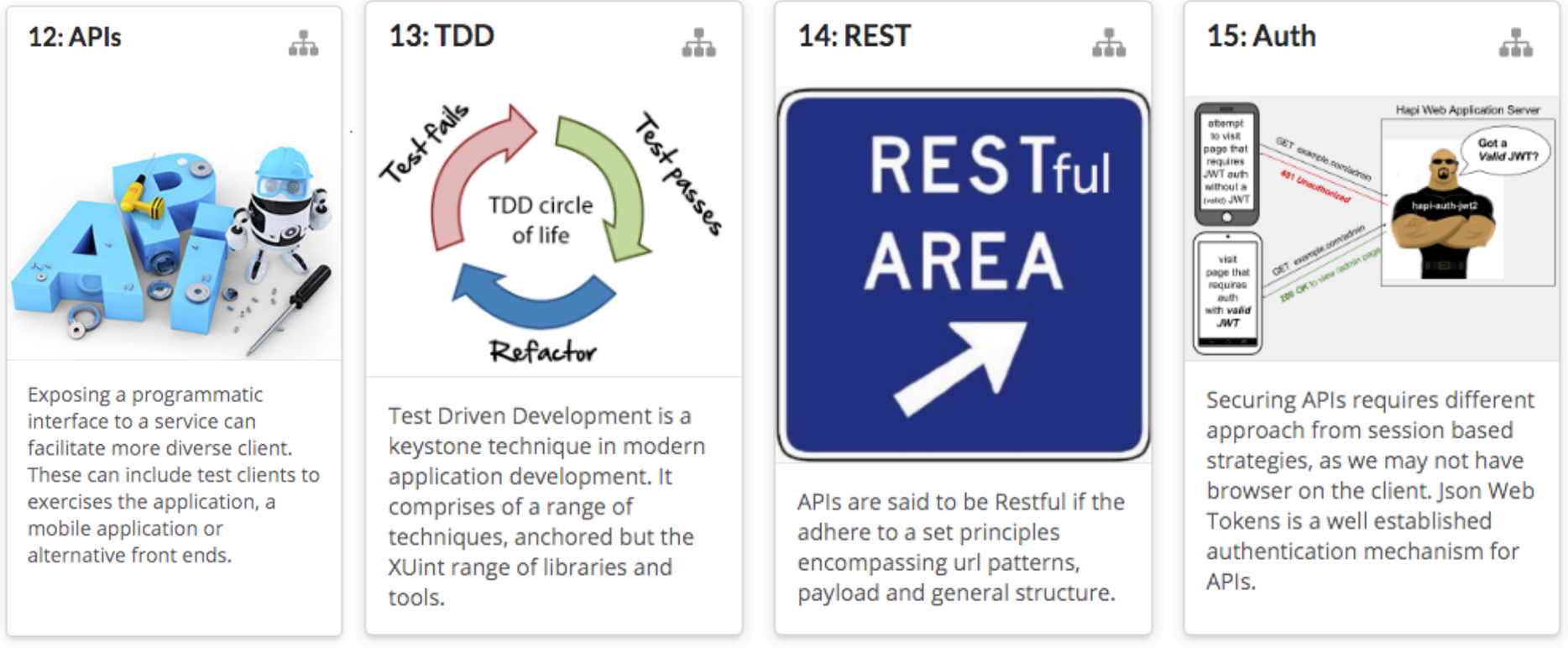
- Models & Schema
- Database access
- Validation of data
- Deployment

Tools

- MongoDB
- Heroku toolbelt
- Mongoose, mongoose-seeder, joi

(4) Test Driven API Development

- Be able to design, implement, test and secure a Restful API



Concepts

- Constructing a basic API
- TDD, Theory & Practice
- Fundamentals of REST
- Securing REST APIs

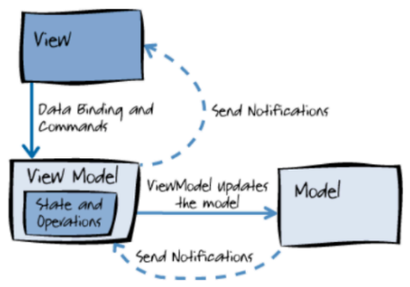
Tools:

- sync-request, mocha, chai, jsonwebtoken, hapi-auth-jwt2

(5) Single Page Applications

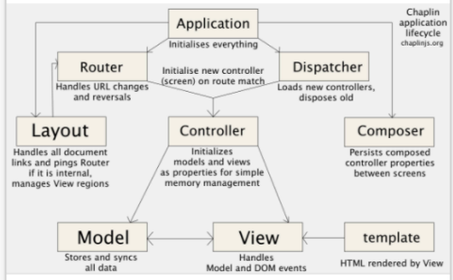
- Understand the SPA paradigm and be able to build a simple API driven SPA application

16: Aurelia View Models



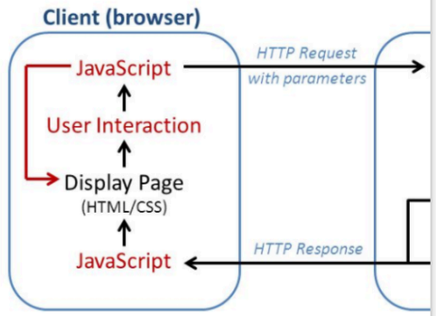
Compose aurelia applications using independent view models. Establish shared state via EventAggregators

17: Aurelia Routers



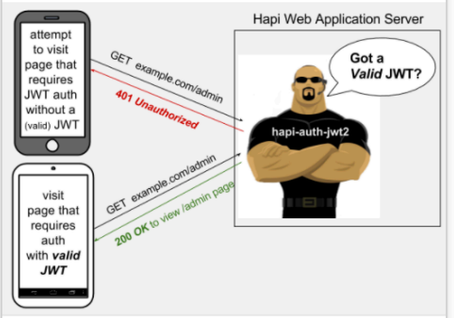
Client side routing is a feature of most SPA frameworks. It facilitates a more flexible and consistent user and developer experience.

18: Aurelia Rest Client



Explore how to connect an aurelia app to a rest API.

19: JWT Auth



Securing APIs requires different approach from session based strategies, as we may not have browser on the client. Json Web Tokens is a well established authentication mechanism for APIs.

Concepts

- Typescript
- Single Page Applications
- Fundamentals of Aurelia.io
- Aurelia View Models, Routers
- JWT

Tools:

- aurelia.io
- aurelia-cli

(1) Front End Foundation

1: HTML Templates

Review the fundamental structure of html5 documents, including templating techniques. Explore the basics of CSS + how to incorporate a CSS framework to simplify and enhance web site styling.

2: CSS Frameworks

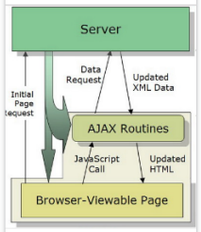
Explore a CSS Framework in detail, leveraging it capabilities to delivers rich UI experience.

3: JavaScript & DOM

Re-introdution to Javascript. Review language structure and usage in the context of JQuery and client side script fragment. Explore google maps API in this context.

(2) Apis, Node & Hapi Applications

4: Ajax & APIs



Learn how to invoke REST services in JQuery using ajax features. Explore github and fouresquare APIs in this context.

5: Hapi Applications

Introduction to node development, framing the origins of node and its role in modern applications. Explore some simple node code and identify its unique features

6: Views

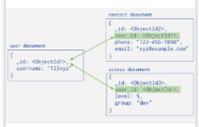
Explore the role of the HAPI application framework. Examine routing, connections, handlers and views within HAPI. Explore HAPI views in depthReview the DRY principle and the role of layouts. Employ the handlebars templating engine, incorporating partials and other constructs.

7: Sessions

Review the role of Sessions in web applications. Incorporate the hapi-auth-cookie plugin into HAPI application to manage sessions. Review session strategies, protected and unprotected routes, cookie passwords, timeouts and other configuration options.

(3) Models, Persistence & Deployment

8: Models



Introduce Persistence layer technology, specifically via a NoSQL databases. Explore the role of an ODM in this context and review the fundamental modeling techniques.

09: Validation

Detecting incorrect or invalid input, and alerting the user as to the nature of the errors, is essential to a modern web application. Validation components are focused on this, and HAPI has an elegant and useful component called joi to provide a robust and efficient approach to this.

10: Deployment

Moving the application from a local development machine to a public servers is called deployment. There are a range of options available. We will focus on heroku and zeit.

11: Model Seeding

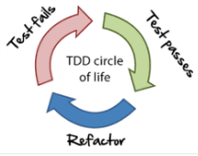
As models increase in complexity, seeding the database with an object graph is a useful technique, enhancing developer productivity. It facilitates exploratory development + early validation of model decisions.

(4) Test Driven API Development

12: APIs

Exposing a programmatic interface to a service can facilitate more diverse client. These can include test clients to exercises the application, a mobile application or alternative front ends.

13: TDD



Test Driven Development is a keystone technique in modern application development. It comprises of a range of techniques, anchored but the XUint range of libraries and tools.

14: REST

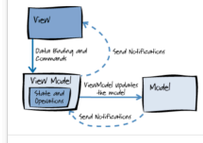
APIs are said to be Restful if the adhere to a set principles encompassing url patterns, payload and general structure.

15: Auth

Securing APIs requires different approach from session based strategies, as we may not have browser on the client. Json Web Tokens is a well established authentication mechanism for APIs.

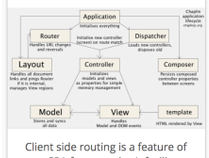
(5) Single Page Applications (optional)

16: Aurelia View Models



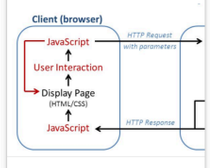
Compose aurelia applications using independent view models. Establish shared state via EventAggregators

17: Aurelia Routers



Client side routing is a feature of most SPA frameworks. It facilitates a more flexible and consistent user and developer experience.

18: Aurelia Rest Client



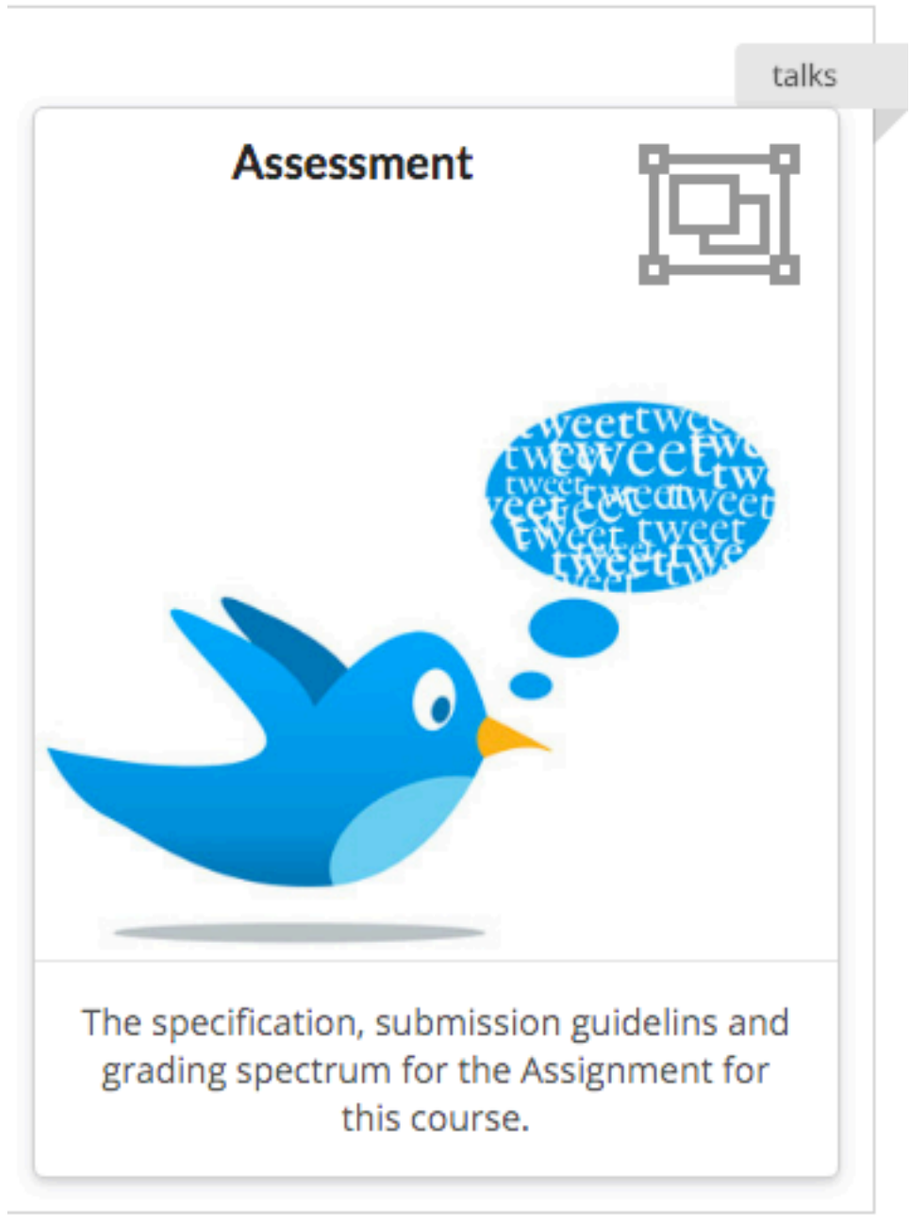
Explore how to connect an aurelia app to a rest API.

19: JWT Auth

Securing APIs requires different approach from session based strategies, as we may not have browser on the client. Json Web Tokens is a well established authentication mechanism for APIs.

Assessment

Single Project - submitted at end of semester (late December 2017)

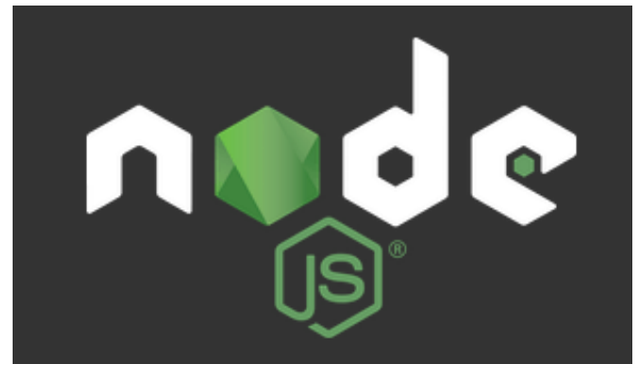


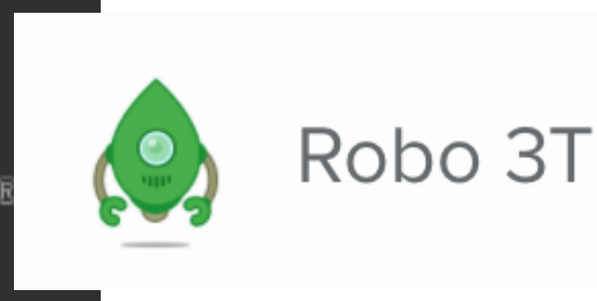
Assessment Specification

https://wit-oth-regensburg-2017-dmas.github.io/topic-00-intro

Lab Requirements

- WebStorm 2016
- VSCode
- Node.js
- Mongo DB
- Robo 3T
- Heroku-cli
- + additional libraries & tools as needed in labs





Schedule (pre and post tuition)

Pre Tuition				
	02/10/2017	09/10/2017	16/10/2017	23/10/2017
18:45 - 20:15	00: Course Overview	01 HTML Templates	02 CSS Frameworks	03 Javascript Review I

	Post Tuition					
	06/11/2017	13/11/2017	20/11/2017	27/11/2017	04/12/2017	11/12/2017
18:45 - 20:15	18 Aurelia Intro	19 Aurelia View/ Models	20 Aurelia Routers	21 Aurelia Rest Client	22 JWT Auth	23 Aurelia & JWT

Schedule (onsite tuition)

	On Site Tuition							
	Sat:28h	Sun: 29th	Mon: 30st	Tue: 31st	Wed: 1st	Thursday 2nd	Friday: 3rd	Saturday 4h
08:15-09:45								
10:00-11:30	03 Javascript Review II						09 Validation	13 TDD
11:45-13:15	04 DOM/Ajax						10 Deployment	14 REST
13:30:15:00	05 Node + HAPI							16 Typescript Intro
15:15-16:45	06 Views						11 Model Seeding	17 Node + Typescript
17:00-18:30						07 Sessions	12 APIs	
18:45-20:15						08 Models		

https://wit-oth-regensburg-2017-dmas.github.io

https://wit-oth-2017-dmas.git

Eamonn

Secure | https://wit-oth-2017-dmas.github.io

Building Modern Web Applications & Services

Module Home

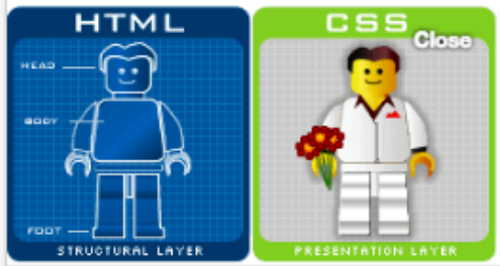
Prepared for OTH Regensburg by Eamonn de Leastar, WIT.
Creative Commons License

17 9

1: Introduction

Introducing the module, assessment and schedule.

1: HTML & CSS Revision



Review of the fundamentals of HTML Templating + the Semantic UI CSS Framework

2: JavaScript Review

Re-introduction to Javascript. Review language structure and usage.

3: DOM & JQuery

Review the nature & structure of the DOM. Basics of JQuery library

Ask Questions here:

OPEN CHAT

https://wit-oth-regensburg-2017-dmas.github.io

https://wit-oth-2017-dmas.git

Eamonn

Secure | https://wit-oth-2017-dmas.github.io

Building Modern Web Applications & Services

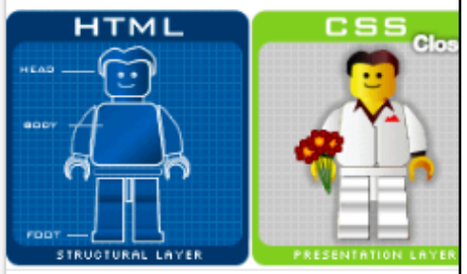
Module Home

Prepared for OTH Rege
Creative

1: Introduction

Introducing the module, assessment and schedule.

1: HTML & CSS Revision



Review of the fundamentals of HTML Templating + the Semantic UI CSS Framework

good day all!

Public Chat Room: Requires account/ sign in on *https://gitter.im* first

I will drop in occasionally to answers any questions or chat in general about course

Click here to type a chat message. Supports GitHub flavoured markdown.