2024 / 25

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South East Technological University

Module Descriptor

Web App Development (Computing and Mathematics)

Web App Development (A14666)

Short Title: Web App Development
Department: Computing and Mathematics
Credits: 10 **Level:** Intermediate

Description of Module / Aims

Introduce the the student to the software development lifecycle via the implementation of a simple but functional web application. In doing this, analyse & model a constrained set of user requirements. Then design, build and deploy a simple web application. Incorporate basic database, session support & server side rendering. Evolve this understanding within a Services context. REST APIs (Representational State Transfer Application Program Interface), with multiple service consumer forms will be considered, including Single Page Apps (SPA) and other services. The principles and patterns underpinning the design of both components (SPA and REST API) will be examined as well as the fine-grained aspects of the underlying communication protocol. Their will be an emphasis on development, including the use of application frameworks, workflow automation tools and cloud deployment platforms. The module?s scope will also encompass security concerns and techniques.

Programmes

		stage/semester/status
COMP-0961	Higher Diploma in Science in Computer Science (WD_KCOSC_G)	1 / 2 / E

Indicative Content

- User Stories & Agile context
- Introduction to Modelling
- Hypertext Transfer Protocol (HTTP) Request/Response Life Cycle
- Introductory Web Application Frameworks
- Simple Object Relational Mapping tools
- Test Driven Development
- Fundamentals: Architecture patterns, HTTP (Hypertext Transfer Protocol) protocol, Advanced Javascript
- API Design patterns and principles– REST, CQRS (Command Query Responsibility Separation) Versioning, Security, Hypermedia, Realtime
- SPA design patterns and principles – MV* (Model View *), Flux, Caching, data synchronisation
- Application Frameworks – Web API, Single Page App, Isomorphic app
- Developer tool suite – API modeling DSL(Domain Specific Language) , Scaffolding, workflow automation
- Security principles related to web development: cryptography; authentication and digital certificates
- Web application vulnerabilities; penetration testing
- Web application protections: input & output validation; various authentication techniques (e.g. cookies, OAuth, JWT, CSRF tokens); secure credential handling

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Examine the key components of a server rendered web application and incorporate them into a running application.
2. Use Model View Controller & related patterns in the implementation of a web project.
3. Relate the request/response lifecycle, routing & session management in the context of a modern application framework.
4. Break down a set of requirements into a set of discrete stories and translate these stories into a simple project plan with associated timeline and testing strategy.
5. Model the user requirements and realize the model in a simple database.
6. Apply best practice principles and patterns to the design and documentation of a web API.
7. Apply best practice principles and patterns to the design of a medium-sized Single Page Web App.
8. Develop an end-to-end web app that supports session management and persistence for a constrained functional requirement set.
9. Demonstrate specific security problems that can arise with web applications and how to address them.
10. Compare and contrast alternative approaches to authentication in both enterprise and consumer-oriented web applications.
11. Use a selection of best security practices in a web application.

Learning and Teaching Methods

- Combination of lectures and computer-based practicals.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	48	
Practical	48	
Independent Learning	174	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Assignment	50%	1,2,3,4,5,6,7
Assignment	50%	5,6,7,8,9,10,11

Assessment Criteria

<40%: Unable to interpret and describe key concepts of modern web app development.

40%–49%: Be able to interpret and describe key concepts of modern web app development.

50%–59%: Ability to demonstrate competency in the tool suite and the ability to develop and deploy small-scale solutions.

60%–69%: Presents implemented solutions to medium-sized problems that demonstrate a good understanding of the main patterns and practices of web app design.

70%–100%: All the above to an excellent level.

Supplementary Material(s)

- Holmes, S. *Getting MEAN with Mongo, Express, Angular, and Node.* New York: Manning, 2015.
- Richardson, L. *RESTful Web APIs.* New York: O'Rielly, 2015.

Requested Resources

- Computer Lab: BYOD Lab