

**LEVEL 5**

**DYNAMIC WEBSITES**

**Student Guide**

## Modification History

Version	Date	Revision Description
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# CONTENTS

<b>1.</b>	<b>Module Overview and Objectives .....</b>	<b>6</b>
<b>2.</b>	<b>Learning Outcomes and Assessment Criteria .....</b>	<b>6</b>
<b>3.</b>	<b>Syllabus .....</b>	<b>7</b>
<b>4.</b>	<b>Related National Occupational Standards .....</b>	<b>9</b>
<b>5.</b>	<b>Resources .....</b>	<b>9</b>
	5.1 Additional Software Requirements .....	10
<b>6.</b>	<b>Pedagogic Approach .....</b>	<b>10</b>
	6.1 Lectures .....	10
	6.2 Tutorials .....	10
	6.3 Laboratory Sessions .....	10
	6.4 Private Study .....	10
<b>7.</b>	<b>Assessment .....</b>	<b>11</b>
<b>8.</b>	<b>Further Reading List .....</b>	<b>11</b>
	<b>Topic 1: Introduction to the Module .....</b>	<b>12</b>
	1.1 Learning Objectives .....	12
	1.2 Timings .....	12
	1.3 Laboratory Sessions .....	12
	1.4 Private Study .....	13
	1.5 Tutorial Notes .....	14
	<b>Topic 2: Designing and Coding a Website .....</b>	<b>15</b>
	2.1 Learning Objectives .....	15
	2.2 Timings .....	15
	2.3 Laboratory Sessions .....	15
	2.4 Private Study .....	16
	2.5 Tutorial Notes .....	17
	<b>Topic 3: Designing and developing for mobile websites .....</b>	<b>18</b>
	3.1 Learning Objectives .....	18
	3.2 Timings .....	18
	3.3 Laboratory Sessions .....	18
	3.4 Private Study .....	20
	3.5 Tutorial Notes .....	21

<b>Topic 4: Introduction to PHP .....</b>	<b>22</b>
4.1 Learning Objectives.....	22
4.2 Timings.....	22
4.3 Laboratory Sessions.....	22
4.4 Private Study .....	23
4.5 Tutorial Notes .....	23
<b>Topic 5: Design and Build a Database (2) .....</b>	<b>25</b>
5.1 Learning Objectives.....	25
5.2 Timings.....	25
5.3 Laboratory Sessions.....	25
5.4 Private Study .....	26
5.5 Tutorial Notes .....	27
<b>Topic 6: Using Scripts (1).....</b>	<b>28</b>
6.1 Learning Objectives.....	28
6.2 Timings.....	28
6.3 Laboratory Sessions.....	28
6.4 Private Study .....	28
6.5 Tutorial Notes .....	30
<b>Topic 7: Using Scripts (2).....</b>	<b>31</b>
7.1 Learning Objectives.....	31
7.2 Timings.....	31
7.3 Laboratory Sessions.....	31
7.4 Private Study .....	32
7.6 Tutorial Notes .....	32
<b>Topic 8: Web development tools .....</b>	<b>33</b>
8.1 Learning Objectives.....	33
8.2 Timings.....	33
8.3 Laboratory Sessions.....	33
8.4 Private Study .....	33
8.6 Tutorial Notes .....	35
<b>Topic 9: Mobile Application Development Integration .....</b>	<b>36</b>
9.1 Learning Objectives.....	36
9.2 Timings.....	36
9.3 Laboratory Sessions.....	37

9.5 Private Study .....	37
9.5 Tutorial Notes .....	38
<b>Topic 10: Web Services .....</b>	<b>39</b>
10.1 Learning Objectives .....	39
10.2 Timings.....	39
10.3 Laboratory Sessions .....	39
10.4 Private Study .....	40
10.5 Tutorial Notes .....	40
<b>Topic 11: Building a dynamic website.....</b>	<b>41</b>
11.1 Learning Objectives .....	41
11.2 Timings.....	41
11.3 Laboratory Sessions .....	41
11.4 Private Study .....	43
11.5 Tutorial Notes .....	44
<b>Topic 12: Evaluation .....</b>	<b>45</b>
12.1 Learning Objectives .....	45
12.2 Timings.....	45
12.3 Laboratory Sessions .....	46
12.4 Private Study .....	46
12.5 Tutorial Notes .....	47

## 1. Module Overview and Objectives

This unit aims to build on existing knowledge of both databases and web design in order to build dynamic websites connected to databases using technologies such as PHP and MySQL. The unit also covers XML-based services (e.g. RSS) in order to equip the learner with a range of skills to present content dynamically on the World Wide Web.

## 2. Learning Outcomes and Assessment Criteria

<b>Learning Outcomes: The Learner will:</b>	<b>Assessment Criteria: The Learner can:</b>
1. Understand the various tools and techniques used for Web Application Development	1.1 Define and explain web applications and their functions 1.2 Identify and evaluate appropriate web application development tools for a given scenario 1.3 Identify and evaluate appropriate web application development techniques for a given scenario
2. Be able to develop data-driven websites	2.1 Design and code a web-based user interface appropriate to a given problem 2.2 Design and build a database which interacts with a web page 2.3 Create scripts to facilitate data transfer between a database and a web page 2.4 Evaluate the functionality of a database-driven website in the context of a given problem
3. Be able to apply the various tools and techniques used to build data-driven websites	3.1 Select appropriate web development tools for a given scenario 3.2 Use a development tool to develop a dynamic web solution which addresses a given scenario
4. Understand the functions of web services	4.1 Define and explain a range of web services (e.g. XML, RSS, SOAP) 4.2 Evaluate and select the optimal web service solution for a given problem 4.3 Appraise the potential business benefits of web services
5. Be able to create and deploy web services	5.1 Use one or more web services to build a dynamic website which addresses a given business problem 5.2 Evaluate a dynamic website which utilises web services in the context of business objectives

## 3. Syllabus

Topic No	Title	Proportion	Content
1	Introduction to The Module	1/12 2 hours of lectures 2 hours of laboratory sessions 1 hour of tutorials	<ul style="list-style-type: none"> <li>• Introduction to the unit</li> <li>• Web applications and their functions</li> <li>• Web development tools and frameworks</li> <li>• Client-server applications</li> <li>• Static -v- dynamic websites</li> <li>• Web service solutions</li> </ul> <p><b>Learning outcome 1</b></p>
2	Designing and Coding A Website	1/12 2 hours of lectures 2 hours of laboratory sessions 1 hour of tutorials	<ul style="list-style-type: none"> <li>• Considerations (colours, fonts, images, file sizes, content)</li> <li>• CSS3 and Semantic structure</li> <li>• HTML5</li> <li>• Responsive design (layout, flexible images and media – dynamic resizing or CSS)</li> <li>• Templates (bootstrap)</li> </ul> <p><b>Learning outcome 2</b></p>
3	Design and Developing for Mobile Websites	1/12 2 hours of lectures 2 hours of laboratory sessions 1 hour of tutorials	<ul style="list-style-type: none"> <li>• CCS3</li> <li>• Flexible layouts</li> <li>• Resizing and adjustments</li> <li>• Code to redirect mobile users</li> <li>• Location map</li> <li>• Web form</li> </ul> <p><b>Learning outcome 2</b></p>
4	Design and Build A Database ( 1)	1/12 2 hours of lectures 2 hours of laboratory sessions 1 hour of tutorials	<ul style="list-style-type: none"> <li>• PHP (source code and HTML code, creating tables, manipulating tables and querying databases)</li> </ul> <p><b>Learning outcome 2</b></p>

# Overview



5	Design and Build A Database ( 2)	1/12 2 hours of lectures 2 hours of laboratory sessions 1 hour of tutorials	<ul style="list-style-type: none"> <li>MySQL (what it is, database queries, data types and ranges, SQL statements)</li> <li>Ruby (what it is, how it can be used, simple coding, basic templates, simple web application)</li> <li></li> </ul> <p><b>Learning outcome 2</b></p>
6	Using Scripts (1)	1/12 2 hours of lectures 2 hours of laboratory sessions 1 hour of tutorials	<ul style="list-style-type: none"> <li>Interactive elements (consumer suggestions, displays)</li> <li>Java/jQuery (loops, arrays, arithmetic operations, strings)</li> </ul> <p><b>Learning outcome 2</b></p>
7	Using Scripts (2)	1/12 2 hours of lectures 2 hours of laboratory sessions 1 hour of tutorials	<ul style="list-style-type: none"> <li>jQuery for mobile devices (HTML 5, CCS3, JavaScript and AJAX)</li> <li>XML (difference with HTML and examples linked to carrying data)</li> <li>JSON</li> </ul> <p><b>Learning outcome 2</b></p>
8	Web Development Tools	1/12 2 hours of lectures 2 hours of laboratory sessions 1 hour of tutorials	<ul style="list-style-type: none"> <li>Cookies and Sessions</li> <li>Ajax Database Development</li> </ul> <p><b>Learning outcome 3</b></p>
9	Mobile Application Development Integration	1/12 2 hours of lectures 2 hours of laboratory sessions 1 hour of tutorials	<ul style="list-style-type: none"> <li>Developing mobile applications</li> <li>DOM,</li> <li>XSLT (content delivered to mobile devices)</li> <li>API</li> <li>Links to mobile applications</li> </ul> <p><b>Learning outcome 3</b></p>
10	Web Services	1/12 2 hours of lectures 2 hours of laboratory sessions 1 hour of tutorials	<ul style="list-style-type: none"> <li>Examples – WSDL, SOAP</li> <li>Streaming (RSS)</li> <li>Web API further</li> </ul> <p><b>Learning outcome 4</b></p>
11	Building A Dynamic Website	1/12 1 hour of lectures 5 hours of laboratory sessions	<ul style="list-style-type: none"> <li>Consideration of security issues (cyber security/SSL and encryption)</li> <li>Integration</li> </ul>



# Overview



		1 hour of tutorials	<ul style="list-style-type: none"> <li>Testing (google mobile and HTML code)</li> </ul> <p><b>Learning outcome 5</b></p>
12	Evaluating Websites	1/12 1 hours of lectures 2 hours of laboratory sessions 1 hour of tutorials	<ul style="list-style-type: none"> <li>Use of web application</li> <li>Functionality of data driven website</li> <li>Web service solutions</li> <li>Business benefits of web services</li> </ul> <p><b>Learning outcome 5</b></p>

## 4. Related National Occupational Standards

The UK National Occupational Standards describe the skills that professionals are expected to demonstrate in their jobs in order to carry them out effectively. They are developed by employers and this information can be helpful in explaining the practical skills that students have covered in this module.

Related National Occupational Standards (NOS)
<p><b>Sector Subject Area:</b> 6.1 ICT Professionals</p> <p><b>Related NOS:</b> 4.7.P.1 – Prepare, under supervision, for system/solution/service design activities;</p> <p>4.7.P.2 – Assist with the design of system/solution/service design;</p> <p>4.7.P.3 – Monitor the progress of system/solution/service design activities;</p> <p>5.1.S.2 – Initiate systems development activities;</p> <p>5.3.S.3 – Manage systems development activities;</p> <p>5.2.P.2 – Perform software development activities</p>

## 5. Resources

- Lecturer Guide:** This guide contains notes for lecturers on the organisation of each topic, and suggested use of the resources. It also contains all of the suggested exercises and model answers.
- PowerPoint Slides:** These are presented for each topic for use in the lectures. They contain many examples which can be used to explain the key concepts. Handout versions of the slides are also available; it is recommended that these are distributed to students for revision purposes as it is important that students learn to take their own notes during lectures.

# Overview



**Student Guide:** This contains the topic overviews and all of the suggested exercises. Every student needs a copy of this and should bring it to all of the taught hours for the module.

**Lecturer Code:** There is a large amount of code provided in this guide for use during the laboratory and tutorial sessions. This supplementary document makes this available in electronic format to avoid the need to re-type all of it. It is available from the NCC Education *Campus* (<http://campus.nccedu.com>)

## 5.1 Additional Software Requirements

This module requires students to have access to a server with MySQL and PHP installed. The following websites may be of assistance in acquiring the necessary software:

- <http://www.mysql.com/downloads>
- <http://www.php.net/>

## 6. Pedagogic Approach

Suggested Learning Hours					
Lectures:	Tutorial:	Seminar:	Laboratory:	Private Study:	Total:
23	12	-	23	90	150

The teacher-led time for this module is comprised of lectures, laboratory sessions, tutorials and seminars. The breakdown of the hours is also given at the start of each topic.

### 6.1 Lectures

Lectures are designed to start each topic and PowerPoint slides are presented for use during these sessions. Students should also be encouraged to be active during this time and to discuss and/or practice the concepts covered. Lecturers should encourage active participation wherever possible.

### 6.2 Tutorials

These are designed to deal with the questions arising from the lectures and private study sessions.

### 6.3 Laboratory Sessions

During these sessions, students are required to work through practical tutorials and various exercises. The details of these are provided in this guide and also in the Student Guide.

### 6.4 Private Study

In addition to the taught portion of the module, students will also be expected to undertake private study. Exercises are provided in the Student Guide for students to complete during this time.

Teachers will need to set deadlines for the completion of this work. These should ideally be before the tutorial session for each topic, when Private Study Exercises are usually reviewed.

## 7. Assessment

This module will be assessed by means of an assignment worth 100% of the total mark. This assessment will be based on the assessment criteria given above and students will be expected to demonstrate that they have met the module's learning outcomes. Sample assessments are available through the NCC Education Campus (<http://campus.nccedu.com>) for your reference.

## 8. Further Reading List

A selection of sources of further reading around the content of this module must be available in your Accredited Partner Centre's library. The following list provides suggestions of some suitable sources:

Ballard, P. and Moncur, M. (2008). *Sams Teach Yourself Ajax, JavaScript, and PHP All in One*. Sams.  
ISBN-10: 0672329654  
ISBN-13: 978-0672329654

Chisholm, W. and May, M. (2008). *Universal Design for Web Applications: Web Applications that Reach Everyone*. O'Reilly Media.  
ISBN-10: 0596518730  
ISBN-13: 978-0596518738

DuBois, P. (2006). *MySQL Cookbook*. O'Reilly Media.  
ISBN-10: 059652708X  
ISBN-13: 978-0596527082

Duckett, J. (2014). *Web Design with HTML, CSS, JavaScript and jQuery Set*. John Wiley & Sons.  
ISBN-10: 1118907442  
ISBN-13: 978-1118907443

Nixon, R. (2014). *Learning PHP, MySQL and JavaScript: with jQuery, CSS & HTML5 (Learning Php, Mysql, Javascript, CSS & HTML5)*. O'Reilly Media.  
ISBN-10: 1491918667  
ISBN-13: 978-1491918661

## Topic 1: Introduction to the Module

### 1.1 Learning Objectives

This topic provides an overview of the module. On completion of this topic, students will be able to:

- Understand the implications of web-based deployment of software;
- Understand the role of the different tools discussed during the module;
- Understand the need for N-Tier architectures when developing distributed applications

### 1.2 Timings

Lectures:	2 hours
Laboratory Sessions:	2 hours
Private Study:	7.5 hours
Tutorials:	1 hour

### 1.3 Laboratory Sessions

The laboratory time allocation for this topic for 2 hours.

#### Activity 1:

Investigate one of the following concepts as discussed in the lecture:

1. Common web applications
2. Client-Server Architectures
3. Database Management Systems
4. Web service solutions

You should take detailed notes as you conduct your research and prepare to feedback what you have found out to other students. Remember that you will need to organise your notes so that you have included the most important information when you discuss these topics with other students.

#### Activity 2: Group Discussion

# Topic 1



Work in small groups as directed by your tutor bringing together the information you have discovered in Activity 1, each group to produce a presentation showing:

- which web applications are preferable and why
- what a client-server architecture is and why it is important to website development
- what a database management system is, the software and how it is integrated into a website
- what web service solutions are and include 3 different examples showing how they can be used in a website

## 1.4 Private Study

The time allocation for private study in this topic is expected to be 7.5 hours.

### Exercise 1: Research Journal

Keep a research journal or blog of important notes and concepts from the lecture. Supplement the material from each lecture with the results from your own studies as you progress through the module. These will be your own revision and research notes which will help you when you come to tackle the assessment. For each topic, your Student Guide will also contain activities suggesting some topics for you to research and summarise. Include examples and interesting slides and web pages that you encounter during your research.

For this topic, research the following topics, and investigate where they fit into the N-Tier architecture and website development discussed in the lecture.

- Ruby on Rails
- Perl
- Python
- ASP.NET
- VBScript
- Simple DB

### Exercise 2: Presentation

Prepare an 8-slide presentation on the results from your research from Exercise 1 above. Your presentation should give a brief overview of each of the following topics – what they are and how they are used in website development:

# Topic 1



## Slide Content

- 1 Ruby on Rails
- 2 Perl
- 3 Python
- 4 ASP.NET
- 5 VBScript
- 6 SimpleDB
- 7 Which you think you would use and why
- 8 Overall summary of your findings

## Exercise 3: Revision

Review the lecture material and ensure that you are comfortable with everything discussed so far.

## 1.5 Tutorial Notes

The time allowance for tutorials in this topic is 1 hour.

## Exercise 1: Reporting Back to the Class

As a result of the research you did during your private study time, you should have a short 8 slide presentation ready to give to the rest of the class. There is no need for this to be especially formal. Students are reporting on each of the following topics – what they are and how they are used in website development:

## Slide Content

- 1 Ruby on Rails
- 2 Perl
- 3 Python
- 4 ASP.NET
- 5 VBScript
- 6 SimpleDB
- 7 Which you think you would use and why
- 8 Overall summary of your findings

Student should also bring along to the class notes to make from their peer presentations.

## Topic 2: Designing and Coding a Website

### 2.1 Learning Objectives

This topic covers the website design considerations. On completion of this topic, students will be able to:

- Understand design principles of a website;
- Understand some of the considerations when building a website;
- Understand responsive web design;
- Understand bootstrap and how it can be used to design a website.

### 2.2 Timings

Lectures:	2 hours
Laboratory Sessions:	2 hours
Private Study:	7.5 hours
Tutorials:	1 hour

### 2.3 Laboratory Sessions

The laboratory time allocation for this topic for 2 hours.

#### Activity 1:

1. Create an appropriate folder and file structure for Andy's Autos.
2. Create a home page and at least one other web page using HTML with external CSS.
3. Create a CSS file which includes the following elements:
  - a. Background colour
  - b. Aligned content
  - c. Menus (at least links to five – future pages)
  - d. Animated banners
  - e. Borders
  - f. Page layout
  - g. Font styles/families/sizes for different elements eg h1, h2, p
  - h. Lists
  - i. Table with border/padding etc
  - j. Viewport
4. You will need to source your own text and images.



# Topic 2



## Activity 2: Group Discussion

Work in small groups as directed by your tutor bringing together the information you have discovered in Activity 1, each group to produce a presentation showing:

- The web pages that they have created
- Accessibility considerations
- How bootstrap can be used to help design and create a website.

Students should peer assess each other's webpages considering accessibility and usability and some of the good and not so good features/elements they have identified in this lesson.

## 2.4 Private Study

The time allocation for private study in this topic is expected to be 7.5 hours.

### Exercise 1: Research Journal

Keep a research journal or blog of important notes and concepts from the lecture. Supplement the material from each lecture with the results from your own studies as you progress through the module. These will be your own revision and research notes which will help you when you come to tackle the assessment. For each topic, your Student Guide will also contain activities suggesting some topics for you to research and summarise. Include examples and interesting slides and web pages that you encounter during your research.

Download and install bootstrap software on your computer. Work through the templates and have a look at the code that sits behind these. Make notes on any key features you think would help you when creating your web pages.

For this topic, research responsive web design, viewport, bootstrap and key considerations when designing and creating these pages.

As an additional activity you may wish to research google analytics which can be used to track visitors to your site. This is a helpful way to monitor traffic on your site.

### Exercise 2: Presentation

Prepare a 6-slide presentation on the results from your research from Exercise 1 above. Your presentation should give a brief overview of each of the following topics – what they are and how they are used in website development:

#### Slide Content

- |   |                                     |
|---|-------------------------------------|
| 1 | What is responsive web design?      |
| 2 | Advantages of responsive web design |



## Topic 2



- 3 What is grid view with 3 examples of grid view
- 4 What is viewport and why is it important in responsive web design?
- 5 What are the key considerations when designing and creating these pages?
- 6 What are the advantages of using Bootstrap when creating responsive web pages?

### Exercise 3: Revision

Review the lecture material and ensure that you are comfortable with everything discussed so far.

## 2.5 Tutorial Notes

The time allowance for tutorials in this topic is 1 hour.

### Lecturers' Notes:

Students have copies of the tutorial activities in the Student Guide. Answers are not provided in the guide.

This tutorial is designed to give students a chance to present the more interesting of their findings from their private study work, particularly to share information with others in the class but also to ensure that they are indeed keeping a journal and researching the topics provided. You should encourage students to bring along their journals to these sessions and make notes on any points of interest that are raised by their classmates.

### Exercise 1: Reporting Back to the Class

As a result of the research you did during your private study time, you should have a short five minute presentation ready to give to the rest of the class. There is no need for this to be especially formal - you are simply reporting on anything interesting that you found during your research, or pointing out especially useful resources on the topic. Bring your journal along to the class so that you can make a note of anything especially useful that your classmates have mentioned. This is a knowledge dissemination exercise; you are not being formally assessed on the style or content of the presentation.

## Topic 3: Designing and developing for mobile websites

### 3.1 Learning Objectives

This topic provides an overview of producing a mobile website. On completion of the topic, students will be able to:

- Understand the key requirements to design and develop a mobile website

### 3.2 Timings

Lectures: 2 hour

Laboratory Sessions: 2 hours

Private Study: 7.5 hours

Tutorials: 1 hour

### 3.3 Laboratory Sessions

The laboratory time allocation for this topic for 2 hours.

#### Activity 1:

1. Create an appropriate folder and file structure for Andy's Autos Mobile Website.
2. Create a home page and at least one other responsive web page which can be displayed on at least two different sized mobile devices.
3. Create a CSS file which includes the following elements which can be viewed on mobile devices:
  - a. Background colour
  - b. Menus (at least links to five – future pages)
  - c. Borders
  - d. Page layout
  - e. Font styles/families/sizes for different elements eg h1, h2, p
  - f. Viewport
4. You will need to source your own text and images.

#### Activity 2: Group Discussion

Work in small groups as directed by your tutor bringing together the information you have discovered in Activity 1, each group to produce a presentation showing:

- The mobile web pages that they have created

## Topic 3



Students should peer assess each other's webpages considering accessibility and usability and some of the good and not so good features/elements they have identified in this lesson.

# Topic 3



## 3.4 Private Study

The time allocation for private study in this topic is expected to be 7.5 hours.

### Exercise 1: Research Journal

Keep a research journal or blog of important notes and concepts from the lecture. Supplement the material from each lecture with the results from your own studies as you progress through the module. These will be your own revision and research notes which will help you when you come to tackle the assessment. For each topic, your Student Guide will also contain activities suggesting some topics for you to research and summarise. Include examples and interesting slides and mobile web pages that you encounter during your research. Make notes on any key features you think would help you when creating your mobile web pages.

For this topic, research different codes that can be used to resize and adjust text and layout on a mobile website, inclusion of different APIs that can enhance the user experience.

### Exercise 2: Presentation

Prepare a 5-slide presentation on the results from your research from Exercise 1 above. Your presentation should give a brief overview of each of the following topics – what they are and how they are used in website development:

#### Slide Content

- 1 Why create a mobile site?
- 2 What are the challenges when creating a mobile website?
- 3 How flexible were “flexible layouts”?
- 4 How easy was it to incorporate google maps in your mobile website?
- 5 What did the website look like in two different devices?

### Exercise 3: Revision

Review the lecture material and ensure that you are comfortable with everything discussed so far.

# Topic 3



## 3.5 Tutorial Notes

The time allowance for tutorials in this topic is 1 hour.

### Exercise 1: Reporting Back to the Class

As a result of the research you did during your private study time, you should have a short five-minute presentation ready to give to the rest of the class. There is no need for this to be especially formal - you are simply reporting on anything interesting that you found during your research, or pointing out especially useful resources on the topic. Bring your journal along to the class so that you can make a note of anything especially useful that your classmates have mentioned. This is a knowledge dissemination exercise; you are not being formally assessed on the style or content of the presentation.

## Topic 4: Introduction to PHP

### 4.1 Learning Objectives

This topic provides an overview of PHP. On completion of the topic, students will be able to:

- Create scripts to facilitate data transfer between a database and a web page
- Evaluate the functionality of a database-driven website in the context of a given problem.

### 4.2 Timings

Lectures: 2 hours

Laboratory Sessions: 2 hours

Private Study: 7.5 hours

Tutorials: 1 hour

### 4.3 Laboratory Sessions

The laboratory time allocation for this topic is 2 hours.

Making use of HTML and the appropriate PHP, write programs that accomplish the following exercises:

#### Exercise 1:

Show the result of rolling a set of dice, with the number of dice and the number of faces on each dice decided by the user.

#### Exercise 2:

Take in some user provided text, and reverse it.

#### Exercise 3:

Using Andy's Autos website, create a new webpage and add a feature which will allow the user to select one of four operations from a drop-down menu – add, subtract, multiply, or divide. Allow them to provide two numbers, and perform the appropriate operation on them.

# Topic 4



## 4.4 Private Study

The time allocation for private study in this topic is expected to be 7.5 hours.

### Exercise 1: Research Journal

As part of your ongoing journal exercise, you should research the following topics:

- Loose typing
- PHP syntax
- PHP functions

### Exercise 2: Calculator Extensions

Using your calculator code that you wrote for exercise 2 in the laboratory exercises, expand it so that it allows for the following:

- Calculates the power of one number to the other
- Calculates the remainder left after dividing one number by another
- Puts the result of a calculation automatically into the first textbox when it has been done.

### Exercise 3: Presentation

Prepare a short, five-minute presentation on the results of your research from Exercise 1 above. If you have found out anything particularly interesting, you should focus on that as a priority.

### Exercise 4: Revision

Review the lecture material and ensure that you are comfortable with everything discussed thus far.

## 4.5 Tutorial Notes

The time allowance for tutorials in this topic is 1 hour.

### Exercise 1: Discussion of Private Study Exercise

Discuss as a group your solution to Exercise 2 in the private study.

### Exercise 2: Reporting Back to the Class

As a result of the research you did during your private study time, you should have a short five minute presentation ready to give to the rest of the class. There is no need for this to be especially formal - you are simply reporting on anything interesting that you found during your research, or pointing out

## Topic 4



especially useful resources on the topic. Bring your journal along to the class so that you can make a note of anything especially useful that your classmates have mentioned. This is a knowledge dissemination exercise; you are not being formally assessed on the style or content of the presentation.



## Topic 5: Design and Build a Database (2)

### 5.1 Learning Objectives

This topic provides an overview of MySQL and the database connection to a web page. On completion of the topic, students will be able to:

- Design and build a database which interacts with a web page.

### 5.2 Timings

Lectures: 2 hours

Laboratory Sessions: 2 hours

Private Study: 7.5 hours

Tutorials: 1 hour

### 5.3 Laboratory Sessions

The laboratory time allocation for this topic is 2 hours.

#### Exercise 1:

Using the techniques that have been discussed in the past four lectures, and using Andy's Autos website, create the MySQL and PHP architecture for a login page. It should permit the following operations:

1. Register your account
2. Prevent people registering usernames that already exist
3. Report on successful logins
4. Prevent access from invalid username/password combinations
5. Create a database to store customer details including the following fields:
  - a. customerID
  - b. firstName
  - c. lastName
  - d. address1
  - e. Town

# Topic 5



- f. County
- g. postcode
- h. telNo
- i. mobNo
- j. eMail

6. Create a php script that will allow you to input data into the database from a webpage which includes a registration form. The form should match the fields in the database.

## 5.4 Private Study

The time allocation for private study in this topic is expected to be 7.5 hours.

### Exercise 1: Research Journal

As part of your ongoing journal exercise, you should research the following topics:

- SQL Injection Attacks
- SQL syntax for MySQL
- Advantages and disadvantages of MySQL versus other database platforms
- Review of Ruby on Rails and at least three positive points and evaluation as to why you would use it.

### Exercise 2: Login Lockouts

Most login systems won't let you simply keep trying until you get in. Implement a lock-out in the login code that you have developed above. It should keep a track of how many unsuccessful attempts were made to log into an account, and if that number goes above three it should automatically report any future logins as failures (even if they're not) for a total of five minutes.

### Exercise 3: Presentation

Download Ruby on Rails software <http://rubyonrails.org/> and create a new rails project. This should take you about an hour to complete. Create at least two pages for Andy's Autos which includes a home page and contact us page (which includes a form).

Have a look at the following webpage to find out how to get started:

[http://guides.rubyonrails.org/getting\\_started.html](http://guides.rubyonrails.org/getting_started.html)

# Topic 5



Produce a presentation which includes screen shots of the two pages you have created and a reflection on how you found the software and an evaluation as to why you would use it over other software.

## **Exercise 4: Revision**

Review the lecture material and ensure that you are comfortable with everything discussed thus far.

## **5.5 Tutorial Notes**

The time allowance for tutorials in this topic is 1 hour.

### **Exercise 1: Discussion of Private Study Exercise**

Discuss as a group your solution to Exercise 3 in the private study.

### **Exercise 2: Reporting Back to the Class**

As a result of the research you did during your private study time, you should have a short five minute presentation ready to give to the rest of the class. There is no need for this to be especially formal - you are simply reporting on anything interesting that you found during your research, or pointing out especially useful resources on the topic. Bring your journal along to the class so that you can make a note of anything especially useful that your classmates have mentioned. This is a knowledge dissemination exercise; you are not being formally assessed on the style or content of the presentation.

# Topic 6



## Topic 6: Using Scripts (1)

### 6.1 Learning Objectives

This topic provides an overview of Ajax and JavaScript. On completion of the topic, students will be able to:

- Make use of JavaScript to create simple client-side applications;
- Make use of Ajax to implement simple server communication.

### 6.2 Timings

Lectures: 2 hours

Laboratory Sessions: 2 hours

Private Study: 7.5 hours

Tutorials: 1 hour

### 6.3 Laboratory Sessions

The laboratory time allocation for this topic is 2 hours.

#### Exercise 1:

Making use of JavaScript, write web pages that perform the following tasks:

1. Implement a dice roller as in Exercise 1 in the laboratory session for Topic 4.
2. Add a script to Andy's Autos website which allows you to validate that a date of birth provided by a user is in a valid form (dd/mm/yyyy). You do not need to validate that the date is sensible (i.e you do not need to worry about the number of days in months etc), just that it adheres to that form.

### 6.4 Private Study

The time allocation for private study in this topic is expected to be 7.5 hours.

#### Exercise 1: Research Journal

As part of your ongoing journal exercise, you should research the following topics:

- JavaScript syntax
- The Document Object Model

# Topic 6



- Events in JavaScript

## Exercise 2: Andy's Autos

Making use of the architecture shown in the lecture, add to your web-application for Andy's Autos. You should have images that link to various external sites, and then use ajax events to add information about the cars that are shown on the site. You should have mouseover explanations about the value the cars, and also images that change when the mouse is moved over them.

Add in at least one

- calculation script,
- one loop
- one string
- animation of the background display.

## Topic 6



### **Exercise 3: Presentation**

Prepare a short, five-minute presentation on the results of your research from Exercise 1 above. If you have found out anything particularly interesting, you should focus on that as a priority.

### **Exercise 4: Revision**

Review the lecture material and ensure that you are comfortable with everything discussed thus far.

## **6.5 Tutorial Notes**

The time allowance for tutorials in this topic is 1 hour.

### **Exercise 1: Discussion of Private Study Exercise**

Discuss as a group your solution to Exercise 2 in the private study.

### **Exercise 2: Reporting Back to the Class**

As a result of the research you did during your private study time, you should have a short five minute presentation ready to give to the rest of the class. There is no need for this to be especially formal - you are simply reporting on anything interesting that you found during your research, or pointing out especially useful resources on the topic. Bring your journal along to the class so that you can make a note of anything especially useful that your classmates have mentioned. This is a knowledge dissemination exercise; you are not being formally assessed on the style or content of the presentation.

## Topic 7: Using Scripts (2)

### 7.1 Learning Objectives

This topic provides an overview of client-side scripting with jQuery. On completion of the topic, students will be able to:

- Make use of jQuery to enhance their front-ends;
- Select elements using jQuery selectors and filters;
- Manipulate and animate HTML elements through jQuery.

### 7.2 Timings

Lectures: 2 hours

Laboratory Sessions: 2 hours

Private Study: 7.5 hours

Tutorials: 1 hour

### 7.3 Laboratory Sessions

The laboratory time allocation for this topic is 2 hours.

#### Exercise 1:

Making use of jQuery, create at least two further web pages in Andy's Autos website that provide the following effects:

1. A form that slides out when a button is pressed.
2. A hyperlink that 'runs away' from the cursor when the user attempts to click on it.
3. A series of nested bullet points that fade away, one after the other, when a button is clicked.

# Topic 7



## 7.4 Private Study

The time allocation for private study in this topic is expected to be 7.5 hours.

### Exercise 1: Research Journal

As part of your ongoing journal exercise, you should research the following topics:

- jQuery filters
- jQuery selectors
- Events in jQuery
- JSON Objects, Arrays and PHP

### Exercise 2: Sprucing Up Your Checklist

The web pages you have created for Andy's Autos can now be made more interactive through the use of jQuery. Add jQuery elements to make your website more visually striking. As some examples of what you might do: Extend the content so as to present further reading in a table, and use jQuery to 'zebra-stripe' the table. Modify it so that when you mouse-over an element from your checklist, it grows in size to make it more distinct from others on the list. Have the table of further reading slide in on a mouse-over of its main point.

### Exercise 3: Presentation

Prepare a short, five minute presentation on the results of your research from Exercise 1 above. If you have found out anything particularly interesting, you should focus on that as a priority.

### Exercise 4: Revision

Review the lecture material and ensure that you are comfortable with everything discussed thus far.

## 7.6 Tutorial Notes

The time allowance for tutorials in this topic is 1 hour.

### Exercise 1: Reporting Back to the Class

As a result of the research you did during your private study time, you should have a short five-minute presentation ready to give to the rest of the class. There is no need for this to be especially formal - you are simply reporting on anything interesting that you found during your research, or pointing out especially useful resources on the topic. Bring your journal along to the class so that you can make a note of anything especially useful that your classmates have mentioned. This is a knowledge dissemination exercise; you are not being formally assessed on the style or content of the presentation.



## Topic 8: Web development tools

### 8.1 Learning Objectives

This topic provides an overview of different web development tools that can be used to create an interactive website. On completion of the topic, students will be able to:

- Use cookies to provide persistent data for PHP applications;
- Use sessions to provide persistent data for PHP applications;
- Use Ajax to build a database.

### 8.2 Timings

Lectures: 2 hours

Laboratory Sessions: 2 hours

Private Study: 7.5 hours

Tutorials: 1 hour

### 8.3 Laboratory Sessions

The laboratory time allocation for this topic is 2 hours.

#### Exercise 1:

Making use of the architecture discussed in the lecture, create an Ajax enabled web application linked to Andy's Autos that allows for creating, querying, browsing and manipulating a database of your own choice.

Each record should have a minimum of four fields and your Ajax application should permit users to modify any of these.

In addition, your front-end should allow users to create a new record, and delete the record they are currently browsing (the latter requiring confirmation via a message-box).

### 8.4 Private Study

The time allocation for private study in this topic is expected to be 7.5 hours.

# Topic 8



## **Exercise 1: Research Journal**

As part of your ongoing journal exercise, you should research the following topics:

- XML parsing in Ajax.
- XML DOM construction in PHP.

## **Exercise 2: Encyclopaedia of You Revisited**

Taking the content, you developed for exercise two in your private study last week, modify the code so that all the data is contained within a mySQL database. This database should then be queried via a PHP script, and converted across to XML for display in a front-end.

## **Exercise 3: Presentation**

Prepare a short, five-minute presentation on the results of your research from Exercise 1 above. If you have found out anything particularly interesting, you should focus on that as a priority.

## **Exercise 4: Revision**

Review the lecture material and ensure that you are comfortable with everything discussed thus far.

# Topic 8



## 8.6 Tutorial Notes

The time allowance for tutorials in this topic is 1 hour.

### Exercise 1: Discussion of Private Study Exercise

Discuss as a group your solution to Exercise 2 in the private study.

### Exercise 2: Reporting Back to the Class

As a result of the research you did during your private study time, you should have a short five-minute presentation ready to give to the rest of the class. There is no need for this to be especially formal - you are simply reporting on anything interesting that you found during your research, or pointing out especially useful resources on the topic. Bring your journal along to the class so that you can make a note of anything especially useful that your classmates have mentioned. This is a knowledge dissemination exercise; you are not being formally assessed on the style or content of the presentation.

## Topic 9: Mobile Application Development Integration

### 9.1 Learning Objectives

This topic provides an overview of consuming web services. On completion of the topic, students will be able to:

- Mobile application development and integration with a website
- HTML5 and mobile applications
- DOM framework
- Developing mobile apps.

### 9.2 Timings

Lectures: 2 hours

Laboratory Sessions: 2 hours

Private Study: 7.5 hours

Tutorials: 1 hour

# Topic 9



## 9.3 Laboratory Sessions

The laboratory time allocation for this topic is 2 hours.

### Exercise 1:

Make a mobile application for Andy's Autos and try to link this to the main web page you have created.

### Exercise 2:

Based on the mobile application you have created add in at least one API and create a direct link from the mobile application to another mobile application of your choice through the app store.

## 9.5 Private Study

The time allocation for private study in this topic is expected to be 7.5 hours.

# Topic 9



## Exercise 1: Research Journal

As part of your ongoing journal exercise, you should research the following topics:

- Mobile application frameworks
- AppLinks
- APIs

## Exercise 2: Mash-Up

Making use of two mobile application frameworks of your own choice, create a mash-up of these. Incorporate at least two different APIs that could be useful linked to the mobile apps.

## Exercise 3: Presentation

Prepare a short, five-minute presentation on the results of your research from Exercise 1 above. If you have found out anything particularly interesting, you should focus on that as a priority.

## Exercise 4: Revision

Review the lecture material and ensure that you are comfortable with everything discussed thus far.

## 9.5 Tutorial Notes

The time allowance for tutorials in this topic is 1 hour.

### Exercise 1: Discussion of Private Study Exercise

Discuss as a group your solution to Exercise 2 in the private study.

### Exercise 2: Reporting Back to the Class

As a result of the research you did during your private study time, you should have a short five-minute presentation ready to give to the rest of the class. There is no need for this to be especially formal - you are simply reporting on anything interesting that you found during your research, or pointing out especially useful resources on the topic. Bring your journal along to the class so that you can make a note of anything especially useful that your classmates have mentioned. This is a knowledge dissemination exercise; you are not being formally assessed on the style or content of the presentation.

## Topic 10: Web Services

### 10.1 Learning Objectives

This topic provides an overview of consuming web services. On completion of the topic, students will be able to:

- Understand Web API;
- Make use of SOAP-based web services;
- Make use of REST-based web services;
- RSS feeds
- Integrate data from two web services into a mash-up.

### 10.2 Timings

Lectures: 2 hours

Laboratory Sessions: 2 hours

Private Study: 7.5 hours

Tutorials: 1 hour

### 10.3 Laboratory Sessions

The laboratory time allocation for this topic is 2 hours.

#### Exercise 1:

Making use of a plug-in of your choice from this list of REST-based web services, create a PHP script that consumes this resource, and an Ajax front-end that presents it to the user. Also add an RSS feed from the BBC website into Andy's Autos Website.

- <http://www.programmableweb.com/apis/directory/1?protocol=REST&format=XML>

#### Exercise 2:

Making use of a plug-in of your choice from this list of SOAP-based web services, create a PHP script that consumes this resource, and an Ajax front-end that presents it to the user. It should be a web service that performs a different task to the one you selected for the first exercise.

- <http://www.programmableweb.com/apis/directory/1?protocol=SOAP&format=XML>

## 10.4 Private Study

The time allocation for private study in this topic is expected to be 7.5 hours.

### Exercise 1: Research Journal

As part of your ongoing journal exercise, you should research the following topics:

- REST versus SOAP
- Web services
- Mash-Ups
- WSDL

### Exercise 2: Mash-Up

Making use of two web services of your own choice, create a mash-up of these whereby the data from both plug-ins work together to produce a result greater than any can achieve on their own.

### Exercise 3: Presentation

Prepare a short, five-minute presentation on the results of your research from Exercise 1 above. If you have found out anything particularly interesting, you should focus on that as a priority.

### Exercise 4: Revision

Review the lecture material and ensure that you are comfortable with everything discussed thus far.

## 10.5 Tutorial Notes

The time allowance for tutorials in this topic is 1 hour.

### Exercise 1: Discussion of Private Study Exercise

Discuss as a group your solution to Exercise 2 in the private study.

### Exercise 2: Reporting Back to the Class

As a result of the research you did during your private study time, you should have a short five-minute presentation ready to give to the rest of the class. There is no need for this to be especially formal - you are simply reporting on anything interesting that you found during your research, or pointing out especially useful resources on the topic. Bring your journal along to the class so that you can make a note of anything especially useful that your classmates have mentioned. This is a knowledge dissemination exercise; you are not being formally assessed on the style or content of the presentation.



# Topic 11



## Topic 11: Building a dynamic website

### 11.1 Learning Objectives

This topic provides an overview of previous content in context.

On completion of the topic, students will be able to:

- Analyse a real-world scenario;
- Integrate tools to develop a solution to the scenario;
- Consider security issues;
- Test the website.

### 11.2 Timings

Lecture: 1 hour

Laboratory Sessions: 5 hours

Private Study: 7.5 hours

Tutorials: 1 hour

### 11.3 Laboratory Sessions

The time allocation for the laboratory sessions for this topic is 4 hours.

# Topic 11



## Case Study

Stocks 'r' Us is a stock trading site. Recently, clients have asked for a mechanism by which they can check the current value of their stock portfolios without having to call their broker. You have been commissioned to develop the site that would permit people to record their stock purchases and find their value at any given time.

The sensitivity of a financial portfolio is such that you have been asked not to develop your own bespoke login system for this site, but instead use the OpenID standard – specifically, users should authenticate against the Google OpenID server and the ID information that is sent back should be used to uniquely identify users in the system. You have been asked to use the PHP class available at <https://developers.google.com/identity/protocols/OpenIDConnect> to create your connection to the Google OpenID servers.

The first pass over the software is intended to be a prototype so that it can be trialled by senior managers, and so only a limited set of functionality is required. Later extensions will be requested, but not for this class exercise. The set of functionality you must provide is as follows:

- Allow people to log in to the system via OpenID
- Allow people to add stocks to their portfolio
- You will need to store this information in a database
- Provide users with a real-time update of stock prices (using the web service that you have used in previous topics).

This is intended to be a flagship product for the company, and as such you are asked to ensure that the system works appropriately across browsers and uses the most current technologies to accomplish your goals. Appropriate use of jQuery and Ajax have been marked down as a key deliverable of the product.

### Activity 1:

Create a setup page for your stock portfolio application.

### Activity 2:

Create the PHP code required to query the database for a particular user. This should return the data in XML format and should include no presentational detail of its own. This page should also be responsible for querying the stock price web service for the current value of the stock.

### Activity 3:

Create the PHP page for updating the stock portfolio. If someone enters a stock that they already possess, it should update the entry rather than adding a new record insertion.

# Topic 11



## Activity 4:

Create the front-end for the application.

## Activity 5:

Incorporate the OpenID authentication system and the PHP class you were provided.

## Activity 6

Test the website for:

- Technical Correctness
- Browser Compatibility
- Standards Compliance

Keep relevant screen shots and notes of your testing.

## 11.4 Private Study

The time allocation for private study in this topic is expected to be 7.5 hours.

### Exercise 1:

Write a short reflection on the web site you have created.

- What are the strengths?
- What are the weaknesses?
- What security measures have you taken into account?
- What were the results of testing the website?

### Exercise 2:

There are many extensions you can make to the stock tracking application. Implement the following:

- Apply a jQuery theme via ThemeRoller
- Incorporate data validation
- Ensure that stocks actually exist before they are added
- Allow users to delete stocks from their list
- Use the Google Charts API to create graphs showing the proportion of total value each of the stocks take up.

# Topic 11



## 11.5 Tutorial Notes

The time allowance for tutorials in this topic is 1 hour.

### Exercise 1: Overview of Scenario Solution

Discuss the solution to the exercise that your lecturer provided.

### Exercise 2: Reporting Back to the Class

As a result of the work done for your private study, you should have implementations for each of the tasks outlined. Be prepared to discuss your solutions with others in your class, and to help them to refine and correct the code they have developed.

## Topic 12: Evaluation

### 12.1 Learning Objectives

This topic provides an overview of the issues of evaluating websites. On completion of the topic, students will be able to:

- Reflect on the use of the web application for a specific purpose;
- Reflect on the functionality of data driven website;
- Reflect on the web service solutions;
- Test for user satisfaction;
- Reflect on the business benefits of the web site/services;
- Understand the issues of accessibility support.

### 12.2 Timings

Lectures: 1 hour

Laboratory Sessions: 2 hours

Private Study: 7.5 hours

Tutorials: 1 hour

# Topic 12



## 12.3 Laboratory Sessions

The laboratory time allocation for this topic is 2 hours.

### Exercise 1:

Making use of the websites with which you have been provided, (Amazon.com and uglytub.com), evaluate each according to the following criteria:

1. Technical correctness
2. Standards compliance
3. User satisfaction (you are the user)
4. Accessibility
5. User Experience and Testing Frameworks

You do not need to write a formal report of your testing as part of this exercise, but you should include the results and your conclusions in your research journal.

## 12.4 Private Study

The time allocation for private study in this topic is expected to be 7.5 hours.

### Exercise 1: Research Journal

As part of your ongoing journal exercise, you should research the following topics:

- Accessibility legislation
- Browser incompatibilities
- The Web Accessibility Initiative
- Usability testing
- User Experience
- User Journey
- Customer Profiling
- Testing Frameworks

### Exercise 2: Checklist

Making use of what you have researched for this topic, prepare a ten-twelve element check list of things people should (or should not) do when creating web applications. Present this check-list as a web application where further details justifying you inclusions are available when the user moves their

# Topic 12



mouse over the list entry. Be prepared to demonstrate this application and discuss your choices during the tutorial.

## **Exercise 3: Revision**

Review the lecture material and ensure that you are comfortable with everything discussed thus far.

## **12.5 Tutorial Notes**

The time allowance for tutorials in this topic is 1 hour.

## **Exercise 1: Checklist Showcase**

As a result of your private study you will have a web application that presents a check-list of 'dos and don'ts' for web developers. Start this application up and be prepared to answer questions on it.