Web Application Development 2

Course Handbook, 2020-21

(Details of the course outlined in this document might need to be changed during the semester in line with updates to University guidance or public health rules. Major announcements will be made via Moodle, email and/or Teams)

0. Personnel, timetable
Course coordinator & lecturer: Dr. Alistair Morrison, email alistair.morrison@glasgow.ac.uk

- **Lecture times**: Lectures run weekly week 17-27. (They are scheduled on Wednesdays and Fridays at 11:00-12:00 but we will not always use those live slots). Lecture videos will be posted on moodle at the beginning of each week, **to be watched in your own time**. There will usually be a **live Q&A session on Fridays 11.00-12.00**. (except first week) to ask any questions, host discussions, provide feedback on work etc. Follow the Zoom link on moodle. Note however that **in the first week of the course only, the live lecture will be Wednesday 13th Jan at 11:00**. Live lecture session attendance is encouraged but not mandatory. Attendance will not be checked and there will be no assessments during live lecture sessions.

- **Lab sessions**: each week during weeks 17-27, via Microsoft Teams. Hopefully you have been allocated to a Group Chat in Teams and know about your tutor and demonstrator. You must attend your lab session at the designated time. For a reminder of your lab group number, check your enrolment record on MyCampus.

1. Introduction
This course aims to provide students with the skills to design and develop distributed web applications in a disciplined manner, using a range of tools and technologies. The main technology will be the Django Web Application Framework; Python will also be used heavily, in conjunction with Django.

Other technologies that are featured in the course include HTML, CSS, HTTP GET/POST, XML/JSON, XHTML, JavaScript, JQuery and AJAX. You will also have an opportunity to use a range of tools aimed at promoting the disciplined design and development of distributed web applications. These include GitHub, Pip, PythonAnywhere,, Virtual Environments and Diagrams.net (Draw.io).

This course is intended to be challenging: it was originally an Honours course but was moved down to Level 2 in response to feedback from students in previous years that Level 2 was not sufficiently challenging! You will need to work hard to succeed with this course, in terms of attending and actively engaging with lectures and lab sessions, and completing assessments (which involve individual and team-based coursework, in addition to the final exam).

2. Course textbook

The course is based on the e-book "*Tango with Django 2: A beginner's guide to web development*", by Leif Azzopardi and David Maxwell, published by Lean Publishing (henceforth "TWD"). As this is an e-book, it is frequently updated. We will be using the version that has been updated for Django 2 – specifically the version that says "**2020-01a**" on the cover. You will be using this book primarily during the lab sessions, especially in the first half of the course.

TWD contains a step-by-step tutorial that guides the reader through the development of a web application called *Rango*, built using Python and Django. Rango lets users browse through user-defined categories to access various web pages. TWD has a very clear and intuitive style and is an excellent resource for learning Django. The first edition of TWD was launched in October 2013 by Leif Azzopardi and David Maxwell while at the University of Glasgow.
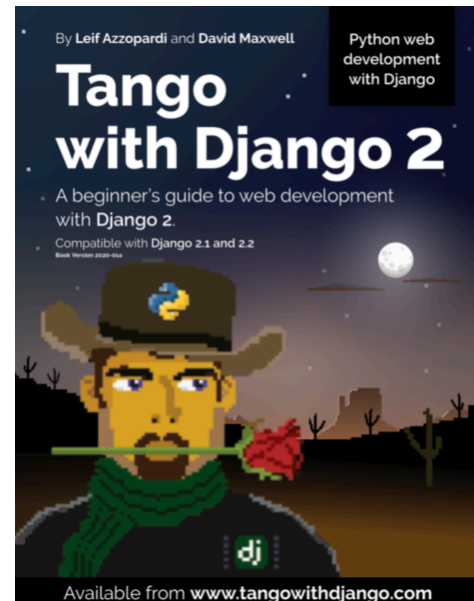
When working through the book, it is very important that you don't just copy and paste the code provided, but instead you should focus on understanding why the code works using the explanations from the book as the application is being built.

You can obtain TWD via the course Moodle page (see under "Course Textbook").

3. Software

3.1 Software versions

We will be using Django 2.2.17 and Python 3.8. All technologies associated with the course are constantly evolving, and indeed the latest version of Django (at the time of writing) is 3.1.5, released in January 2021. However, the version of Django that we will be using keeps us in sync with the most recent update of the TWD book. It's also worth noting that Django 2.2 is the latest version of Django with Long Term Support (LTS). It is good software engineering practice to use LTS releases to minimise software development efforts in any project.

In any case, it is very important to appreciate that the specific version of Django employed in the course is not a key issue; rather, what we seek to emphasise are the *principles* that underpin the design and development of distributed web applications. As such, once you complete this course you should find that it should be easy to *transfer your knowledge* to later versions of the technologies that we cover, and indeed to other web application frameworks.

3.2. Integrated Development Environments (IDEs)

There are various choices of Integrated Development Environment for developing Python modules. A basic desktop application for Python is IDLE. A more advanced option is PyCharm, which has Django support. You are free to choose any IDE to work in, but **note** that instructions given in lab sheets etc will assume a 'basic' text editor and will give details on how to execute commands and manage environments from the command line, rather than use any IDE's built-in tools. If you choose to use any other options such as PyCharm to manage these options, we can't guarantee support if you get stuck.

Another option is PythonAnywhere, which has its own editor, together with file management tools and the ability to launch consoles. PythonAnywhere provides you with the ability to deploy your web applications. Using PythonAnywhere for the development of your Rango application will give useful experience ahead of the project stage, during which you will develop a web application that is required to be hosted on PythonAnywhere.

4. Course assessment

4.1 Assessment summary

The course assessment is made up of the following components:

- Individual assessment (60%):
  - Development of the Rango application (10%)
  - Multiple-choice quizzes on Moodle (10%)
  - Final exam in April / May 2021 (40%)
- Team-based assessment – the WAD2 project (40%):
  - Design specification (10%)
  - Web application (25%)
  - Project presentation (5%)

4.2 Coursework

4.2.1 Individual assessment

4.2.1.1 Rango application

The development of your Rango application is guided by TWD, which you will work through on a self-study basis during lab sessions. Your final application will be assessed using automated testing. Thus it is important to adhere rigidly to the specification provided by TWD. This means that you do not have the flexibility to modify Rango or to adapt its functionality (though the exercises provide an opportunity to add your own code). However, you will have plenty of freedom to create a web application of your choosing later in the course when it comes to the WAD2 team project. You should regard the Rango exercise as providing the "scaffolding" to help you to learn Django in a structured way, in preparation for the project where you will have much more flexibility in terms of tools and technologies.

On the other hand, programming to a rigid specification (where, for example, identifiers have to be named precisely according to given rules in order to pass unit tests) could easily be a software engineering task that you might encounter in industry, so this exercise provides good training from that perspective.

4.2.1.2 Moodle quizzes

Each week (starting from second week) there will be four or five assessed quiz questions on Moodle. As well as forming part of your assessment, the quizzes are included to reinforce learning and provide regular feedback on understanding. They also incentivise ongoing engagement with the course; in previous years it has been observed that there is a strong correlation between lecture attendance and performance in the final exam.

Each week, quizzes will be released on Moodle over the weekend. The deadline for completing the quizzes on Moodle each week will be **Friday mornings at 10.30**. Therefore, the first such deadline will be **22nd January at 10:30**, I will cover the answers in the live sessions on 11:00 on Friday.

The questions are intended to be straightforward, and the answer (one from a multiple-choice selection) should be immediately clear once the relevant details required to answer the question have been covered during the lectures.

For each question a correct answer will score 1 mark, and an incorrect or missing answer will score 0 marks.

Your band for the quizzes will be published at the end of the course on the SoCS Online system (https://studentltc.dcs.gla.ac.uk). The quizzes collectively amount to 10% of the overall mark for the course.

4.2.2 Team-based assessment – the WAD2 project
You will be assigned to teams to work on the WAD2 project with other members of your lab group.

4.2.2.1 Design specification
Within your teams you will discuss the web application that you would like to build. The first deliverable will be a Design Specification, which will provide a whole range of details regarding the design of your planned web application. This will include an overview, user personas, a specification, system architecture diagram, ER diagram, wireframes and a site walkthrough.

4.2.2.2 Project application
The WAD2 Project is mainly based on the development of a web application of your choosing. Your web application should be developed using Python, Django, HTML, CSS and associated technologies including Javascript, JQuery and AJAX. The implementation of your web application should draw on the skills that you have built up during the development of your Rango app.

4.2.2.3 Project presentation
During your normal lab session time in the last week of the course (25 or 26 March), you will be required to present, as a team, your project to your tutor and to other members of your lab group. This might take the form of a pre-recorded video, but you will likely be expected to take live questions.

4.3 Final exam
The final exam will take place during the April / May 2021 exam diet. It will be a multiple-choice exam lasting 1 hour, comprising 30 questions. Each question will have 4 possible answers, only one of which is correct.

For each question there are 3 marks for a correct answer, an incorrect answer will result in a deduction of 1 mark, whilst an answer left blank equates to 0 marks. The paper thus carries a maximum mark of 90 and any negative total mark will be adjusted to 0. The rationale behind this marking scheme is that if a student guesses each answer uniformly at random, the expected overall mark is 0. If you don't know the answer to a given question, it is better to leave it blank than to make a complete guess.

The structure of the paper will be as follows:

- Section A: 10 questions on general principles of web application development;
- Section B: 10 questions on associated technologies including HTML, CSS, JavaScript, jQuery, AJAX, XML, JSON
- Section C: 10 questions on Django principles, including models, views, templates and URL configuration files.

Past exam papers will be available on the course Moodle page so you can see the typical format.

5. Attending live sessions and labs, and engaging with the course
As mentioned above, we have noted a strong correlation between ongoing engagement and performance in the final exam. It is thus important to attend classes to take full advantage of the support that is offered to you.

The lecture slides and videos will be made available in advance of each lecture on the course web page on Moodle There will also be demonstrations of code that will again be provided via Moodle. You will be free to try out this code in your own time, and indeed to use it as a basis for developing your own web applications when it comes to the project stage. As stated, attendance at the weekly live Q&A lecture session is encouraged but not

mandatory. Attendance will not be checked and there will be no assessments during live lecture sessions.

Lab sessions offer you the opportunity to discuss your coursework with your peers and to obtain assistance from your lab tutor. In the second half of the course you will also meet with the other members of your project team during lab sessions. It is really important to attend lab sessions and to engage actively with the team project – a delta system will be used which will reward those who make a very strong contribution to the project, and penalise those whose contribution is weak and who act as passengers!

6. Illness

If medical or other mitigating circumstances affect your work on this course then you should consult the Student Absence Policy[1], its associated guidance notes[2], the Good Cause Guide[3], and take appropriate action. This flowchart[4] may help you to determine whether you need to submit an Absence Report or a Good Cause Claim. Furthermore, there may be additional course-specific actions that should be taken as follows:

- If you are unable to complete an assessed quiz due to illness or good cause, you must email me
- If your work on the *Rango application* is affected by illness or other mitigating circumstances, to the extent that an extension to the submission deadline may be appropriate, you may apply for an extension at `https://studentltc.dcs.gla.ac.uk/` (this link will only work on the SoCS network) which will normally be at most three working days if granted. If your work on Rango is seriously affected (by illness or other mitigating circumstances, to the extent that either you are unable to submit the exercise, or your work on the exercise is so severely impaired that an extension of up to three working days would not be sufficient), you must submit a Good Cause Claim via MyCampus.
- If your work on the *team-based component*s of the assessment (i.e., design specification, web application and project presentation) is affected (by illness or other mitigating circumstances, to the extent that you have not been able to make an adequate contribution to some aspect(s) of the team-based work) you must email your lab group tutor to inform them, *and copy me in*. Lab group tutors are responsible for marking these aspects of the assessment. They give marks for the team for the design specification, web application and presentation, and your overall mark for the team-based assessment components is then adjusted by a delta that reflects your individual contribution. If illness meant that you were unable to make an adequate contribution to the team-based components of the assessment then your lab group tutor needs to know about this so they can take this into account when computing your delta. You should submit a Good Cause Claim via MyCampus in this case as well.
- If your *final exam* was affected (by illness or other mitigating circumstances, to the extent that either you were unable to attend the exam, or your performance during the exam was severely impaired), you must submit a Good Cause Claim via MyCampus.

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1. https://www.gla.ac.uk/media/media_129312_en.pdf
2. https://www.gla.ac.uk/media/media_129313_en.pdf
3. https://www.gla.ac.uk/media/media_420013_en.pdf
4. https://www.gla.ac.uk/media/media_424718_en.pdf