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**GSS Learning Curriculum**

**For those looking to develop their mathematical or statistical knowledge and skills**

**June 2016**

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**GSS Statistical Capability Team**

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| **This policy has been authorised by** | **Head of GSS Statistical Capability** |
| **Policy Owner** | **Head of GSS Statistical Capability** |
| **Implemented** | **June 2016**  |
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**About us**

The GSS Statistical Capability Team formed on 1st June 2016 following the merger of the GSS Capability Team and the Statistical Training Service. The new team forms part of the Analytical strand of the ONS Learning Academy and aims to ensure the statistical and data science learning needs of the GSS and GSG are met.

**Contact us**

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**The GSS Learning Curriculum**

1. **Introduction**
	1. **Who is the GSS Learning Curriculum for?**

This Learning Curriculum is aimed at all Civil Servants who are looking to develop their statistical or data science knowledge and skills. It brings together the suite of learning and development activities available to all members of the Government Statistical Service (GSS) – that’s anyone who helps to support the delivery of Official Statistics.

The learning curriculum also provides profession-specific learning for members of the Government Statistician Group (GSG) – the Statistical Profession - that will count towards their Continuous Professional Development (CPD). It also provides the starting point for those looking to develop their data science skills and to build their CPD in this field.

If you are confused about the difference between the GSS and the GSG, please see diagram 1 below.

**Diagram 1. The GSS Learning Curriculum is for everyone in the GSS and GSG:**

**GSS - all who work on and support the delivery of Official Statistics:**

* **Members of other analytical professions – GES, GORS, GES**
* **Operation Delivery staff**
* **IT staff, etc**

**GSS**

**The GSG – everyone in the statistical profession:**

* **Statistical Officers (StO, HStO &SStO)**
* **Statistical Data Scientists (all grades)**
* **Assistant Statisticians (Fast Stream)**
* **G7, G6 and SCS**

**GSG**

There are a wide range of opportunities for development of an individual’s core generic skills, which are identified in the Civil Service Competency Framework, available on the [Civil Service Learning portal](https://civilservicelearning.civilservice.gov.uk/). Learning for these skills is not covered here.

In line with the Civil Service Reform Plan, all members of the GSS are encouraged to spend at least five days a year on professional development.

Training budgets vary across departments so it is a person’s responsibility to gain approval for their learning from their line manager before booking onto activities that have an associated cost.

* 1. **How to join the Government Statistician Group (GSG)**

There arevarious routes into the statistical profession, which will assess your skills and experiences against the standards set for the profession. Once you have been accepted through one of the entry procedures, you will become part of the profession’s community and be able to take advantage of the training and development opportunities made available to you.

Routes into the GSG are via:

* the Statistical Fast Stream assessment boards;
* the central recruitment process;
* a specific GSG ‘badging’ board (grades above EO); or
* a G7 promotion board that has a Statistical Assessor on the panel.

To apply via a recruitment, promotion or badging board, candidates must *either*hold a first or second class honours degree in a subject containing formal statistical theory and methods (e.g. Maths, Statistics, Economics, Sciences, Social Sciences) *or* have experience of working within a statistical field, plus can demonstrate continuous professional development leading to a minimum of a Level 5 statistical qualification.

Upon joining the profession, you should receive your membership confirmation and be invited to any upcoming events.

**If you are interested in joining the GSG, please contact the** **GSS Recruitment Team**

* 1. **What are the Benefits to joining the GSG?**

Some of the benefits to being in the GSG include:

* A network of statistically minded individuals who are excited about contributing to analysis across Government. The network includes Methodologists, Data Scientists and Statisticians.
* Bespoke training which introduces you to the GSG (Induction training) and covers the structure and governance of the GSS, the UK Code of Practice, the UK Statistics Authority Strategy and career management.
* Attendance of a three day residential course (currently under review) which covers aspects of data collection, analysis and dissemination.
* Opportunities to maintain your Continuous Professional Development (CPD) through a statistical learning and development programme.
* Exciting opportunities to develop your career across a spectrum of Government Departments.
	1. **Career Development and Progression within GSG**

Entry level into the GSG traditionally starts at Statistical Officer or Statistical Data Scientist (EO level) if centrally recruited, or Assistant Statistician through the Fast Stream.

However, staff may join the profession at any point through the badging process. More details on badging can be found in ‘[Guidance on Badging, Level Transfer and returning to the GSG’](https://gss.civilservice.gov.uk/wp-content/uploads/2016/03/Guidance-on-Badging-level-transfer-and-returning-to-the-GSG_final-Apr-16.pdf) document on the GSS website.

Centrally Recruited Progression Pathway:

Fast Stream Progression Pathway:

1. **Compulsory Learning for Members of the GSG**

This section sets out the compulsory learning that is expected to be undertaken by all members of the Statistical Profession within the first 6 to 8 months of commencing their employment. This is aimed at:

* Assistant Statisticians;
* Statistical Officers; and
* Statistical Data Scientists.

All members of the profession are expected to undertake the following compulsory learning:

1. A relevant Induction course (relevant to one’s career pathway); and
2. The Statistical Foundations Course.
	1. **Induction Courses**

**Assistant Statisticians**

* **Civil Service Resourcing Fast Stream Induction**. Two courses are run each year, 2016 dates are:
	+ **Mon 5th – Wed 7th Sep**, plus a GSG day on **Thu 8th** **Sep**.
	+ **Mon 3rd – Wed 5th Oct**, plus a GSG day on **Thu 6th** **Oct**.

All Assistant Statisticians who were recruited in the 2015/16 cohorts are expected to attend one of the above courses.

We are in the process of learning about the location/venue and cost for this course and we will keep you updated via the GSS website as more information is received. This course is managed by Civil Service Resourcing but if you have any queries, please contact us.

**Statistical Officers**

* **GSG Induction course (under review, Jun - Aug 2016)**. Undertaken within 2 to 3 months of commencing employment. The course is currently 1.5 days and is run in London, Leeds or Newport. It is non-residential and costs £160. To make an enquiry or to enrol (a waiting list system is in place), please contact us.

**Data Scientists**

* **Data Science Induction Course (under review, Jun - Aug 2016)**. Undertaken within 2 to 3 months of commencing employment. The course is currently available to all new centrally recruited Data Scientists and those who have been recruited through local/departmental recruitment exercises. This is a 1 day non-residential course and is currently only held in London and costs £100. If you have any enquiries, please contact us.

*We will update this section following the review and agreement of the new Induction programme. For more information on mandatory learning events, please visit the* [*GSS website*](https://gss.civilservice.gov.uk/learning-and-development/training-events/)*.*

**2.2 The Statistical Foundations Course (under review, Jun - Aug 2016)**.

This course is mandatory for all members of the profession and should be taken within 2 to 3 months of the Induction course. This course is currently a 3-day residential course, held at the Strand Palace, London and costs £1000. You should be automatically enrolled onto this course but to make an enquiry please contact us.

*We will update this section following the review and agreement of the new Induction programme. For more information on mandatory learning events, please visit the* [*GSS website*](https://gss.civilservice.gov.uk/learning-and-development/training-events/)*.*

**2.3 Continuous Professional Development (CPD) for Members of the GSG**

CPD is the process of undertaking any relevant learning activity to maintain and develop an individual’s competencies throughout their career. The learning may develop knowledge and/or skills, may take the form of structured or un-structured learning activities, and will develop the individual in both statistical and non-statistical aspects.

Members of the GSG are expected to maintain a [CPD log](https://gss.civilservice.gov.uk/learning-and-development/continuous-professional-development-2/), which documents the amount of statistical and non-statistical learning undertaken in a given year.

GSG members are broadly required to undertake **60 – 100 hours** of CPD activity each year, of which **30 – 50 hours** should be statistical. In the early stages of a career, the upper end of this guideline will generally be required.

It is recognised that in some years, an individual may focus more on non-statistical competencies, and their statistical development will therefore fluctuate. In order to take account of this, the minimum requirement for CPD is averaged over a five year period and this is automatically calculated by the CPD log (Excel).

Prior to interview, GSG members may be required to submit their CPD log for the sift to demonstrate how individuals are continuing to develop professionally. Learning activities can take on various forms, including:

* Training courses
* Events
* Seminars
* Work-based learning/Reading
* Further academic learning, etc.

This Learning Curriculum sets out some opportunities for the various forms of learning.

1. **Learning Opportunities for all in the GSS – Statistical and Data Science**
	1. **ONS Statistical Short Course Programme**

The Statistical Short Course Programme is presented here –further details and the timetable for delivery can be found in Annexes 1 and 2. The Programme is mainly delivered by ONS Methodologists and provides a useful overview of the statistical techniques used by statisticians and many of the courses provide information on how and why to choose the most appropriate methodology.

There are **two levels** to the courses:

* **Level 1 -** no prior knowledge is required. The course provides an introduction and understanding of the subject.
* **Level 2** -Advanced Level, open to all staff with a good working knowledge of the subject area.

**Locations**

The courses are run at the Office for National Statistics sites in Newport, Titchfield and London. Courses can however also be delivered to a department or to a group of departments, at an agreed location on request. Dates and prices for this service will need to be negotiated separately with the GSS Statistical Capability Team.

**For an application form, contact us by emailing:** **GSS.Capability@statistics.gov.uk**

Full details of each course is provided at Annex 1. The Timetable is provided at Annex 2.

**Level 1 – No prior knowledge required**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Title\*** | **Length (days)** | **Location** | **Cost (£)** |
|  |
| * 1. Quality and Statistics
 | 1 | ONS Newport and Titchfield | 116 |
| * 1. Introduction to Questionnaire Design & Testing
 | 1 | ONS Newport and Titchfield ONS London | 116126 |
| * 1. Administrative Data
 | 1 | ONS Newport and Titchfield | 116 |
| * 1. Data Linkage
 | 1 | ONS TitchfieldONS London | 116126 |
| * 1. Sample Design & Estimation for Social Surveys
 | 2 | ONS Newport | 206 |
| * 1. Sample Design & Estimation for Business Surveys
 | 2 | ONS Newport | 206 |
| * 1. Population Statistics and the Census
 | 1 | ONS Titchfield | 116 |
| * 1. Editing & Imputation
 | 1 | ONS Newport | 116 |
| * 1. Introduction to National Accounts
 | 1 | ONS Newport | 116 |
| * 1. Statistical Disclosure Control
 | 1 | ONS Newport and Titchfield ONS London | 116126 |
| * 1. Geography for Statistics
 | 1 – GSS only2 – ONS only | ONS Newport and Titchfield | 116/206 |
| * 1. Seasonal Adjustment
 | 1 | ONS Newport | 116 |
| * 1. Index Numbers
 | 1 | ONS Newport | 116 |
| * 1. Data Visualisation
 | 1 | ONS Newport and Titchfield ONS London | 116126 |
| * 1. Communicating Statistics
 | 1 | ONS Newport and Titchfield | 116 |

*\* See Annex 1 for full details of all courses; See Annex 2 for timetable*

**Level 2 - For those with a good working knowledge of the subject area**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Title\*** | **Length (days)** | **Location** | **Cost (£)** |
|  |
| 1. Sample Design and Estimation for Social Surveys
 | 1 | ONS Newport | 116 |
| 1. Sample Design and Estimation for Business Surveys
 | 1 | ONS Newport | 116 |
| 1. Small Area Estimation
 | 1 | ONS Newport | 116 |
| 1. Geography for Statistics – Spatial Analysis
 | 1 | ONS Titchfield | 116 |
| 5. Seasonal Adjustment (Day 1 L1, Day 2 L2) | 2 | ONS Newport | 206 |
| 1. Index Numbers
 | 1.5 | ONS Newport | 167 |
| 1. Hypothesis Testing
 | 1 | ONS Newport and Titchfield | 116 |

*\* See Annex 1 for full details of all courses; see Annex 2 for timetable*

* 1. **Data Science Learning**

This section should help those who are looking to develop their data science knowledge and skills.

1. **The Data Science Accelerator Programme.** This is a 3 month commitment with the Government Digital Service (GDS), who will provide you with the kit, a Mentor and the space at GDS for one day a week. You will need to have a data science project idea in mind with backing from your line management and HoP. An application process operates since there are only 5 places available on the Programme for each run – the programme does however run 3 times a year. You will be provided with a bespoke training programme and will gain access to data science seminars and workshops.

Pre-requisites:

* Good analytical skills
* Basic understanding of coding (e.g. R, Python, HTML/Javascript) – not essential
* **High willingness to learn**

For more information, visit the [GDS blog site](https://data.blog.gov.uk/2016/05/03/the-data-science-accelerator-is-back/) or contact Tony Wilkins at GDS.

1. **ODI courses (classroom based)**
	* **Open Data in a Day.** Learn how todiscover, use and describe the benefits of open data and how they impact your organisation. This is an introductory, jargon free course that will enable you to quickly get a 360 degree view of the open data landscape and increase your confidence in working with open data. There will be costs associated with this course – [for more info](http://opendatainstitute.org/courses/open-data-day)
	* **Open Data in Practice – 3 days.** The course looks at the best practice involved in using and publishing open data and the legal and policy requirements in order to remove potential risks. Open Data in a Day is a suggested pre-requisite to this course. There will be costs associated with this course – [for more info](file:///%5C%5CNSDATA7%5CGSS%20Capability%5CCSL%5C%E2%80%A2%09http%3A%5Copendatainstitute.org%5Ccourses%5Copen-data-in-practice-3days)
2. **General coding in** **R**
* [CodeSchool](http://tryr.codeschool.com/) **Free** online course for beginners.
* [DataCamp](https://www.datacamp.com/) **Free** online course for beginners. Recommended for those who have no experience of R coding. R object types and functions are introduced thematically. Learning is in small manageable chunks and all coding is undertaken in the browser window. Other courses are available via DataCamp.
1. **Graphics in R**
* Exploratory data analysis by [Coursera](https://www.coursera.org/course/exdata). A **free** online course that runs every month for 4 weeks with 4-9 hours of study per week (depending on your level of ability at outset). Some R programming experience is necessary. The course provides an introduction in how to make visual representations of data using the base, lattice, and ggplot2 plotting systems in R. It applies basic principles of data graphics to create rich analytic graphics from different types of datasets, construct exploratory summaries of data in support of a specific question and create visualisations of multi-dimensional data using exploratory multivariate statistical techniques.
1. **Python**
	* [CodeAcademy](http://www.codecademy.com/tracks/python) **Free** online course that is estimated to take around 13 hours.
	* Programming for Everybody by [Coursera](https://www.coursera.org/course/pythonlearn%20.) **Free** online course that runs every few months for 10 weeks with 2-4 hours of study per week.
2. **Machine learning**
* Machine learning by [Coursera](https://www.coursera.org/learn/machine-learning/) **Free** online course that can be done at your own pace and is estimated to take around 70 hours. The course covers: ML topics, algorithms and applications such as recommender systems, OCR, image processing, etc. It also includes good advice on how to organise your machine learning “pipeline”, how to decide the size of your test datasets, evaluate your results, etc.
1. **Git - version control**
* Free online course run by [Udacity](https://www.udacity.com/course/ud775) - How to Use Git and Github. The course can be done in your own time and gives a quick overview of Git and Github for version control. Takes about 10 hours to complete in total.

**3.3 GSS Good Practice Team (GPT) Offerings**

For all info, see the [GSS Good Practice Team](https://gss.civilservice.gov.uk/national-statistician-2/gss-professional-support-team/good-practice-team/good-practice-resources/) web pages on the GSS website.

Areas covered on the website include:

* **Communicating Statistics** –access to:PresentationChampions, tools and guidance on communicating and disseminating statistics, access to Peer Reviews and User Panels, Improving Statistical Communication and the Effective use of Tables and Graphs.
* **Engaging** **with Users** – access to: Working with users, User Engagement Champions.

GPT has lots of experience of facilitating workshops on improving Statistical Commentary and Engaging with Users. If you’d like GPT to visit your department, contact the GPT at: goodpracticeteam@statistics.gsi.gov.uk. All courses are free.

Keep an eye open for the GPT series of sharing seminars via their [web pages](https://gss.civilservice.gov.uk/national-statistician-2/gss-professional-support-team/good-practice-team/good-practice-resources/).

**3.4 MSc in Official Statistics - This programme is being reviewed during June – Sep 2016 in readiness for a retendering process in Oct 2016 (for Sep 2017 delivery).**

[The MSc programme](http://www.southampton.ac.uk/demography/postgraduate/taught_courses/msc_official_statistics.page) has been jointly developed by the University of Southampton and the GSS to cover the core skills and knowledge needed by professional government statisticians.

The programme can be taken on a full-time or part-time basis. The programme is structured as a series of modules that run in **one-week slots** throughout the academic year. Some modules are run at the ONS site at Newport, South Wales and some in Southampton in the Social Statistics Research Centre at the University.

Modules can be taken as one-off modules for CPD purposes.

PG Certificate 6 modules

PG Diploma 12 modules

MSc 12 modules plus dissertation

Modules are available in a variety of topics including: Introduction to Survey Research, Survey Data Collection, Survey Sampling & Estimation, Evaluation and Monitoring, Demographic Methods, Compensating for Non-Response, Statistical Disclosure Control, National Accounts, Elements of Official Statistics, Statistical Computing and various Data Analysis modules including Regression Modelling and Small Area Estimation.

For the full suite of modules, please refer to the web link above.

To make an enquiry or to make a booking, please email the GSS Statistical Capability Team.

**3.5 Other Recommended Learning & Development Providers**

* [The Royal Statistical Society](http://www.rss.org.uk/RSS/pro_dev/RSS_training_courses/RSS/pro_dev/RSS_training_courses_sub/Our_courses.aspx?hkey=20e85bcf-4c66-467f-afd4-28cf897ad7fe) provides various courses, seminars and a conference throughout the year.
* [The Cathie Marsh Institute for Social Research,](http://www.cmist.manchester.ac.uk/events/short-courses/) based at Manchester University, provides a variety of courses that cover data collection and data analysis techniques.
* [CASS courses in applied social surveys](http://www.southampton.ac.uk/demography/cpd/courses/courses_in_applied_social_surveys.page#overview), based at Southampton University and run by the Southampton Statistical Sciences Research Institute (S3RI).
* [European Statistical Training Programme (ESTP](https://gss.civilservice.gov.uk/courses-and-events/european-statistical-training-programme/)) is a series of courses run by [Eurostat](http://epp.eurostat.ec.europa.eu/portal/page/portal/about_eurostat/introduction). They are delivered either internally at Eurostat (Luxembourg) or at national training sites in the [European Union](http://europa.eu/index_en.htm) (EU) and [European Free Trade Association](http://www.efta.int/about-efta/european-free-trade-association) (EFTA) countries.
* [Mango Solutions](file:///%5C%5Cndata13%5Creganc%24%5CMy%20Documents%5CNSO%5CLearning%20Curriculums%5C2016%5Cww.mango-solutions.com) specialises in the delivery of training in R, Python and Shiny, at all levels. They have recently been assisting many organisations to move from SAS to R as the primary programming tool. They have an experienced team that can deliver bespoke solutions for your department. If you are interested in organising something for your department, please contact Mango Solutions directly. However, if you would like us to coordinate something across departments, please contact the GSS Statistical Capability Team.
* [National Centre of Research Methods](http://www.ncrm.ac.uk/) run a series of events and training courses throughout the year. It is based at Southampton University. Course costs are£60 per day for staff in the UK public sector. All fees include event materials, lunch, morning and afternoon tea. They do not include T&S or accommodation costs.

**3.6 Bespoke Training Courses**

The GSS Statistical Capability Team at the ONS can help to source any bespoke training needs that you or your department has. To make an enquiry, please email the GSS Statistical Capability Team.

**3.7 Reading/blogs/websites**

* [E-learning resources](https://civilservicelearning.civilservice.gov.uk/) (non-statistical)
* [Government Digital Service blog](https://gds.blog.gov.uk/about/):
* [Go Science website](file:///%5C%5CNSDATA7%5CGSS%20Capability%5CCSL%5C%E2%80%A2%09https%3A%5Cwww.gov.uk%5Cgovernment%5Corganisations%5Cgovernment-office-for-science)
* [GSS Website](https://gss.civilservice.gov.uk/)
* Follow [Statistical blogs](https://gss.civilservice.gov.uk/interact/gss-blogs/)

**3.8 Work based learning**

In this section, we list some of the other development opportunities that are available to you to develop your career and contribute to your Continuing Professional Development.

* [Voluntary Sector placement scheme](https://gss.civilservice.gov.uk/secondments/)
* [Secondments to external organisations](https://gss.civilservice.gov.uk/secondments/)
* Secondment or loan to another government department, a policy area, an official statistic output area, etc
* Mentor or be mentored in a specific area
* Coach or secure coaching in a specific area
* Shadowing
* Visit stakeholders or end users

**3.9 Events/Conferences/Seminars – Open to all GSS members**

**GSS Methodology Symposium** – The annual [GSSM Symposium](https://gss.civilservice.gov.uk/blog/2016/04/21st-gss-methodology-symposium-2016-call-abstracts/) features papers on completed, work in progress and future methodological work. The next event is being held in London on **6th July 2016**. This year’s theme is “Methodology – the key to the door of innovation”.

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**RSS Conference** –The annual [RSS conference](http://www.rss.org.uk/RSS/Events/RSS_Conference/RSS_2016__International_Conference/RSS/Events/Conference/RSS_2016_International_Conference.aspx?hkey=44c3b1e0-42b0-42e1-867f-6a78b09121de) provides a unique opportunity for anyone interested in data analysis and statistics to come together to share information and network. The event is open to all statisticians and users of data. The next event is being held **5th – 8th September** at University Place, Manchester. Whatever your experience, field of



expertise or background, the RSS Conference provides an open forum to exchange knowledge and experiences, whether in the formal conference sessions or in the many networking opportunities at refreshment breaks and evening social events. Details of future conferences and events and be found on the RSS website.

**GSS Conference** – The next annual [GSS Conference](https://gss.civilservice.gov.uk/interact/gss-conference-2016/) is being held on **8th and 9th September 2016** at the University of Manchester. This year’s theme is “Connect. Collaborate. Create.” The conference will showcase best practice, new opportunities and future directions in the world of official statistics, and aims to deliver a significant and positive impact on the work of the statistical profession with an event that addresses the most relevant issues to GSS members.

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**The EARL Conference** - [Effective Applications of the R Language (EARL) Conference](https://earlconf.com/london/) will be held in London, **13th-15th September 2016**. EARL is a Conference for users and developers of the open source R programming language. The primary focus of the Conference is the commercial usage of R across a range of industry sectors with the aim of sharing knowledge and applications of the language.

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The organisers have agreed to extend their academic discount (plus an additional £10 reduction) to government delegates. This puts a day ticket at £290 reduced from £414, and a two day ticket at £410 reduced from £660.

**GSS Presentation and Dissemination Symposium** – The Presentation and Dissemination Symposium is held every 12 – 18 months and features papers and presentations on the challenges in the fields of data science, open data, data visualisation and improving statistical releases. Presentations from the March 2015 event in Cardiff are available on the [GSS website](https://gss.civilservice.gov.uk/) where details of future events will also be broadcast.



**ODI Friday Lunchtime Lecture Series**. Friday lunchtime lectures are for everyone and free to attend. Take your lunch, ODI provides tea and coffee, and an interesting talk. They run from 13:00 – 13:45, with informal networking until 14:00. The lectures do not require any specialist knowledge, but are focused around communicating the meaning and impact of open data in all areas of life. [See here](http://theodi.org/events) for more info and venue The ODI Friday lunchtime lecture series is now available to listen to and download as a podcast on [*iTunes*](http://itunes.apple.com/gb/podcast/theodi/id699004921) or via the [*RSS feed*](http://feeds.feedburner.com/odifridaylunchtimelectures).



**GSS/GES Forum** - The ONS Economic Forum is a quarterly seminar that keeps key users of economic statistics better informed – about the key messages in ONS economic statistics in recent months, what methodological improvements have been made recently or are coming up, and how to interpret the change that they might bring. The Economic Forum represents a significant improvement in communications with an influential group of economic commentators and analysts. This includes those in business,



the City, academia, think-tanks, and the media, and allows users to discuss all aspects of economic statistics with ONS experts. Details of forthcoming seminars will be issued via the GSS Newsletter via the [GSS website](https://gss.civilservice.gov.uk/people-and-careers-2/courses-events)

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Various **GSS workshops** will be advertised throughout the year at various locations. See the [GSS website](https://gss.civilservice.gov.uk/people-and-careers-2/courses-events/) for latest.

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The **Young Statisticians’ Meeting** (YSM) - is for those in the first 10 years of their statistical career or currently studying for a PhD, MSc or BSc in Statistics or a subject with statistical content. The YSM holds an annual two-day event for career-young statisticians, organised by career-young statisticians. For further details see the [GSS website](https://gss.civilservice.gov.uk/blog/2014/12/young-statisticians-meeting-ysm-2015/)

**Annex 1 – ONS Statistical Short Course details**

**Level 1 Courses**

1. **Quality and Statistics**

Level: Level 1

Location: Newport and Titchfield

Duration: 1 day

**Aims**

To introduce some of the quality considerations that are appropriate in the production of Official Statistics.

**Objectives**

By the end of the course, participants will gain:

* An understanding of the importance of quality through aligning with specific aspects of the Code of Practice following the Generic Statistical Business Process Model (GSBPM)
* Knowledge in the practical application of quality and how to implement it
* An overview of relevant guidance and tools
1. **Introduction to Questionnaire Design and Testing**

Level: Level 1

Location: Newport and Titchfield

Duration: 1 day

**Aims**

To introduce participants to data collection methodology and how it is applied to the survey development process.

**Objectives**

By the end of the course, the participant will be able to understand and identify:

* different sources of non-sampling error, focusing on measurement error and non-response error
* different modes of data collection including mixed modes and web data collection
* questionnaire and question design principles including different types of questions, sources of measurement error, including mode effects, and potential ways to mitigate them
* qualitative and quantitative methods for developing and testing questions, including expert review and cognitive question testing
1. **Administrative Data**

Level - Level 1

Location – Newport and Titchfield

Duration – 1 day

**Aims**

To consider the differences between survey and administrative data by:

* highlighting some of the challenges when linking different datasets
* providing an insight into the legal issues around acquiring administrative data

**Objectives**

By the end of the course, participants will be able to:

* explain what is meant by the term administrative data
* describe the benefits and limitations of using administrative data
* explain the advantages of using administrative data in the production of social and demographic statistics
* describe the principles behind matching and linking microdata
1. **Data Linkage**

Level - Level 1

Location – Newport, Titchfield and London

Duration – 1 day

**Aims**

This course will provide participants with an introduction to the principles, theory and practice of data linkage. Data linkage is playing an increasing role in producing statistics, to support a wide range of users and uses, through integration of data from multiple sources. The increased use of data sharing and data linkage will be key strategic issues in the next few years.

**Objectives**

By the end of the course, participants will be able to understand:

* the difficulties involved in data linkage
* desirable qualities of matching variables
* how to prepare datasets before matching
* different types of linkage methods
* how to link very large datasets
* how to evaluate the quality of your matches
* how to link encrypted datasets
1. **Sample Design and Estimation (Social)**

Level: Level 1

Location: Newport and Titchfield

Duration: 2 days (Newport) 1 day (Titchfield)

**Aims**

To explore aspects of sampling and estimation that are particularly applicable to social (household) surveys.

**Objectives**

By the end of the course, participants will be able to understand:

* the use of sampling frames
* different data collection modes (Newport only)
* sample design and different sampling methods
* estimation of simple statistics under various designs and their associated standard errors and confidence intervals
* the use of weights
1. **Sample Design and Estimation (Business)**

Level = Level 1

Location = Newport

Duration = 2 days

**Aims**

To introduce participants to sampling frames, sample design, calibration weights, outliers and the estimation process, particularly application to business surveys.

**Objectives**

By the end of the course, participants will be able to understand:

* the importance of creating and maintaining good sampling frames
* the need for a sampling selection method that can provide good quality and representative results
* how sampling is done for business surveys in ONS (use of the IDBR)
* the main estimators of population totals used in ONS business surveys
* design and calibration weights
* under what circumstances each estimator is appropriate and be aware of different methods for assessing the accuracy of estimators
* what outliers are and why they occur
* some methods of outlier detection and treatment strategies
* the Winsorisation method
1. **Population Statistics and the Census**

Level – Level 1

Location - Titchfield

Duration – 1 day

**Aims**

To introduce participants to key ONS demographic outputs and provide an understanding of the range of outputs produced and the challenges involved.

**Objectives**

By the end of the course, participants will be able to understand:

* key elements of conducting a census and population estimates
* migration estimates and population projections
* how demographic analysis is conducted by ONS
1. **Editing and Imputation**

Level – Level 1

Location – Newport

Duration 1 day

**Aims**

To introduce participants to:

* the editing process of detecting and correcting errors in business survey response data
* the imputation process of estimating for non-response in business surveys

**Objectives**

By the end of the course, participants will be able to understand:

* the vital importance of editing and imputation
* how editing and imputation methods are implemented in practice
1. **Introduction to National Accounts**

Level – Level 1

Location - Newport

Duration – 1 day

**Aims**

To introduce participants to:

* the different approaches to measuring Gross Domestic Product (GDP)
* the Balance of Payments
* the division of the economy into sectors
* balancing theory and practice

**Objectives**

By the end of the course, participants will be able to;

* describe the three approaches to measuring GDP
* understand what is included in the Balance of Payments
* list the characteristics of the sectors in the UK
* understand why we need to balance
* identify the participants in the economy and the transactions that flow between them
1. **Statistical Disclosure Control**

Level – Level 1

Location – Newport, Titchfield and London

Duration – 1 day

**Aims**

To introduce participants to:

* potential disclosure risks
* available statistical disclosure methods

**Objectives**

By the end of the course, participants will be able to understand:

* what is meant by disclosure risk and statistical disclosure control
* why there is a need to protect data against disclosure
* how to recognise situations that bring about statistical disclosure control risk
* the disclosure techniques and tools that are used to protect data
* the GSS standards for disclosure control
1. **Geography For Statistics**

Level – Level 1

Location – Newport and Titchfield

Duration – 2 days

**Aims**

To introduce participants to:

* the importance of geography in the production and use of statistics
* the generic elements of geographic knowledge, understanding and skills needed for analysis and research

**Objectives**

By the end of the course, participants will be able to understand:

* the nature of statistical geography in the UK
* the importance to statistics of getting your geography right
* the different types of statistical maps and their interpretations
* how to produce a basic statistical map
* the application of the GSS Geography Policy
* sources of geography data for Official Statistics
1. **Seasonal Adjustment**

Level – Level 1

Location - Newport

Duration – 1 day

**Aims**

To give participants:

* an introduction to the basic theory behind seasonal adjustment and the seasonal adjustment process
* an overview of the US Census Bureau’s software X-13-ARIMA-SEATS (GSS recommended software for seasonal adjustment)

**Objectives**

By the end of the course through a mixture of theory and practical application of X-13ARIMA-SEATS, course participants will gain an understanding of:

* the basic theory underpinning seasonal adjustment
* issues to consider when publishing seasonally adjusted estimates
* how to perform basic seasonal adjustment
* how to analyse your own time series data
1. **Index Numbers**

Level – Level 1

Location – Newport

Duration – 1 day

**Aims**

To introduce participants to the theory behind index numbers and the techniques used in practice.

**Objectives**

By the end of the course, participants will be able to understand:

* the uses of index numbers
* the definitions of value and value share
* Laspeyres and Paasche indices
* how to choose an index formula
* the definitions of deflation and referencing
1. **Data Visualisation**

Level – Level 1

Location – Newport, Titchfield and London

Duration – 1 day

**Aims**

To introduce the basic principles of data visualisation and their application in designing functional effective static graphics for a wide audience.

**Objectives**

By the end of the course, through use of examples and theory, participants will be able to understand:

* the fundamentals of effective data graphics at a basic level (for example in tables and charts)
* how different charts can be used to highlight particular data relationships
* the wider potential for data visualisation to support exploration and narrative
* emerging trends in data visualisation, their relevance and application
1. **Communicating Statistics**

Level - Level 1

Location – Newport and Titchfield

Duration – 1 day

**Aims**

To introduce participants to:

* the importance of user engagement, good commentary and clear data visualisation
* improving how we communicate our statistics to a range of users
* a set of useful tools that can be used to communicate statistics effectively

**Objectives**

By the end of the course, participants will be able to understand:

* why user engagement is important
* effective ways of identifying and engaging with users
* how social media can be effective in engaging with users
* best practice for report writing
* importance of data visualisation
* how to conduct a peer review

**Level 2 courses**

1. **Sample Design and Estimation (Social)**

Level – Level 2

Location - Newport

Duration – 1 day

**Aims**

To explore more complex aspects of sampling and estimation that are particularly applicable to social (household) surveys.

**Objectives**

By the end of the course, through practical application of the methods participants will be able to understand:

* the principles and practicalities behind sampling and estimation used within Official Statistics
* when to use different sampling strategies, with particular emphasis on multi-stage sampling
* how sample data can be used to estimate parameters of interest, with emphasis on weighting strategies that account for non-response and allow calibration to known population totals
* how to assess the quality of sample estimates, with attention paid to sampling errors and the use of design factors
1. **Sample Design and Estimation (Business)**

Level – Level 2

Location – Newport

Duration – 1 day

**Aims**

To explore more complex aspects of sampling and estimation that are particularly applicable to business (or establishment) surveys.

**Objectives**

By the end of the course, through practical application of the methods, participants will understand:

* the principles and concepts behind sampling and estimation used within Official Statistics
* when to use different sampling strategies, with particular emphasis on stratification
* how sample data can be used to estimate parameters of interest, with emphasis on estimation methods that make best use of other available information
* how to assess the quality of sample estimates, including the impact of the sample design and estimator
1. **Small Area Estimation**

Level – Level 2

Location - Newport

Duration – 1 day

**Aims**

To introduce participants to:

* the methodology applied to small area estimates
* when and how small area estimation methods should be applied

**Objectives**

By the end of the course, participants will be able to:

* understand the concepts and principles of a variety of methods
* be aware of which methods are most commonly used and why
* observe how different methods are applied
* understand which techniques are used in Official Statistics
* combine and model survey data with other datasets
1. **Geography For Statistics – Spatial Analysis**

Level – Level 2

Location – Titchfield

Duration – 1 day

**Aims**

To give participants an introduction to geographic/spatial analysis in the context of Official Statistics, focussing on location to gain a deeper understanding of data.

**Objectives**

By the end of the course, participants will:

* understand what is ‘special’ about spatial data
* understand some necessary spatial statistical concepts
* be able to apply a selection of spatial statistical techniques and interpret the outputs
* to be able to confidently identify, analyse and interpret spatial patterns in data
* gain hands-on experience working with software designed for spatial analysis
1. **Seasonal Adjustment**

Level – Level 2

Location – Newport

Duration 2 days (inclusive of 1 day L1 course, if you have previously attend L1 please contact GSS Capability)

**Aims**

To give participants:

* an introduction to basic and advanced theory behind seasonal adjustment and the seasonal adjustment process
* the ability to use the US Census Bureau’s software X-13-ARIMA-SEATS (GSS recommended software for seasonal adjustment)

**Objectives**

By the end of the course, through a mixture of theory and the practical application of X-13-ARIMA-SEATS, course participants will:

* gain an in-depth understanding of the theory underpinning seasonal adjustment (building on the Level 1 course)
* be able to perform more advanced seasonal adjustment
* be able to analyse their own time series
1. **Index Numbers**

Level – Level 2

Location - Newport

Duration – 1.5 days

**Aims**

To introduce participants to:

* the theoretical background to index numbers
* index number techniques used in practice
* aspects of the Consumer Price Index (CPI)

**Objectives**

By the end of the course, participants will be able to understand:

* the definitions of value and value share
* Laspeyres and Paasche indices
* how to choose an index formula
* what domains and aggregation are
* the definitions of deflation, referencing and linking
* the aspects of the Consumer Prices Index (CPI)
* the wider uses of index numbers
1. **Hypothesis Testing**

Level – Level 2

Location – Newport and Titchfield

Duration – 1 day

**Aims**

To give participants an overview of hypothesis testing and its application within Official Statistics

**Objectives**

By the end of the course, through the use of examples and theory, participants will gain:

* an understanding of the basics of hypothesis testing
* a working knowledge of statistical power
* an overview of more complex hypothesis testing problems and knowledge of how to deal with them

**Annex 2 - Statistical Short Course Programme Timetable for 2016-2017**

The aim of the Statistical Short Course Programme is to deliver courses that can develop key areas of Statistical knowledge and skills for those working with Official Statistics. The courses provide development in a variety of areas including data collection/data sourcing techniques, analytical tools and techniques, data dissemination good practice, and quality. Courses are delivered at ONS sites in Newport, London and Titchfield by experts in the field.

The entry requirements for courses are:

* **Level 1** – no prior knowledge is required. The course provides an introduction to the subject.
* **Level 2** – advanced level, open to all staff with a good working knowledge of the subject area.

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| Course (Sep – Dec 2016) | Level | Newport | Titchfield | London |
| Quality and Statistics | L1 | 14/09/16 | 13/10/16 |  |
| Administrative Data | L1 | 20/09/16 | 10/11/16 |  |
| Data Visualisation | L1 | 22/09/16 |  |  |
| Communicating Statistics | L1 | 28/09/16 | 30/11/16 |  |
| Data Linkage | L1 | 29/09/16 | 20/11/16 |  |
| Introduction to Questionnaire Design and Testing  | L1 | 05/10/16 | 24/11/16 |  |
| Statistical Disclosure Control | L1 | 06/10/16 | 06/12/16 |  |
| Geography for Statistics | L1 | 12&13/10/16 | 16&17/11/16 |  |
| Introduction to National Accounts | L1 | 12/10/16 |  |  |
| Administrative Data | L1 | 19/10/16 |  |  |
| Sample Design and Estimation (Business) | L1 | 02&03/11/16 |  |  |
| Sample Design and Estimation (Social) | L1 | 09&10/11/16 | 03/11/16 |  |
| Quality and Statistics | L1 | 16/11/16 |  |  |
| Index Numbers | L1 |  23/11/16 |  |  |
| Geography (ONS 2 days – GSS 1 Day) | L1 | 30&01/11/16 |  |  |
| Editing & Imputation | L1 | 01/12/16 |  |  |
| Sample Design and Estimation (Social) | L2 | 07/12/16 |  |  |
| Seasonal Adjustment (Day 1 L1, Day 2 L2) | L1/2 | 07&08/12/16 |  |  |
| Population Statistics and the Census | L1 |  | 29/09/16 |  |

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| Course (Dec 2016 – Jul 2017) | Level | Newport | Titchfield | London |
| Administrative Data | L1 | 14/12/16 |  |  |
| Introduction to National Accounts  | L1 | 25/01/17 |  |  |
| Hypothesis Testing | L2 | 01/02/17 |  |  |
| Sample Design and Estimation (Business) | L2 | 15/02/17 |  |  |
| Sample Design and Estimation (Social) | L2 | 01/03/17 |  |  |
| Editing & Imputation | L2 | 08/03/17 |  |  |
| Statistical Disclosure Control | L1 | 22/03/17 |  | 20/06/17 |
| Communicating Statistics | L1 | 29/03/17 |  |  |
| Data Visualisation | L1 | 26/04/17 |  |  |
| Small Area Estimation | L2 | 07/06/17 |  |  |
| Seasonal Adjustment(Day 1 L1, Day 2 L2) | L1/2 | 14&15/06/17 |  |  |
| Index Numbers | L2 | 21&22/06/17 |  |  |
|  Data Visualisation | L1 | 28/06/17 |  | 14/03/17 |
| Introduction to Questionnaire Design and Testing | L1 |  | 23/02/17 |  |
| Data Linkage | L1 |  | 08/06/17 | 07/03/17 |
| Geography for Statistics – Spatial Analysis | L2 |  | 09/03/17 |  |
| Quality and Statistics | L1 |  |  23/03/17 |  |
| Administrative Data | L1 |  | 30/03/17 |  |
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