

# **Position Classification Flysheet for Data Science Series, 1560**

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## Introduction

This position classification flysheet establishes the **Data Science Series, 1560**, and provides the series definition and titling instructions. In the General Schedule position classification system established under chapter 51 of title 5, United States Code, the positions addressed here would be two-grade interval positions.

The term “General Schedule” or “GS” denotes the major position classification system and pay structure for white collar work in the Federal Government. Agencies that are no longer subject to chapter 51 have replaced the GS pay plan indicator with agency-unique pay plan indicators. For that reason, reference to General Schedule or GS has been omitted from this flysheet.

## Coverage

This position classification flysheet covers the following occupational series: **Data Science Series, 1560**

## Establishing the Occupational Series and Standard

Issuance of this flysheet establishes this occupational series as described in the following table. The table also indicates how to classify work covered by this series.

New/Previous Series or Guidance	Action Taken/How to Classify Work Previously Covered
<b>Data Science Series      1560</b>	<ul style="list-style-type: none"> <li>• Refer to the Job Family Standard for Professional Work in the Mathematical Sciences Group, 1500.</li> </ul>

## General Series Determination Guidelines

Determining the correct series for a position is usually apparent by reviewing its assigned duties and responsibilities and then comparing them to the series definitions and general occupational information the classification flysheet or standard provides. Generally, the classifier decides the series for a position based on the primary work of the position, the highest level of work performed, and the paramount knowledge required to do the work of the position. In some situations, however, following this guidance may present difficulties.

When the work of a position matches more than one occupation, then use the following guidelines to determine the appropriate series for classification purposes.

- **Paramount knowledge required.** Although there may be several different kinds of work in the position, most positions will have a paramount knowledge requirement. The paramount knowledge is the most important type of subject matter knowledge or experience required to do the work.
- **Reason for existence.** The primary purpose of the position or management's intent in establishing the position is a positive indicator for determining the appropriate series.
- **Organizational mission and/or function.** Positions generally align with the mission and function of the organization to which they are assigned. The organization's function is often mirrored in the organizational title and may influence the appropriate series.
- **Recruitment source.** Supervisors and managers can help by identifying the occupational series that provides the best qualified applicants to do the work. This is closely related to the paramount knowledge required.

The [Additional Occupational Considerations](#) section of this flysheet provides examples where the work may involve applying related knowledge and skills, but not to the extent that it warrants classification to this occupation.

For further guidance, refer to [The Classifier's Handbook](#).

## **Classifying Professional Scientific Work**

Professional scientific work involves exercising discretion, analytical skill, judgment, personal accountability and responsibility for creating, developing, integrating, applying, and sharing an organized body of knowledge that characteristically is: uniquely acquired through extensive education or training at a recognized college or university; equivalent to the curriculum requirements for a bachelor's or higher degree with major study in or pertinent to the specialized field; and continuously studied to explore, extend, and use additional discoveries, interpretations, and applications to improve data quality, materials, equipment, applications, and methods. Data scientist work classified in this series includes professional knowledge and skills acquired through extensive education or training equivalent to higher levels of formal education. Data scientist work requires continued competence in the field of data science.

### **Interdisciplinary Professional Positions**

An interdisciplinary position is a position involving duties and responsibilities closely related to more than one professional occupation. As a result, you could classify the position into two or more professional occupational series. The nature of the work is such that persons with education and experience in two or more professions may be considered equally well qualified to do the work. In both categories the position description should show clearly that the position is interdisciplinary and indicate the various series in which the position could be classified. The final classification of the position is determined by the qualifications of the person selected to fill it. Data scientist work may overlap with other types of work given similarities in duties and responsibilities. A thorough analysis of the work is required to determine the appropriate series and/or any overlap with other positions.

For further guidance on the use and classification of interdisciplinary positions, refer to [The Classifier's Handbook](#).

## **Distinguishing Between Professional, Administrative, and Technical Work**

Distinguishing between professional, administrative, and technical work requires the proper analysis of positions duties/responsibilities and the qualifications required to perform the work upon entry into the position. Professional, administrative, and technical work include specific characteristics as described below.

### **Professional Work**

Professional work requires knowledge in a field of science or learning characteristically acquired through education or training equivalent to a bachelor's or higher degree with major study in or pertinent to the specialized field, as distinguished from general education. Work is professional when it requires the exercise of discretion, judgment, and personal responsibility for the application of an organized body of knowledge that is constantly studied to make new discoveries and interpretations, and to improve data, materials, and methods. When professional work is not inherent in a position, the position is classified in a nonprofessional series, based on the duties and responsibilities assigned and the qualifications required to do the work.

### **Administrative Work**

Administrative work involves the exercise of analytical ability, judgment, discretion, and personal responsibility, and the application of a substantial body of knowledge of principles, concepts, and practices applicable to one or more fields of administration or management. While these positions do not require specialized education, they do involve the type of skills (analytical, research, writing, judgment) typically gained through a college level education, or through progressively responsible experience. Employees engaged in administrative work are concerned with analyzing, evaluating, modifying, and developing the basic programs, policies, and procedures which facilitate the work of Federal agencies and their programs. They apply a knowledge of administrative analysis, theory, and principles in adapting practice to the unique requirements of a particular program.

### **Technical Work**

Technical work is typically associated with and supportive of a professional or administrative field. It involves extensive practical knowledge, gained through experience and/or specific training less than that represented by college graduation. Work in these occupations may involve substantial elements of the work of the professional or administrative field but requires less than full knowledge of the field involved.

For further guidance on making distinctions between professional, administrative, and technical positions can be found in the [Introduction to the Position Classification Standards](#).

## Official Titling Provisions

Title 5, United States Code, requires the U.S. Office of Personnel Management (OPM) to establish authorized official position titles to include a basic title may be appended with one or more prefixes and/or suffixes. Agencies must use the official position titles for human resources management, budget, and fiscal purposes. Instructions for assigning official position titles are provided in this section.

### Supervisors and Leaders

Add the prefix “Supervisory” to the basic title when the agency classifies the position as supervisory. If the position is covered by the General Schedule, refer to the [General Schedule Supervisory Guide](#) for additional titling information.

Add the prefix “Lead” to the basic title when the agency classifies the position as leader. If the position is covered by the General Schedule, refer to the [General Schedule Leader Grade Evaluation Guide](#) for additional titling information.

### Specialty or Parenthetical Titles

Specialty titles are typically displayed in parentheses and referred to as parenthetical titles. Agencies may supplement the authorized title with agency established parenthetical titles if necessary, for recruitment or other human resources needs. See the [Data Scientist Titling Guidance Memorandum](#) for additional guidance on using the data scientist parenthetical title.

### Organizational Titles

Organizational and functional titles do not replace, but rather complement, official position titles. Agencies may establish organizational and functional titles for internal administration, public convenience, program management, or similar purposes. Examples of organizational titles are Branch Chief or Division Chief. Examples of functional titles are Chief of Data Development and Chief of Operations.

**Data Science Series, 1560****Qualification Standard****Series Definition**

This series covers professional positions which primarily involve work related to identifying the methods, processes, algorithms, tools, and systems to extract and interpret findings from varied structured and unstructured data sets related to the data science lifecycle. Work also involves the development of algorithms and/or tools to support data manipulation and processing as well as the use of data visualization techniques to articulate findings. The primary requirements of the work are applying professional knowledge of computer science and mathematical and statistical theories, techniques, and methods to gather, analyze, design and construct new processes for modeling, interpret, and/or report quantitative information, trends, relationships and correlations among or within data sets.

The work requires knowledge of, or skills and abilities related but not limited to the following:

- Algorithms
- Application of fact-finding and investigative techniques
- Artificial intelligence
- Big data principles
- Communicate findings both orally and in writing
- Computer science
- Data analytics
- Data modeling
- Data governance
- Data visualization
- Machine learning
- Mathematics
- Natural Language Processing
- Optimization Methods
- Programming languages
- Simulation
- Statistical methods and techniques
- Statistical software and computer programs to perform computer analysis of statistical data and findings
- Statistical theory



## Titling

The basic title specified for this series is **Data Scientist**.

Agencies may supplement the basic position titles by adding parenthetical titles, where necessary and as permitted in the [Data Scientist Titling Guidance](#), to identify duties and responsibilities which reflect specific knowledge and skills required in the work.

## General Occupational Information

Data science work involves the use of scientific methodology, processes, algorithms, and systems to extract insights from structured and unstructured data, and to provide guidance for data-driven decision making. The field of data science consists of several domain sub-disciplines including computer science, mathematics and statistics and business knowledge. Specific to these sub-disciplines data science work broadly incorporates traditional research, machine learning, and software development.

Data scientists use life cycle process models to perform their work. There are various data science lifecycle models that consist of a set of processes in an application that transforms data into useful knowledge. Data science life cycle models incorporates principles, techniques, and methods including data cleaning, data management, analytics, visualization, and engineering.

Specifically, the data science lifecycle includes gathering and storing data, usually in its original form (i.e., raw data); processing and converting raw data into clean, organized information; developing tools and processes for analysis; applying various tools and techniques to produce findings and insights from structured and unstructured data. The data and the results of this process are communicated across various organizations.

The data science lifecycle employs processes such as data training models (i.e., machine learning algorithms) to generate insights for building dashboards. In addition, such algorithms can be re-used in other organization/agency to generate additional value. The data science models are generally based on how the creator interprets the stages of the lifecycle and defines data science work.

One distinguishing factor in identifying Data Scientist work is determining what is being done with the data and the types of data being extracted and/ or analyzed. To illustrate, Data Scientists primarily apply advanced quantitative, computer science, mathematical, and statistical skills to interpret extremely large and unstructured data sets and asks questions regarding the unknown. This differs from other Data Science work roles such as Data Analysts, Data Architects, and Data Engineers. These other work roles may not require the same skill sets as a Data Scientist and therefore may not be appropriately classified in this series. For example, work performed by Data Scientists may overlap among computer science, mathematical, statistical, and information technology work in the areas of application of methods and techniques. Such positions may be found at any organizational level within Federal agencies. The primary purpose of data scientist work is to provide managers or leadership with objectively based information derived from the use of advanced scientific, mathematical, and statistical principles and theories. The results of this data will be used for making data driven decisions regarding the administrative and programmatic aspects of agency operations and management.

Listed below, are some illustrations of the work performed by data scientist and covered of this series. This list should not be considered as a definitive catalog of all the specific kinds or combinations of work performed by positions in this series and is not in order of importance.

- Advising on the potential benefits/uses of automation to improve the efficiency of program operations;
- Analyzing a variety of data sources to provide data-driven insights to the organization to streamline processes;
- Analyzing and evaluating (on a quantitative and/or qualitative basis) the effectiveness of line program operations in meeting established goals and objectives;
- Analyzing and evaluating the effectiveness of organization based on data findings to improve operations;
- Analyzing management information requirements to develop program or administrative reporting systems including the systems specifications, data gathering and analytical techniques, and systems evaluation methodology;
- Applying a combination of computational and machine learning methods to new or big data to identify new insights using next generation analytical tools;
- Combining, analyzing, and interpreting large and/or complex data sets to develop data-driven organizational solutions;
- Conducting data extraction by using computer programming without preset specifications;
- Conducting in-depth analysis of data and disseminating the results of those analyses;

- Conducting regression analysis, statistical analysis, modeling, machine learning, data engineering, mathematical programming, Natural Language Processing, auto coding and data visualization;
- Conducting statistical analysis to make informed projections, data driven decisions, and recommendations based on findings;
- Defining useful measurements for specific purposes;
- Determining the best and most efficient ways to collect quantitative information;
- Determining the feasibility of reducing an ill-defined problem to one in which objective measurements can be identified and evaluated;
- Developing data required for use in the management and direction of programs;
- Developing life cycle cost analyses of projects or performing cost benefit or economic evaluations of current or projected programs;
- Developing management and/or program evaluation plans, procedures, and methodology;
- Developing statistical software and computer programs to perform analysis of statistical data and findings;
- Establishing procedures for data storage and retrieval;
- Establishing systems of classification and coding;
- Establishing the sequence of collection, summarization, and representation;
- Exploring data using various means available to find insights and trends that may go undiscovered in traditional research;
- Identifying data required for use in the management and direction of programs;
- Organizing a reporting system;
- Planning data dissemination systems;
- Planning necessary quality checks and controls;
- Planning the development of related data for comparison;
- Planning, organizing, and overseeing the operation of a survey;
- Preparing reports using machine learning, programming, and data visualization skills to present organization findings;
- Solving statistical problems that occur in survey collection and summarization processes;
- Using existing and new data sources to extract new information and convey that information according to the audience to the data;
- Using spatial data types to conduct analysis, assess spatial quality, uncover new insights, improve workflows and outcomes, define new products, identify new data sources, and develop machine learning solutions to solve problems;
- Using tools, emerging technology, and various data sources to perform exploratory analyses on new and archival data sources.

### **Impact of Automation**

Data Scientist use technology to wrangle enormous data sets and work with complex algorithms. The tools used by data scientist are complex, requiring expertise in coding, prototyping, and integration with complex data systems. The exploration of big data by data scientist requires the use of powerful technology to explore data using such as machine learning and artificial intelligence.

The technological tools involved, and the skills required to use them generally replace or supplement work previously done manually or by machines. Automation does not change the primary purpose of the work or the paramount knowledge required to do the work, which is a professional knowledge of mathematics, statistics, and/or computer science. Properly classifying positions in these occupations is based on the relevant knowledge and skills required to do the professional duties of the position.

<b>Additional Occupational Considerations</b>	
<p>Some positions may include work requiring knowledge and skills typically associated with the Management and Program Analysis Series. As a result, a closer look at the work may reveal classification to this series may not be appropriate. The General Series Determination Guidelines section of this flysheet offers guidance on selecting the most appropriate series.</p> <p>The following table provides examples of work similar to that performed in the Data Science Series, 1560, but not to the extent the paramount knowledge required, the reason for the position’s existence, the mission and/or function of the organization, and the recruitment sources for the best qualified candidates warrant classification to this series. For further guidance, refer to OPM’s publication <a href="#">The Classifier’s Handbook</a>.</p>	
<b>If Work Involves...</b>	<b>See This Standard or Series Definition:</b>
<p>Positions which have as their paramount qualification requirement specialized subject-matter knowledge and skills equivalent to those required of a fully-trained employee in the subject-matter occupations.</p>	<p>Such positions should be classified in the appropriate specialized series, or if none is established, in the <a href="#">Miscellaneous Administration and Program Series, GS-0301</a>.</p>
<p>Positions primarily engaged in conducting, supervising, or managing the line program activities or functions of the employing agency.</p>	<p>Depending on the specific knowledges and skills required, such positions should be classified either in the appropriate subject-matter series, the <a href="#">Program Management Series, 0340</a>, or the <a href="#">Miscellaneous Administration and Program Series, GS-0301</a>.</p>

<b>If Work Involves...</b>	<b>See This Standard or Series Definition:</b>
Positions performing the evaluation of the effectiveness of government programs and operations or the productivity and efficiency of the management of Federal agencies or both which require knowledge of: the substantive nature of agency programs and activities; agency missions, policies, and objectives; management principles and processes; and the analytical and evaluative methods and techniques for assessing program development or execution and improving organizational effectiveness and efficiency.	<a href="#"><u>Management and Program Analysis Series, 0343</u></a>
Positions that perform professional accounting and auditing knowledge, standards, and principles such as advising on, supervising, or performing work consisting of a systematic examination and appraisal of financial records, financial and management reports, management controls, policies and practices affecting or reflecting the financial condition and operating results of an activity; analyzing work related to developing and executing audit policies and programs; conducting performance audits; or conducting activities related to the detection of fraud, waste, and abuse.	<a href="#"><u>Auditing, 0511</u></a>
Positions that perform, advise, or supervise work in any of the phases of the budget administration process when such work requires knowledge of and skill in applying budget- related laws, regulations, policies, precedents, methods, and techniques.	<a href="#"><u>Budget Analysis, 0560</u></a>
Positions managing, supervising, leading, and/or performing professional engineering and scientific work to determine, evaluate, predict, and advise on effective ways for an organization to use its production factors (i.e., people, equipment, materials, information, and energy) to make or process a product or provide a service.	<a href="#"><u>Industrial Engineering, 0896</u></a>

<b>If Work Involves...</b>	<b>See This Standard or Series Definition:</b>
Positions that direct or perform analytical and evaluative work requiring a comprehensive knowledge of (1) the theory and principles of finance applicable to the full range of financial operations and transactions involved in the general activities of the various types of business corporate organizations; (2) the financial and management organization, operations, and practices of such corporate organizations; (3) pertinent statutory or regulatory provisions; and (4) related basic economic, accounting, and legal principles.	<a href="#"><u>Financial Analysis Series, GS-1160</u></a>
Positions that manage, supervise, lead, or perform scientific work that involves designing, developing, and adapting mathematical, statistical, econometric, and other scientific methods and techniques. The work also involves analyzing management problems and providing advice and insight about the probable effects of alternative solutions to these problems. The primary requirement of the work is competence in the rigorous methods of scientific inquiry and analysis.	<a href="#"><u>Operations Research, 1515</u></a>
Positions that perform work that involves managing, supervising, leading, or performing scientific work that involves designing, developing, and adapting mathematical methods and techniques to statistical processes; or research that relates to the basic theories and science of statistics.	<a href="#"><u>Mathematical Statistics, 1529</u></a>
Positions that manage, supervise, lead, or perform scientific work or provide professional consultation in applying statistical theories, techniques, and methods to gather, analyze, interpret, and/or report quantified information.	<a href="#"><u>Statistics, 1530</u></a>
Positions which primarily involve the application of, or research into, computer science methods and techniques to store, manipulate, transform, or present information by means of computer systems.	<a href="#"><u>Computer Science Series, 1550</u></a>
Positions for which the paramount requirement is knowledge of IT principles, concepts, and methods such as but not limited to data storage, database management, system analysis, policy and planning, software applications, networking.	<a href="#"><u>Information Technology Management, 2210</u></a>

### Crosswalk to the Standard Occupational Classification

The Office of Management and Budget requires that all Federal agencies that collect occupational data use the Standard Occupational Classification (SOC) system for statistical data reporting purposes. The Bureau of Labor Statistics uses SOC codes for the National Compensation Survey and other statistical reporting. OPM and other Federal agencies maintain a “crosswalk” between OPM authorized occupational series and the SOC codes to serve this need. This requirement and these SOC codes have no effect on the administration of any Federal human resources management system. The information in this table is for information only and has no direct impact on classifying positions covered by this series. The SOC codes shown here generally apply only to non-supervisory positions in this occupation. As changes occur to the SOC codes, OPM will update this table. More information about SOC is available at <http://stats.bls.gov/soc>.

#### Federal Occupational Series and Position Title and The Related Standard Occupational Classification System Code

Federal Occupational Series	Standard Occupational Classification Code Based on Occupational Series		Position Title	Standard Occupational Classification Code Based on Position Title	
Data Scientist, 1560	15-2050	Data Scientists	All	15-2051	Data Scientists



## Grading Instructions

This flysheet does not provide occupation-specific grading criteria.

Use the [Job Family Standard for Professional Work in the Mathematical Sciences Group, 1500](#) to evaluate nonsupervisory positions.

Specific grade level criteria for positions in this occupation have not been developed. As a general rule, positions included in this series should be evaluated by reference to classification standards for related kinds of work. (See the [Introduction to the Position Classification Standards](#).)

Evaluate leader positions using the [General Schedule Leader Grade Evaluation Guide](#).

Evaluate supervisory positions using the criteria in the [General Schedule Supervisory Guide](#).

## Explanatory Material

### Key Dates and Milestones

In January 2019, the Foundations for Evidence-Based Policymaking Act of 2018 (“Evidence Act”), signed into law and emphasized collaboration and coordination to advance data and evidence-building functions in the Federal Government by statutorily mandating Federal evidence-building activities, open government data, and confidential information protection and statistical efficiency.

In June 2019, OPM issued a [Data Scientist Titling Guidance Memo for Hiring Data Scientists](#). This guidance authorized agencies to use a parenthetical of (Data Scientist) along with the occupational title for positions that perform data science work as a major portion of the job, and not as a collateral duty. Data Scientist work is multifaceted and requires talent from interdisciplinary backgrounds. OPM has determined that data science work may be found in various occupational series, including but not limited to, the Epidemiology - Medical and Health Care Series (0601); Actuarial Science Series (1510); Operations Research Series (1515); Statistician Series (1530), and IT Specialist - Data Management (2210). The occupational series in which data scientist work is performed is determined by the domain expertise required to conduct data scientist activities. Therefore, agencies will maintain the flexibility to use a parenthetical of Data Scientist along with the occupational title for positions that perform data science work as a major portion of the job, and not as a collateral duty, for example Statistician (Data Scientist).

In October 2019, the U.S. Office of Personnel Management (OPM) worked in collaboration with the U.S. Office of Management and Budget, the Chief Information Officer (CIO) Council, the U.S. Department of Commerce/U.S. Census Bureau, Federal agencies, and other key stakeholders to explore data scientist work in the Federal Government. Using scientific methodologies and evidence-based approaches, OPM conducted a comprehensive study on data scientist work leveraging data from industry, academia, and governmentwide. OPM stakeholder engagement activities included focus groups with technical and human capital Federal agency subject matter experts and leadership informed the development of the Flysheet by identifying key data scientist work roles, knowledge areas, skills, and competencies. OPM conducted subject matter expert (SME) focus groups with 20 agencies in attendance and held one Executive briefing to identify key data scientist work roles, skills, and competencies with 14 Federal agencies. OPM also collected feedback from Federal agencies on the draft data scientist Flysheet and qualification requirements. Data Scientist SME’s provided various perspectives (Hiring Managers, Workforce Analysts, Technical, and Human Resources) of data scientist work and challenges filling data scientist positions. OPM collected rich data from the focus groups and other data collection activities that were used to cement the foundation for data scientist work policy.

March 2021, OPM invited agencies to participate in a survey to review **"Draft Data Scientist Classification Policy"** for data scientist work. Agencies’ participation informed OPM’s efforts in providing policy guidance to agencies.

August 2021, after consulting with Federal agencies, OPM finalized the Data Scientist Series, 1560 for issuance.

Agencies are reminded that there are numerous roles such as Data Analysts, Data Architects, and Data Engineers in the data science lifecycle. These other work roles may not require all the same skill sets as a Data Scientist and therefore may not be appropriately classified in this series, but there may be some overlap.

For positions whose duties fall in more than one occupational group, the most appropriate series for the position depends on consideration of a number of factors. For many of these positions the grade controlling duties will determine the series. Sometimes, however, the highest level of work performed does not represent the most appropriate series, and the series can be determined only after considering the paramount qualifications required, sources of recruitment and line of progression, the reason for establishing the position, and the background knowledge required.