DATA ANALYTICS CAREER ROLES: GUIDANCE FOR EDUCATORS, STUDENTS, AND PROFESSIONALS

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Devry University
Purpose

Identify common role titles in analytics
  • Role descriptions
  • Skill requirements

Position roles along a technical-business spectrum

Provide guidance for
  • Students seeking programs
  • Institutions designing programs
  • Graduates seeking careers

Move toward consensus terminology
"Essentially, data science, data engineering, and data analytics are broad—and sometimes ambiguous—terms that describe a litany of skills and job titles in the world of data analytics." (White, 2016)

"The nature of jobs and careers associated with data management and insights has evolved. . . . Today's data professional may be part data scientist, tasked with digging into data to pull important nuggets and building a business story, part developer, and part administrator." (McKendrick, 2017)
Methodology

Search
- ProQuest Career and Tech Ed database
- Google
- Keywords: analytics & big data & careers

Filter
- Last 3 years
- Described specific career roles
- Practitioner authored/oriented

Compare
- 12 publications
- 42 roles
- 11 roles listed by 3 or more authors

Sources reviewed: Discover Data Science, 2018; Harvey, 2017; Helle, 2017; Jain, 2018b; Mayo, 2017; Marshall, Moore-Colyer, & Thorpe, 2018; McKendrick, 2017; Nelson, 2018; Pratt, 2017; Shacklett, 2016; White, 2018; and Wright, 2016.
## Common Career Roles: Analyst Roles

<table>
<thead>
<tr>
<th>Role</th>
<th>Description</th>
<th>Skills/Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Analyst</td>
<td>Retrieves, prepares, and analyzes data using existing tools. Technically oriented (usually IT background). Often a junior position.</td>
<td>R, Python, HTML, C/C++, SQL, statistics, a/b testing, SAS/SPSS, Hive, BI tools (e.g. Tableau, Power BI).</td>
</tr>
<tr>
<td>Business Analyst</td>
<td>Retrieves, analyzes data using existing tools; presents and interprets results; gathers and documents information requirements. Business oriented.</td>
<td>SQL, NoSQL, reporting tools, dashboards, data warehousing, data visualization, basic statistics, BI tools (e.g. Tableau, Power BI). Often MBA.</td>
</tr>
<tr>
<td>Marketing Analyst</td>
<td>Business analyst focused on marketing.</td>
<td>Same as business analyst plus marketing degree/background. May have expertise in surveys, web/mobile analytics, and/or social media.</td>
</tr>
<tr>
<td>Business Intelligence Analyst</td>
<td>Often the next step up from business analyst. Builds and validates models; presents and interprets results, often at an executive/strategic level; oversees data and business analysts.</td>
<td>Similar to business analyst, but more advanced, plus advanced analysis techniques and scenario planning.</td>
</tr>
</tbody>
</table>
## Common Career Roles: Infrastructure/Architecture Roles

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<tr>
<th>Role</th>
<th>Description</th>
<th>Skills/Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Engineer</td>
<td>Designs and implements infrastructure for data acquisition, storage, and analysis.</td>
<td>Software engineering, SQL, Hadoop, programming (Python, Java, Ruby), relational and NoSQL database design/implementation, data warehousing, cloud computing</td>
</tr>
<tr>
<td>Data Architect</td>
<td>Designs and implements overall strategy and systems for data capture, storage, processing, quality assurance, retrieval, and analysis across organization.</td>
<td>SQL, XML, Hadoop, Spark, data warehousing, systems development, database architecture (relational and NoSQL).</td>
</tr>
<tr>
<td>Database Administrator</td>
<td>Plans, designs, implements, operates, maintains, and secures databases and data warehouses.</td>
<td>Database design, operation, and maintenance (relational and NoSQL); SQL; scripting; security; performance monitoring and tuning; backup and recovery; distributed DBMS; cloud computing.</td>
</tr>
</tbody>
</table>
### Common Career Roles: Other Roles

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<tr>
<th>Role</th>
<th>Description</th>
<th>Skills/Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistician</td>
<td>Analyzes data using classical statistical methods with hypothesis testing (as opposed to other analytic methods using heuristics and/or machine learning).</td>
<td>Advanced statistics, R, SAS/SPSS.</td>
</tr>
<tr>
<td>Data Modeler</td>
<td>Builds conceptual and logical models of data as foundation for database design, reporting, analysis, and machine learning.</td>
<td>Data modeling (e.g. entity relationship modeling); database design (relational and NoSQL); SQL; machine learning principles/tools.</td>
</tr>
<tr>
<td>Data Scientist</td>
<td>Develops, implements, and applies complex algorithms and interprets results. Creates new tools. Able to work across multiple phases of the analytics process.</td>
<td>SQL, Hadoop, Spark, R, SAS/SPSS, Python, Matlab, relational and NoSQL databases, advanced math/statistics, machine learning. Often a PhD.</td>
</tr>
<tr>
<td>Data/analytics manager</td>
<td>Manages analytics teams, projects and initiatives.</td>
<td>Data science, leadership, project management.</td>
</tr>
</tbody>
</table>
Career Roles Mentioned Less Frequently

- CRM Analyst
- E-commerce Analyst
- ERP Analyst
- Financial Analyst
- Pricing Analyst
- Fraud/Risk Analyst
- Data Miner
- ETL Developer
# Skills for Data Analytics Professionals

## Most Frequently Requested Technical Skills (Hele, 2017)

<table>
<thead>
<tr>
<th>SQL</th>
<th>Excel</th>
<th>Access</th>
<th>SAS</th>
<th>Oracle</th>
<th>SQL Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tableau</td>
<td>SAP</td>
<td>Python</td>
<td>SPSS</td>
<td>Java</td>
<td>R</td>
</tr>
</tbody>
</table>

## Skill Requirements Mentioned Most Frequently in All Sources Reviewed

<table>
<thead>
<tr>
<th>SQL</th>
<th>Statistics</th>
<th>Data Visualization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hadoop</td>
<td>Spark</td>
<td>Data Warehousing</td>
</tr>
<tr>
<td>NoSQL</td>
<td>Python</td>
<td>R</td>
</tr>
</tbody>
</table>
Combines aspects of BI framework (Coronel & Morriss, 2015) and Business Analytics model (Laursen & Thorlund, 2016)
Suggested Target Roles for Representative Analytics Programs

Tech Oriented Bachelors
- Data Analyst
- DBA
- Data Engineer

Business Oriented Bachelors
- Business Analyst
- Marketing Analyst

MBA / Other Business Masters
- Data Analytics Manager
- BI Analyst
Limitations and Future Research

Limitations

• Limited number of sources
• May not reflect industry practice
• Largely qualitative analysis

Future Research

• Analyze job postings
• More rigorous quantitative analysis
Conclusions

Potentially useful approaches

- Comparative analysis of published works on analytics career roles
- Mapping of roles to data flow through the BI-analytics process
- Definition of target roles to focus program and institutional offerings

Open question: Target roles versus broad preparation

- McKinsey: Broad need for data-driven decision makers (Jain, 2018a)
- All aspects of IT are impacted by data and machine learning (Shukla, 2018; Chawla, 2018; Subramanian, 2018)
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References (1)


References (2)


