



State of California

Building a GenAI-Ready State Workforce

July 2024

Executive Summary

Governor Newsom's [Executive Order N-12-23](#) emphasizes the need for responsible implementation of GenAI throughout state government. State entities and their respective leadership will ultimately be responsible for evaluating and incorporating GenAI, as appropriate, to support each entity's unique structure and mission.

The safe adoption of GenAI tools aims to support the development of a skilled, innovative, resilient and responsive state workforce that mirrors the changing landscape of California. California's existing commitment to upskill the state workforce will continue in the strategic training for GenAI. In combination with the knowledge and skill sets state employees already possess, this upskilling strategy will greatly augment the state workforce's capacity, as well as serve as a developmental opportunity. While it may be premature to determine the impact GenAI technology may have in terms of increasing productivity across departments, it is not in any way a substitute for a well-qualified and diverse workforce. By focusing on developing the skills and competencies necessary for effective and safe use of GenAI, the state will be well positioned to leverage it as a tool to enhance current and future business processes and the ways the state workforce serves all Californians.

This document addresses the approach that the Government Operations Agency (GovOps), the Labor and Workforce Development Agency (LWDA), the California Department of Human Resources (CalHR), Office of Data and Innovation (ODI), and California Department of Technology (CDT) took to develop and deploy training opportunities for state government workers and respective departments in the use of state-approved Generative Artificial Intelligence (GenAI) tools. The goals of the training are to invest in and create opportunities for our state workforce, achieve equitable outcomes for the public, and identify and mitigate potential output inaccuracies, fabricated text, hallucinations, and biases of GenAI, while upholding public privacy protections and applicable state laws and policies.

This document also builds upon the [State of California: Benefits and Risks of Generative Artificial Intelligence Report](#) published in November 2023, and the [State of California GenAI Guidelines for Public Sector, Procurement, Uses and Training](#) published in March 2024, and serves as a summary of the process of developing General Workforce, Business Leader and Technical training for the state of California workforce. CalHR, ODI and CDT will continue to take an iterative and worker-centered approach on Learning & Development tools and resources to ensure departments have access to a growing catalog of relevant training.

Approach

GovOps, CDT, CalHR, and LWDA collaborated to determine the skills and competencies necessary for the state workforce to safely and effectively use GenAI, as well as increasing awareness of both the opportunities and risks it may present. Training courses will position the state to leverage GenAI as a tool to enhance current and future business processes and improve the ways the state workforce serves California. The training contains key elements for the general workforce, business leaders and technical experts so that collectively, organizations will be well positioned to:

- Support safe, secure and responsible business implementation of GenAI.
- Prepare California's state government workforce for the next generation of skills needed to thrive in the GenAI economy.
- Utilize GenAI tools to achieve equitable outcomes and identify and mitigate potential output inaccuracies and biases.

Along with best practice research, the State of California partnered with stakeholder groups and subject matter experts in the public and private sector as well as academics to identify the most important key elements to include in the initial training courses. This will serve as a starting point as state entities explore where in their organizations GenAI tools are best used and seek to upskill their workforce where needed to meet current and future needs and opportunities. CalHR, ODI, and CDT will maintain an iterative approach to Learning & Development tools and resources, ensuring that departments have access to an expanding catalog of relevant training. Trainings will continue to evolve as we continue to learn more about GenAI technology.

Our state workforce delivers services to Californians every day and are the experts that can help inform how the State of California can improve services. Empowering our state workforce to innovate and identify areas where GenAI may be utilized will support GenAI innovation and adoption in a way that is most beneficial and effective. Our state workforce will evaluate the trainings to ensure effectiveness in the training program.

Additionally, a key element in positioning the state to take advantage of GenAI is a thorough understanding of the top emerging roles in both the public sector and private sector. These roles will provide a workforce development roadmap of associated knowledge and skill sets that aligns with the current classification plan.

The identified training topics and the top roles currently align with [CalHR's Core Competency model](#). Aligning the Core Competency model to the learning objectives in the training courses as well as clearly connecting them to the top roles provides a bridge from a familiar structure in state workforce development to the new opportunities available through GenAI.

Development of General Workforce, Business Leader, and Technical Training

GenAI training for the state workforce will serve four primary groups:

General Workforce

State entities should build GenAI skill sets and competencies with and for program staff to identify where GenAI may help improve operational efficiency and high-quality, equitable service delivery. The general workforce will receive general education and training before GenAI tools are deployed. Training on emerging technologies will also be available for the workforce who utilize GenAI technology. Training offered on CalLearns will emphasize safety, privacy and risk mitigation.

Business Leaders

Supervisor and Executive-level individuals should receive general education and training first, followed by more specialized roles in leadership. This will allow executives to ensure that the appropriate individuals in their organizations are enrolled in subsequent training. Training offered on

CalLearns will emphasize proactively addressing legal, labor and privacy risks.

Program Staff

State entities should build GenAI skill sets and competencies with and for program staff to identify where GenAI may help improve operational efficiency and high-quality, equitable service delivery. Departments should develop plans to train program staff and prepare them to evaluate potential GenAI use cases and identify potential risks based on organizational need and the specific services being delivered.

Technical and Cybersecurity Experts

State entities should train technical experts and cybersecurity professionals concurrently with program staff to ensure safety and security during use case planning and piloting. Trained technical experts will also be essential for evaluating a state entity's technical readiness for GenAI technology ahead of procurement and ensuring that GenAI technical solutions are implemented consistent with state administrative policies and best practices.

General Workforce and Business Leader Training

The goal of the general workforce training is twofold: to build and prepare a GenAI ready workforce leveraging curriculum that is informed by them to best suit their needs, and to equip existing staff to effectively use new tools in their current roles or help prepare for future advancement opportunities. The methodology and approach described above align with [CalHR's Core Competency Model](#) and other existing employee development efforts. To develop this training, CalHR entered into a no-cost partnership with [InnovateUS](#), a public nonprofit, government-sponsored, collaborative group that focuses on providing training solutions through human-centered design and technology.

The general workforce training has three course objectives:

- 1) Understand what GenAI is,
- 2) Understand risks related to GenAI and how to minimize them, and
- 3) Identify opportunities for GenAI use cases.

CalHR engaged in initial development sessions with InnovateUS and facilitated stakeholder engagement throughout the process. Specifically, CalHR customized the initial content for the California state workforce through a series of pre-alpha and alpha design sessions. GovOps and CalHR then shared the training outline with multiple external groups including employee representative groups, academic and industry stakeholders, internal GenAI-related groups, LWDA, and employee advocacy groups. These same partners also had the opportunity to beta-test the training in its final development phases. The feedback opportunities and multiple review cycles meant that CalHR not only considered user experience in the design of the training solution, but also leveraged expertise from the state workforce and a diverse group of external stakeholders in each development phase.

The business leader training is additive to the general workforce content so that leaders and team members will have access to the same foundational content with business leaders also moving through modules centering on privacy and security. The business leaders training builds on the general workforce training and includes the following course objectives:

- 1) Understand the different types of GenAI and their applications in government
- 2) Know how to identify and prioritize GenAI projects
- 3) Recognize the importance of data quality and strategies to improve it
- 4) Understand the talent and skills needed for GenAI and how to develop them
- 5) Be aware of key ethical considerations and risk management practices for responsible GenAI

General workforce training will deploy in July 2024 and the business leader modules are scheduled to follow in August through CalLearns. Both training courses align with industry best practices regarding Americans with Disabilities Act accessibility. The partnership with InnovateUS will allow CalHR to make this training available to state employees without any cost to their departments. This training is not considered mandatory by CalHR and will be open for any state employee to enroll with supervisor approval. To support effective learning, there are knowledge checks woven throughout the training that reinforce the learning objectives. Integrated pre- and post-assessment surveys will identify knowledge gaps both before and after learners complete the courses. As with all learning and development content, California is committed to ongoing evaluation and iterative incorporation of feedback for future enhancements or additional programs.

Technical Training

The goal of the technical training is to prepare the state technology workforce to responsibly and securely use GenAI tools and ensure that IT staff and leaders have the appropriate training to maintain an agile and competitive workforce.

Unlike the general workforce and business leader trainings, the technical training will be provided by a variety of vendors to ensure the appropriate depth and specialized training is available to meet the various needs of the state IT workforce. To accomplish this, CDT has taken the approach to identify four high level domains that are necessary to prepare technologists for the initial adoption of GenAI. During our research phase, CDT met with vendors, technical Subject Matter Experts (SMEs) within the state, educational partners, as well as Federal entities. In July 2024, CDT will offer a variety of training that includes an eLearning subscription tailored for the State, in-person hands on training/workshops, virtual trainings, and links to free training resources. CDT will also incorporate GenAI in the IT Leadership, Project Management, and Information Security academies and bootcamps. The training will focus on the following technical areas while also incorporating human-centered design:

- Security
 - Detecting vulnerabilities, risks, and abnormalities
 - Conducting Risk Assessments and analyzing malware and malicious scripts
 - How to resolve attacks
 - Creating incident reports and automate alert processes
- Data Analytics
 - Identify patterns & analytical skills
 - Identify bias, noise, or “dirty” data
 - Prepping and pre-processing your data for tuning a model/LLM
 - Ways to intervene when output is wrong, bias, or hallucinating
- Engineering & Development
 - Code review, product requirement document, and proof of concepts, including development mindset and product development
 - Identify security risks that might leak or leave vulnerability for hackers

- Workforce upskilling opportunities and reduce workforce replacements fears
- Web Accessibility
- Project Management
 - Maintain and uphold human-centered design values and principles
 - Ethnics, bias, hallucinations, echo-chamber, and user experience
 - How to integrate human validation processes while using AI
 - Web Accessibility, Speech to Voice, Color contrast, literacy level, UI/UX implication

CDT will promote these new training offerings through the training email distribution list (DL), the CDT training website, at the Workforce Development Advisory Council (WDAC), the Information Technology Executive Council (ITEC), and the Statewide Technology Leadership forum. State and local partners will be able to register for these classes via CDT's Course Catalog on the CDT website.

As with all technical training, it will be an iterative process and CDT will let the feedback from surveys, market research, stakeholders, and use cases guide us on what additional training topics will be needed in the future.

GenAI Top Roles

ODI conducted a two-month research project to study the prevalence of certain role types in private industry and post-secondary internships to determine the most highly sought after roles related to GenAI. The research goal was to evaluate existing public sector and industry job requirements for previously identified top GenAI roles and scaffold skills and knowledge for entry level through senior roles in California state government. There were seven top roles identified by the research and in order from least senior to most senior, they are:

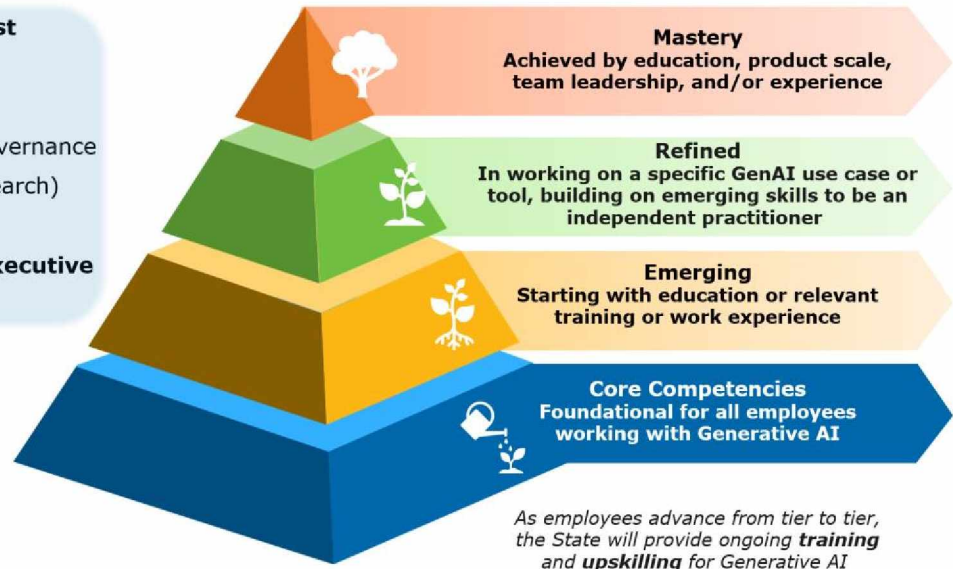
- GenAI Analyst / Specialist
- Data Analyst
- GenAI User Researcher
- GenAI Program Lead (Governance | Compliance | Policy | Research)
- Engineer
- GenAI Equity Officer / Executive
- Data Scientist

Top Roles for GenAI

List of Top GenAI Roles

- GenAI Analyst / Specialist
- Data Analyst
- GenAI User Researcher
- GenAI Program Lead (Governance | Compliance | Policy | Research)
- Engineer
- GenAI Equity Officer / Executive
- Data Scientist

Skills Matrix



Upon completion of the initial research, ODI mapped the knowledge and skills for each position across entry-level, mid-career and senior level. This was framed as emerging knowledge and skills, refined knowledge and skills and mastery knowledge and skills. A matrix was developed for each role.

- Emerging knowledge and skills are gained by relevant training or work experience in an entry type role.
- Refined knowledge and skills are built by working as an independent practitioner with a specific GenAI use or tool.
- Mastery knowledge and skills build on refined knowledge and skills with additional education, scale of product or program, leadership experience or work experience

The entire document can be found in the appendix to this report. Here is one example:

Data Analyst	Knowledge	Skills
Emerging	<ul style="list-style-type: none"> • Computer science, mathematics or similar Microsoft Excel (macros, data manipulation and formulas, pivot tables, basic visualizations) • Tableau/PowerBI: dashboarding • Basic business concepts 	<ul style="list-style-type: none"> • Communication skills • Querying databases At least one industry-standard programming language (Python, Java, JavaScript) • Filtering data
Refined	<ul style="list-style-type: none"> • Degree or relevant work experience • Principles of data analysis • At least one industry-standard programming language (e.g., Python, R) • Statistical methods • Understanding of how data quality impacts GenAI systems • Understanding of limitations of using GenAI systems in data analysis 	<ul style="list-style-type: none"> • Product mindset (prioritization, iteration, cross-team collaboration) • Prompting Data visualization • Large language model operation • Bias detection • Data cleaning, preprocessing, querying, and manipulation • Implementing security best practices • Methods for generating data out of unstructured content using GenAI • Draw insights from generated outputs • Written and verbal communication skills
Mastery	<ul style="list-style-type: none"> • Degree or relevant work experience • Potential experience with backend support and coding • Principles of data analysis • At least one industry-standard programming language (e.g., Python, R) • Statistical methods • Understanding of how data quality impacts GenAI systems • Understanding of limitations of using GenAI systems in data analysis • Ability to evaluate whether business challenges are well suited for machine learning vs GenAI solutions 	<ul style="list-style-type: none"> • Leadership of teams of Data Analysts • Summarizing and presenting to an Executive audience • Prompting Data visualization • Large language model operation • Bias detection • Data cleaning, preprocessing, querying, and manipulation • Staying current in emerging technology and

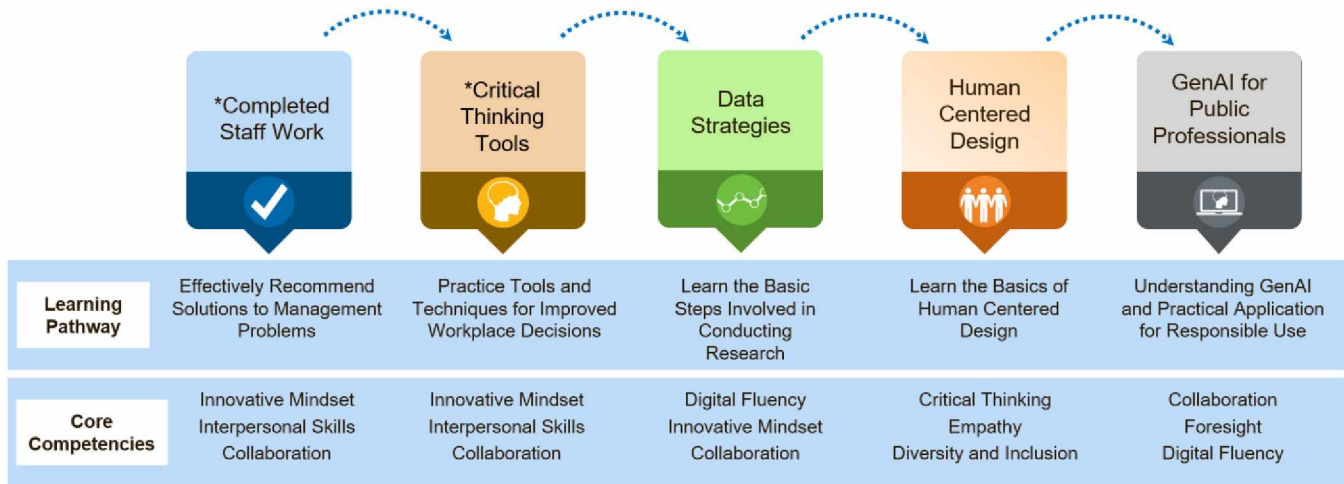
Data Analyst	Knowledge	Skills
	<p><i>*May transition to Data Scientist with additional knowledge and skill development</i></p>	<p>innovation</p> <ul style="list-style-type: none"> • Developing security best practices Written and verbal communication skills <p><i>*May transition to Data Scientist with additional knowledge and skill development</i></p>

Since upskilling is identified as a guiding principle of training within the state and for GenAI, California will train existing talent on the knowledge and skills for the safe and equitable use of GenAI.

Next, CalHR and ODI partnered to develop a new learning path for state employees in GenAI, called the *Foundations of GenAI* series. This series uses existing training resources already available within state government. This learning path is specifically for those state employees at the analyst level to ensure their safe and effective use of GenAI enabled tools.

The *Foundations of GenAI* series encompasses five courses. Four of the five courses are available through CalLearns and are Completed Staff Work, Critical Thinking Tools, Data Strategies, and GenAI for Public Professionals. Both Completed Staff Work and Critical Thinking Tools also count concurrently towards the Analyst series certificate. The fifth course, Human Centered Design for Public Professionals is available through ODI's CalAcademy. The GenAI for Public Professionals and Human Centered Design for Public Professionals courses are offered at no cost to state departments. The image below illustrates how each of the courses contributes to the overall learning pathway and also how they each map to [CalHR's Core Competency Model](#):

Foundations of GenAI Learning Pathway



* Counts toward Analyst Series Certificate as well

Conclusion

GenAI has the potential to be a key element in developing and supporting a workforce that is innovative, resilient and responsive to the changing landscape of California. It may help many departments to deliver on strategic plan goals, accomplishing the challenging work that may be currently out of reach given the intense resource load it carries, mitigating their State Leadership Accountability Act risks and responding to the changing economy without compromising mission critical services or commitment to our workforce. The key to success in all those areas is ensuring the state workforce is trained to use GenAI safely to positively impact the way they do their work and deliver services to all Californians.

Resources

[GenAI Toolkit](#)

[GenAI Disclosure & Fact Sheet](#)

[Benefits and Risks of Generative Artificial Intelligence Report](#) (November 2023)

[Executive Order N-12-23](#)

[White House's Blueprint for an AI Bill of Rights](#)

[National Institute for Standards & Technology's AI Risk Management Framework](#)

[Responsible AI for Public Professionals](#)

[GovOps GenAI in California](#)

Final Top Roles Knowledge and Skills Matrix - See Appendix

Document History

Revision Number	Revision Date	Summary of Changes	Author
1	July 2024	Initial presentation of State of California Learning and Development	California Department of Human Resources, Office of Data and Innovation, Department of Technology

Appendix

GenAI Top Roles Skills Matrix

Data Analyst	Knowledge	Skills
Emerging	<ul style="list-style-type: none"> • Computer science, mathematics or similar Microsoft Excel (macros, data manipulation and formulas, pivot tables, basic visualizations) • Tableau/PowerBI: dashboarding • Basic business concepts 	<ul style="list-style-type: none"> • Communication skills • Querying databases At least one industry-standard programming language (Python, Java, JavaScript) • Filtering data
Refined	<ul style="list-style-type: none"> • Degree or relevant work experience • Principles of data analysis • At least one industry-standard programming language (e.g., Python, R) • Statistical methods • Understanding of how data quality impacts GenAI systems • Understanding of limitations of using GenAI systems in data analysis 	<ul style="list-style-type: none"> • Product mindset (prioritization, iteration, cross-team collaboration) • Prompting Data visualization • Large language model operation • Bias detection • Data cleaning, preprocessing, querying, and manipulation • Implementing security best practices • Methods for generating data out of unstructured content using GenAI • Draw insights from generated outputs • Written and verbal communication skills
Mastery	<ul style="list-style-type: none"> • Degree or relevant work experience • Potential experience with backend support and coding • Principles of data analysis • At least one industry-standard programming language (e.g., Python, R) • Statistical methods • Understanding of how data quality impacts GenAI systems • Understanding of limitations of using GenAI systems in data analysis • Ability to evaluate whether business 	<ul style="list-style-type: none"> • Leadership of teams of Data Analysts • Summarizing and presenting to an Executive audience • Prompting Data visualization • Large language model operation • Bias detection • Data cleaning, preprocessing, querying, and manipulation

Data Analyst	Knowledge	Skills
	<p>challenges are well suited for machine learning vs GenAI solutions <i>*May transition to Data Scientist with additional knowledge and skill development</i></p>	<ul style="list-style-type: none"> Staying current in emerging technology and innovation Developing security best practices Written and verbal communication skills <p><i>*May transition to Data Scientist with additional knowledge and skill development</i></p>
GenAI Analyst / Specialist	Knowledge	Skills
Emerging	<ul style="list-style-type: none"> Current GenAI Business and policy trends Basic business concepts Basics of computer science 	<ul style="list-style-type: none"> Prompting/use of GenAI tools Implementing policy Synthesis and presentation Microsoft Excel: ability to create macros
Refined	<ul style="list-style-type: none"> Fluency in current GenAI Business/Policy trends Basic business concepts Computer science Large language model architecture Large language model operation 	<ul style="list-style-type: none"> Product mindset (prioritization, iteration, cross-team collaboration) Cloud computing platforms Policy development Synthesis and presentation Written and verbal communication skills
Mastery	<p><i>*Mastery level would move to Governance/Compliance/Policy/ Research tier</i></p>	<p><i>*Mastery level would move to Governance/ Compliance /Policy/ Research tier</i></p>
GenAI User Researcher	Knowledge	Skills
Emerging	<ul style="list-style-type: none"> Common user research techniques Qualitative: Interviews, usability testing (moderated and unmoderated), focus groups, card sorting, ethnographic observation Quantitative: Surveys, A/B testing, web analytics Research methodologies 	<ul style="list-style-type: none"> Data Analysis: use both qualitative and quantitative data to extract themes and identify patterns in user behavior Creating research plans Conducting interviews Survey design

Data Analyst	Knowledge	Skills
	<ul style="list-style-type: none"> Human-Centered Design principles and Human Computer Interaction 	<ul style="list-style-type: none"> Writing research reports
Refined	<ul style="list-style-type: none"> BA/MA in Social Science research, Computer Science or similar Qualitative and Quantitative research Statistics and statistical models Legal and ethical standards for data privacy Responsible research Machine Learning (supervised learning, unsupervised learning, and natural language processing) Generative models and their applications Applicable state and federal law on GenAI Awareness of ethical risk with GenAI Understanding of the needs of California's vulnerable communities 	<ul style="list-style-type: none"> Product mindset (prioritization, iteration, cross-team collaboration) Synthesis and presentation skills Cultural competency Data visualization Data Analysis: use both qualitative and quantitative data to extract themes and identify patterns in user behavior Creating research plans Conducting interviews Survey design Writing research reports Written and verbal communication skills
Mastery	<ul style="list-style-type: none"> MA/PhD in Anthropology, Psychology, Human-Computer Interaction, Human Factors, or User Experience or similar Human-Centered Design principles and Human Computer Interaction Experimental design and survey methods Qualitative and Quantitative research Machine Learning (supervised learning, unsupervised learning, and natural language processing) Statistics and statistical methods Generative models and their applications Understanding of the needs of California's vulnerable communities 	<ul style="list-style-type: none"> 4-10 yrs of relevant work experience Interest in mentoring emerging user researchers Leading strategic research Working cross-functionally Organizational Change Management
GenAI Program Lead	Knowledge	Skills
Emerging	<p><i>*Emerging knowledge and skills for this role can be found in various disciplines in public service such as GenAI Analyst/Specialist, Legal, Policy, Procurement and Research</i></p>	<p><i>*Emerging knowledge and skills for this role can be found in various disciplines in public service such as GenAI Analyst/Specialist, Legal,</i></p>

Data Analyst	Knowledge	Skills
		<i>Policy, Procurement and Research</i>
Refined	<ul style="list-style-type: none"> • BA/MA in Social Science research, Computer Science or similar OR JD • Qualitative and Quantitative research • Statistics and statistical models • Legal and ethical standards for data privacy • Responsible research • Machine Learning (supervised learning, unsupervised learning, and natural language processing) • Generative models and their applications • Applicable state and federal law on GenAI • Awareness of ethical risk with GenAI • Understanding of the needs of California's vulnerable communities 	<ul style="list-style-type: none"> • Product mindset (prioritization, iteration, cross-team collaboration) • Experience in public sector governance on AI • Experience in public sector digital policy development • Government procurement • Written and verbal communication skills • Synthesis and presentation skills • Cross-functional collaboration • Bias detection • Risk mitigation • Implementing existing policy frameworks • Expertise in technical methods for AI accountability (auditing, evaluation, etc.)
Mastery	<ul style="list-style-type: none"> • MA/PhD in Social Science research, Computer Science or similar OR JD • Qualitative and Quantitative research • Statistics and statistical models • Legal and ethical standards for data privacy • Responsible research • Machine Learning (supervised learning, unsupervised learning, and natural language processing) • Generative models and their applications • Applicable state and federal law on GenAI • Awareness of ethical risk with GenAI • Understanding of the needs of California's vulnerable communities 	<ul style="list-style-type: none"> • 1-10 years working in GenAI research or relevant experience • Writing on complex topics for general audience • Interest in mentoring emerging Compliance/Policy/Research leads • Human-Centered Design principles and Human Computer Interaction • Organizational Change Management • Experience in public sector governance on GenAI • Experience in public sector digital policy development • Government procurement

Data Analyst	Knowledge	Skills
		<ul style="list-style-type: none"> • Written and verbal communication skills • Synthesis and presentation skills • Cross-functional collaboration • Bias detection • Risk mitigation • Implementing existing policy frameworks • Expertise in technical methods for GenAI accountability (auditing, evaluation etc.)
Engineer	Knowledge	Skills
Emerging	<ul style="list-style-type: none"> • Computer science • Common data structures • Software Development Lifecycle 	<ul style="list-style-type: none"> • Writing and editing code • At least one industry-standard programming language (Python, Java, JavaScript)
Refined	<ul style="list-style-type: none"> • Degree or relevant work experience • Cloud computing • Machine Learning (supervised learning, unsupervised learning, and natural language processing) • Large language model architecture • Bias detection • Data cleaning, preprocessing, querying, and manipulation 	<ul style="list-style-type: none"> • Writing and editing code • At least one industry-standard programming language (Python, Java, JavaScript) • Product mindset (prioritization, iteration, cross-team collaboration) • Prompting • Large language model operation • Working with vendors to integrate external services with State applications • Bias detection • Security and network engineering • API development and safety • Written and verbal communication skills
Mastery	<ul style="list-style-type: none"> • Degree or 4+ years relevant work experience • Cloud computing 	<ul style="list-style-type: none"> • 4-10 yrs of relevant work experience working at scale

Data Analyst	Knowledge	Skills
	<ul style="list-style-type: none"> Machine Learning (supervised learning, unsupervised learning, and natural language processing) Large language model architecture Bias detection Data cleaning, preprocessing, querying, and manipulation 	<ul style="list-style-type: none"> Product mindset (prioritization, iteration, cross-team collaboration) Leadership in problem-solving, defining risk, identifying potential threats, and developing action/mitigation plans Interest in mentoring emerging engineers Staying current in emerging technology and innovation Written and verbal communication skills
GenAI Equity Officer / Executive	Knowledge	Skills
Emerging	<ul style="list-style-type: none"> Bias replication or amplification by GenAI Social impacts of GenAI Public sector policy 	<ul style="list-style-type: none"> Implementing policy Synthesis and presentation Good judgment and discretion Cultural awareness Risk detection and mitigation Bias detection and mitigation
Refined	<ul style="list-style-type: none"> Understanding of the needs of California's vulnerable communities Social impacts of GenAI Public sector policy Machine Learning (supervised learning, unsupervised learning, and natural language processing) 	<ul style="list-style-type: none"> Good judgment and discretion Confidentiality Cultural competency Written and verbal communication skills Risk detection and mitigation Bias detection and mitigation
Mastery	<ul style="list-style-type: none"> Understanding of the needs of California's vulnerable communities California state policy development Social impacts of GenAI Policy development 	<ul style="list-style-type: none"> Leading teams focused on equity Mentoring leaders in equity Exercising sound judgment and discretion Maintaining confidentiality

Data Analyst	Knowledge	Skills
	<ul style="list-style-type: none"> Machine Learning (supervised learning, unsupervised learning, and natural language processing) 	<ul style="list-style-type: none"> Cultural competency Risk detection and mitigation Bias detection and mitigation Implementing California state policy Written and verbal communication skills
Data Scientist	Knowledge	Skills
Emerging	<i>*This tier starts with refined knowledge</i>	<i>*This tier starts with refined skills</i>
Refined	<ul style="list-style-type: none"> Degree or relevant work experience Basics of cloud computing Large language model architecture Statistics and statistical models Machine Learning (supervised learning, unsupervised learning, and natural language processing) Understanding of how data quality impacts GenAI systems Understanding of limitations of using GenAI systems in data analysis 	<ul style="list-style-type: none"> Product mindset (prioritization, iteration, cross-team collaboration) Prompting Bias detection Proficiency in programming languages (e.g., Python, R) Data cleaning, preprocessing, querying, and manipulation Statistical modeling Deploying machine learning Deep learning techniques Ability to communicate complex findings derived from GenAI systems Written and verbal communication skills
Mastery	<ul style="list-style-type: none"> Degree and 4+ years relevant work experience with large scale systems Basics of cloud computing Large language model architecture Statistics and statistical models Machine Learning (supervised learning, unsupervised learning, and natural language processing) Understanding of how data quality impacts GenAI systems Understanding of limitations of using GenAI systems in data analysis 	<ul style="list-style-type: none"> 4-10 yrs of relevant work experience Product mindset (Prioritization, iteration, cross-team collaboration) Leadership in problem-solving, defining risk, identifying potential threats, and data science simulation methods, approaches, applications,

Data Analyst	Knowledge	Skills
	<ul style="list-style-type: none"> Organizational Change Management 	<p>predictions or dataset creation</p> <ul style="list-style-type: none"> Written and verbal communication skills Ability to explain problems to non-technologists Interest in mentoring emerging data analysts and data scientists