STATE OF NEVADA
Department of Administration
Division of Human Resource Management

CLASS SPECIFICATION

TITLE	GRADE	EEO-4	CODE
PROFESSIONAL ENGINEERING SPECIALIST, P.E.	**42**	**B**	**6.231**

Professional Engineering Specialists are experienced Professional Engineers (P.E.) who have detailed and in-depth knowledge and expertise that enables them to develop solutions to complex atypical design and/or construction challenges; advise management, engineering professionals and technical staff division/department-wide on contract interpretation, conceptual design alternatives analyses, code interpretation, and specialized research and analysis related to best methods, materials and practices. The preponderance of duties and responsibilities of positions in this class is providing technical expertise for project development, specialized systems and/or functions and advanced research, analysis and problem solving in specialized areas of highway maintenance and construction.

Consult with management regarding solutions and alternatives in specialized areas and on special projects; provide technical expertise in the application of advanced theories, concepts, and processes; research new technologies and processes to solve existing problems; develop innovative approaches to the application and utilization of new and advanced technology; and support management and staff department-wide by providing expertise, research and analysis in specialized engineering areas.

Evaluate specific elements of research conducted by others and determine the applicability to specific design, construction or maintenance projects in Nevada; prepare reports for management defining the issues, evaluation, possible solutions, costs, risks and alternatives on projects that significantly impact the department's mission.

Research and analyze design proposals, specifications, manuals, new technology and new products, and other data to evaluate the feasibility, cost and maintenance requirements of designs or applications; conduct risk analysis based on cost benefit and probability of success or failure in order to quantify the risk associated with each recommended alternative.

Evaluate and interpret code requirements in relation to specific projects and recommend deviations as appropriate to the circumstances; provide technical direction to Professional Engineers and administration on the interpretation of the American Association of State & Highway Transportation Officials (AASHTO) policy and applicable codes; review and make recommendations regarding the AASHTO policies; and develop and recommend design policies and procedures when there are no standard practices.

Act as lead designer on complex or major projects, directing the work assignments of a group of professional engineers; coordinate project activities on major projects with departmental divisions and various private and public agencies to determine and address their requirements.

Participate in public hearings to inform the public and receive comments about upcoming projects related to the area of specialization; participate in preliminary site investigations for complex projects with other division representatives.

Provide technical advice regarding design, construction, or program modifications and structural repairs to management and personnel in other divisions.

Serve on local, regional, and national technical committees and serve as the professional technical expert in court and/or litigation cases.

May serve as project lead and oversee the work of others or supervise subordinate staff as assigned.

Examples of projects and assignments include:

Roadway Design Division

Roadway Design Section: Provide technical direction to Professional Engineers, Landscape Architects and other design staff on the proper interpretation, selection and implementation of design standards relating to roadside design elements; develop department standards for barrier and other roadside element design and product selection using current research in finite element simulation and crash testing.

Prepare designs for new and relocated utility infrastructure planned or impacted by department projects; research applicable utility design standards, clearances, and materials selection for inclusion into department projects.

Provide technical direction to Professional Engineers and Design Division administration on the interpretation of research prepared by the Transportation Research Board, the National Cooperative Highway Research Program and others; review and make recommendations regarding the applicability and department implementation of this research, and develop and recommend design policies and procedures based upon them.

Act as lead designer or technical advisor on complex or major projects involving intricate geometric design, alignment constraints, operational and constructability issues, and synchronization of multi-disciplinary designs.

Evaluate new design-related (roadway geometrics, roadside element selection and safety analysis, cost/benefit analysis) software, technologies, and innovations considering their technical soundness and application to department needs, and develop guidance, standards and specifications for their use and implementation.

Research and analyze the impact of deviations from geometric policy and prepare geometric design exception reports for concurrence by administration and/or the Federal Highway Administration.

Hydraulics Section: Develop hydrology, hydraulics and water quality technical standards, guidelines, standard plans and specifications; provide technical support to committees; develop and provide technical training in hydrology, hydraulic engineering and water quality for hydraulic engineers; provide technical advice to Professional Engineers based on thorough understanding of hydrologic, hydraulic engineering and water quality theoretical concepts and mathematical principles.

Act as a technical leader for complex, high risk and extraordinary projects such as design of regional flood control facilities, design of dams, and sediment transport studies; oversee and coordinate the work of Professional Engineers; determine applicability and appropriateness of technical procedures; set technical standards and perform quality assurance.

Evaluate new hydrologic and hydraulics computer software, technologies and innovations considering their technical soundness and application to department needs, and develop guidance, standards, and specifications for their use.

Develop hydrologic and hydraulic technologies, processes and innovations that warrant deployment within the department and/or nationwide.

Assess current practices in hydrology, hydraulic engineering, and water quality; identify research needs and apply for research funding and/or grants; perform or direct the research of high priority issues; develop standards and guidelines based on research results.

Perform sediment transport studies, numerical modeling, hydraulic modeling of unsteady flow, supercritical channel design, risk analysis, pressure flow modeling, pump station design, advanced hydraulic design of flood control facilities (dams, channels, spillways), advanced hydrologic analysis and modeling and/or river mechanics studies.

Materials Division

Roadbed Design, Geotechnical, Bituminous Operations: Perform advanced studies in pavement structural design, geotechnical design, and bituminous materials engineering requiring in-depth understanding of theoretical concepts, processes and computer program operations, and related algorithms.

Provide technical leadership for complex projects, research, and quality control; evaluate new products and technology; develop technical training program for pavement design and geotechnical engineers.

Provide technical direction regarding interpretation of AASHTO design codes, pavement structural design methods, and bituminous mix design methods; develop and recommend design policies and procedures; review, recommend and coordinate research activities.

Provide technical direction to Professional Engineers on the use of pavement structural design methods and geotechnical, seismic and foundation analysis and design methods and associated software.

Serve as professional technical expert on AASHTO policies, Transportation Research Board (TRB), National Cooperative Highway Research Program (NCHRP), or other national research project committees; evaluate research results to make recommendations regarding implementation to administration.

Perform advanced modeling, analysis, and design evaluations of bituminous mixtures to determine and evaluate performance properties related to rutting resistance, fatigue resistance, thermal cracking resistance, and durability.

Evaluate and recommend tests, properties, analysis methods, design methods, and research projects to evaluate bituminous mixtures; conduct, or act as project manager, on research projects for in-depth evaluation of bituminous mixtures.

Perform advanced modeling (i.e., finite element, mechanistic design) analysis, and design evaluations of pavement structural sections to determine pavement performance or to evaluate existing pavement sections.

Structural Design Division

Bridge Design Section: Provide technical direction to Professional Engineers on the appropriate method of structural design analysis which may include methods such as linear elastic, grid, finite element, or strut and tie as indicated by the nature and complexity of design issues; and assist with interpretation of the analytical results.

Provide technical advice regarding design, construction, or program modifications and structural repairs to management and personnel in other divisions.

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MINIMUM QUALIFICATIONS

INFORMATIONAL NOTE:

* Any person that is a licensed Professional Engineer in another state must become licensed as a Professional Engineer in Nevada within six months of appointment as a condition of employment.

EDUCATION AND EXPERIENCE: Master's degree from an accredited college or university in a civil engineering field such as geotechnical, structural, transportation or construction engineering, and licensure as a Professional Engineer which included practical experience relevant to the assignment; **OR** Bachelor's degree from an accredited college or university in civil engineering, completion of 12 units of graduate level coursework relevant to the assignment, licensure as a Professional Engineer, and one year of professional post-licensure civil engineering experience. *(See Informational Note)*

MINIMUM QUALIFICATIONS (cont'd)

ENTRY LEVEL KNOWLEDGE, SKILLS AND ABILITIES (required at time of application):
Detailed knowledge of: mathematics, calculus, and differential equations to formulate and solve civil engineering problems; strength of materials as applied to the area of specialty. **Working knowledge of:** civil engineering principles and practices applicable to the area of specialization; economic analysis; finite element methods; probability and statistical analysis methods and techniques; design methods, applicable codes and associated theory related to the area of specialization; computer applications and the theoretical basis related to the area of specialization; project management methods and their application. **Ability to:** conduct research to develop conclusions and recommendations; organize, analyze, and synthesize complex data and issues specific to the area of specialization; analyze and communicate technical ideas and solutions; delegate assignments; demonstrate leadership and project management skills. **Skill in:** making effective oral presentations to internal and external groups and organizations.

FULL PERFORMANCE KNOWLEDGE, SKILLS AND ABILITIES (typically acquired on the job):
Detailed knowledge of: computer applications related to the area of specialization. **Working knowledge of:** State laws and regulations pertinent to the engineering assignments. **Ability to:** develop computer programs for solutions to engineering problems.

This class specification is used for classification, recruitment, and examination purposes. It is not to be considered a substitute for work performance standards for positions assigned to this class.

6.231

ESTABLISHED: 7/1/07P
8/11/06PC