County of Orange
Established: 8-23-85

TELECOMMUNICATIONS ENGINEER SERIES

Class Code	Title
1890	Telecommunications Engineer I
1891	Telecommunications Engineer II
1892	Telecommunications Engineer III
1893	Senior Telecommunications Engineer

DEFINITION

Under supervision, to perform a variety of office and field professional telecommunications engineering work; to plan, design, evaluate, modify and maintain complex analog and digital voice, data, and video telecommunications networks, systems and equipment; to coordinate interface with State and federal emergency telecommunications systems; and to do other work as required.

CLASS CHARACTERISTICS

Classes in the series provide engineering services for telecommunications systems which support County and city telephone, data, video, and Public Safety radio systems, and interface with State and federal emergency telecommunications systems. Engineers in these classes typically specialize in specific technologies.

Telecommunications Engineer I is the entry level professional engineer class. Incumbents work under close supervision and are assigned the less complex office and field assignments with special emphasis on their training and development. Limited exercise of judgment is required on detail of work and in making preliminary selection and adaption of engineering alternatives.

Telecommunications Engineer II is the intermediate experienced level engineering class. Positions in this class are distinguished from Telecommunications Engineer I in having assigned responsibility for completion of routine projects or portions of major projects. Positions at this level generally work under the project leadership of a Telecommunications Engineer III.

Telecommunications Engineer III is the journey level engineering class. This level independently performs complex or specialized assignments, provides project leadership and training for lower level staff and consults in area of specialty.

Senior Telecommunications Engineer is the highly skilled class distinguished from the above levels by lead responsibilities for a section or unit of professional or technical staff. Incumbents in this class are assigned major complex telecommunications projects which have long-term and/or significant cost impact. May independently review, complete and approve a County-designed plan as responsible engineer.

EXAMPLES OF DUTIES

1. Analyzes requirements, performs cost analyses and feasibility studies, develops plans and designs, prepares detailed technical and operational specifications or requests for proposals, and other documentation required for the development and implementation of complex telecommunications systems.

2. Works with other agencies/departments for purposes of evaluating telecommunications systems and requirements, and recommends modifications and/or new equipment; analyzes technical problems and recommends appropriate corrective measures.

3. Assists County and city departments and agencies in developing medium and long range telecommunications plans; developing cost estimates for budgetary purposes; researching

and recommending alternatives which will best meet their operational requirements and budgetary constraints. Investigates new technologies for potential application to County and city systems.

4. Conducts technical field surveys to determine telecommunications site locations; develops detailed system design criteria; prepares equipment specifications and assists in procurement processing; evaluates equipment to determine compliance with specifications.

5. Prepares engineering instructions for installation or modification of new or replacement equipment. Determines most cost effective method of installation/modification. Supervises the on-site installation/ modification of projects and coordinates with field technicians or contractors until the project is complete and operational. Evaluates system performance following installation and/or modification of equipment.

6. Prepares FCC license applications; provides licensing assistance to other agencies; prepares requests for frequency coordination; interprets FCC regulations; responds to FCC notices of violations; represents the County at meetings of frequency coordination and other regulatory bodies.

7. Sets data communications standards and recommends cost effective methods of data transmission between County offices. Continually reviews current methods of voice, video and data transmission. Evaluates the use of new transmission technologies.

8. Conducts engineering studies; prepares technical reports; compiles data evaluating and justifying requests for equipment and material to be included in the budget.

9. Analyzes technical problems in the operation of message switching networks and related telecommunications equipment; determines and takes appropriate corrective action.

10. Estimates costs such as design and engineering fees, consultant fees and contractor costs; evaluates bids and proposals on basis of responsiveness, quality of systems, acquisition and installation costs, and maintenance cost over life of system.

11. Works with architects and engineers in determining housing supports, access areas, electrical power supply and cooling systems for telecommunications equipment.

MINIMUM QUALIFICATIONS

Telecommunications Engineer I - some knowledge of one of the following:

Telecommunications Engineer II - general knowledge of one of the following:

Telecommunications Engineer III - thorough knowledge of one of the following:

Senior Telecommunications Engineer - thorough knowledge of one of the following plus general knowledge of at least one more of the following:

Radio and microwave communications systems design and operation, including fixed, mobile, station and related systems and equipment, for the transmission of voice, data and video information.

Data communications system design and operation, operation of store-and-forward message switching systems, and protocols used in data communications systems.

Telephone system design and operation, including transmission engineering, PABX and switching systems, signaling methods, network analysis techniques and PSN interface requirements.

Design of Public Safety dispatch centers including console equipment, CAD systems, logging recorders, and other related equipment.

AND

Knowledge of

Engineering economics, mathematics, statistics and physics (all levels).

Application of microcomputers to engineering tasks and a working knowledge of commonly used microcomputer programming languages (all levels).

Analog and digital multiplexing techniques used in wire or cable, microwave, optical and fiber optic communications links (Telecommunications Engineer II or higher).

Radio frequency spectrum allocations, electromagnetic wave propagation and radio field strength measurements and tolerances (Telecommunications Engineer II or higher).

Equipment and materials currently available for new and revised telecommunications installations (Telecommunications Engineer II or higher).

Queuing theory, Erlang formulas and other traffic engineering techniques applicable to network analysis (Telecommunications Engineer III or higher).

Contract administration and the legal relationships between the agency, architectural and engineering consultants, contractors, subcontractors and vendors (Telecommunications Engineer III or higher).

FCC and/or PUC regulations applicable to governmental communications (may be required for some assignments).

Ability to

Establish and maintain effective working relationships with others (all levels).

Communicate effectively orally and in writing on technical subjects to technical and non-technical people (all levels).

Conduct surveys of existing telecommunications installations, evaluate their effectiveness and efficiency, and recommend design modifications to systems or equipment, as necessary (all levels).

Assimilate and analyze data, and prepare accurate and concise engineering reports and studies (all levels).

Perform the mathematical calculations required in the design and planning of telecommunications networks, systems and equipment (all levels).

Analyze technical problems accurately and recommend or take an effective course of action (all levels).

Use a County-approved means of transportation to travel to work sites (all levels).

Design or modify a variety of telecommunications and electronic systems and equipment, including microwave, for analog and digital voice, data and video transmission (Telecommunications Engineer II or higher).

Analyze responses to bids or proposals for compliance to specifications (Telecommunications Engineer II or higher).

Understand, interpret and enforce compliance with plans, specifications, schedules and provisions of contractural documents (Telecommunications Engineer II or higher).

Instruct professional and technical staff concerning new equipment, techniques and new or revised FCC and PUC regulations (Telecommunications Engineer III or higher).

Act as telecommunications engineering consultant to County agencies/departments and cities (Telecommunications Engineer III or higher).

Plan and organize large projects requiring coordination with several agencies/departments (Senior Telecommunications Engineer).

Act as team leader on major projects making assignments, reviewing work and maintaining quality control (Senior Telecommunications Engineer).

Train other staff in principles of telecommunications engineering and operating principles for County equipment (Senior Telecommunications Engineer).

Make system programming changes to telecommunications switching systems and program mini or microcomputers in Basic, Assembler, Cobol, Pascal, C or other commonly used languages (may be required for some assignments).

License Required

Possession of a valid General Radiotelephone Operator License issued by the Federal Communications Commission may be required for some positions. When required, license must be obtained within six months of date of appointment.

Education/Experience

Telecommunications Engineer I

OPTION I

Graduation from an accredited college or university with major course work in electronic or electrical engineering or a closely related field.

OR

OPTION II

Four years experience in electronic engineering, design or systems troubleshooting which would have applied or developed the knowledges and abilities listed above. Education or training that can be directly related to knowledge and ability requirements may be substituted for experience at the rate of three semester units for one month of experience and one hour of job-related training for one hour of experience.

Telecommunications Engineer II

OPTION I

Graduation from an accredited college or university with major course work in electronic or electrical engineering or a closely related field and one year of experience which would have applied or developed the knowledges and abilities listed above.

OR

OPTION II

Five years experience in electronic engineering, design or systems troubleshooting which would have applied or developed the knowledges and abilities listed above. Education or training that can be directly related to knowledge and ability requirements may be substituted for experience at the rate of three semester units for one month of experience and one hour of job-related training for one hour of experience.

Telecommunications Engineer III

OPTION I

Registration as a professional Electrical Engineer in the State of California by date of appointment.

OR

OPTION II

Graduation from an accredited college or university with major course work in electronic or electrical engineering or a closely related field and two years of experience which would have applied or developed the knowledges and abilities listed above.

OR

OPTION III

A combination of education and experience in electronic engineering, design or systems troubleshooting which would have applied or developed the knowledges and abilities listed above.

Senior Telecommunications Engineer

OPTION I

Registration as a Professional Electrical Engineer in the Date of California by date of appointment and one year of experience subsequent to registration which would have applied or developed the knowledges and abilities listed above.

OR

OPTION II

Graduation from an accredited college or university with major course work in electronic or electrical engineering or a closely related field and three years experience which would have applied or developed the knowledges and abilities listed above.

OR

OPTION III

A combination of education and experience in electronic engineering, design or systems troubleshooting which would have applied or developed the knowledges and abilities listed above.

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