

ILLINOIS DEPARTMENT OF CENTRAL MANAGEMENT SERVICES  
CLASS SPECIFICATION

CHEMIST SERIES

<u>Class Title</u>	<u>Position Code</u>	<u>Effective</u>
CHEMIST I	06941	03-01-13
CHEMIST II	06942	03-01-13
CHEMIST III	06943	03-01-13

SERIES DISCUSSION:

The Chemist series encompasses positions which perform professional chemistry laboratory work. Tests conducted by Chemists principally pertain to the composition and properties of substances (i.e., elements, compounds, mixtures) and the reactions in which substances are produced from other substances. Positions performing professional chemistry laboratory work conduct tests to determine the identity and/or amount of substances present in a sample and interpret the findings of complex experiments; successful interpretation of these results is dependent upon a thorough knowledge of the theories, assumptions and ethical standards underlying the field of chemistry. In contrast, technical positions conduct chemical tests where the test results lead to obvious conclusions. (For example, the addition of a particular reagent to a sample causes the sample to change color if the substance being sought is present, and no discernable reaction occurs if the substance is not present.)

The various levels in the Chemist series are distinguished from each other primarily by expertise, decisions and commitments and supervision received. The Chemist I conducts professional laboratory work under the close supervision of the immediate supervisor, test results obtained are reviewed by the supervisor prior to release. Typically positions in this class do not provide expert testimony in court or administrative hearings. Although the test interpretations made by Chemist II's may be similar in difficulty to the interpretations rendered by Chemist I's, the increased expertise at the Chemist II level allows positions in this class to serve as expert witnesses in court and to serve as designated lead workers of professional laboratory staff. The Chemist III interprets the most highly complex test results in which findings of all substances in the sample are intermingled. A Chemist III requires specialized training and experience in highly complex analytical chemistry applications and requires little direct supervision.

CHEMIST I

POSITION CODE: 06941

DISTINGUISHING FEATURES OF WORK:

Under direct supervision, performs professional chemistry work in a state laboratory on such samples as animal feed, fertilizers, coal, food products, water, air, soil, animal and human blood and sera; interprets test results; retests if necessary; reports test results to immediate supervisor or lead worker for review and approval; releases test in accordance with laboratory protocols.

CHEMIST I (Continued)

ILLUSTRATIVE EXAMPLES OF WORK:

1. Operates laboratory equipment (e.g., atomic absorption, ultra-violet and visible light spectrophotometers; flame photometers; liquid chromatographs) to conduct tests of feed and fertilizer formulation samples; analyzes test results, compares analyses with acceptable parameters and decides if label guarantees are accurate; reports findings to the supervisor for review.
2. Conducts analyses of coal mine rock dust samples to test for percentages of carbon dioxide, ash and total moisture; utilizes various equipment (e.g., carbon dioxide train, Brabender moisture tester, analytical balance, muffle furnace, chemicals) to conduct the tests; interprets test results; supplies interpretation to supervisor for reporting requirements.
3. Uses spectrometric techniques to test water for quantities of iron, manganese, nitrates, phosphates, phenols, and surfactants present; applies titrimetric techniques to evaluate water for calcium, calcium hardness, chloride, total hardness, magnesium, sodium, pH; tests water for turbidity, conductivity and total dissolved solids; reviews and analyzes test findings; reports analysis for supervisor's review.
4. Prepares and obtains extracts from sanitary landfill samples; analyzes extracts, compares to allowable limits and determines if specific metals exceed recommended maximum levels.
5. Tests various types of cheese, determines percentage fat and percentage moisture present; further analyzes cheese to ascertain inadequate pasteurization and inadequate refrigeration of samples; reports analysis of results to lead worker.
6. Tests for biological oxygen demand, residual chlorine and dissolved oxygen in water and wastewater samples.
7. Tests various foods and manufactured/processed products (e.g., meats, vegetables, dairy products, baked goods, soups, cereals, soft drinks, candy, artificial cheeses) for extraneous matter including rodent hairs, insect fragments and bird filth; analyzes results and identifies matter found; analysis is then checked by the supervisor.
8. Trains other staff on test methods and protocols.
9. Performs other duties as required or assigned which are reasonably within the scope of the duties enumerated above.

DESIRABLE REQUIREMENTS:

Education and Experience

Requires completion of four years of college, including 32 semester hours in chemistry from a recognized college or university.

This class is included as an Upward Mobility Program credential title.

CHEMIST I (Continued)

Knowledges, Skills and Abilities

Requires working knowledge of the principles, practices and techniques of chemical analyses as applied in analytical work.

Requires working knowledge of biochemistry and physics.

Requires ability to assume responsibility for extreme accuracy in analyses and to set up and use fragile laboratory equipment.

Requires ability to make chemical analyses of various products and substances according to standardized procedures.

Requires ability to follow written and oral directions, formulae and charts.

CHEMIST II

POSITION CODE: 06942

**DISTINGUISHING FEATURES OF WORK:**

Under general supervision, serves as designated lead worker of professional laboratory staff; or performs difficult professional chemistry analytical work, regularly interpreting test results and reporting findings to concerned parties (e.g., person/laboratory requesting the tests, United States Environmental Protection Agency, food manufacturers, local public health agencies); serves as an expert witness in court and/or administrative hearings.

**ILLUSTRATIVE EXAMPLES OF WORK:**

1. As a designated lead worker of equivalent or lower level professional staff engaged in laboratory work, controls subordinates' workload through daily allocation of work assignments; spot checks their work; reviews their calculations; explains various reactions and phenomena to subordinates; trains personnel in new or existing testing techniques.
2. Gives expert testimony in court regarding methods and standards, procedures and instruments used in the analyses of organic/inorganic materials and the results of the analyses.
3. Analyzes food and nonfood items for the presence of organic or pesticide compounds such as ketones, aldehydes, alcohols, organic corrosives; interprets results of tests and prepares reports to be sent to field personnel who obtained the samples and requested the experiments.
4. Analyzes purity and authenticity of liquor samples collected by Illinois Liquor Control agents; checks various characteristics of the samples including proof, solids, color, total acids, organic color and fusel oils; reports test results to the Illinois Liquor Control Commission; testifies before the Commission as required concerning preparation of samples, experiments conducted and interpretations rendered.
5. Uses gas chromatographs to analyze air samples obtained from underground and surface mines in the State; operates portable gas chromatograph to test air in cases of mine fires, roof falls, and other mine disasters.

CHEMIST II (Continued)

6. Conducts analyses of a variety of samples (e.g., water, feed, soil and animal tissue) for the presence of various pesticides; interprets results of tests; reports test results to the laboratory's clients.
7. Trains staff on test methods and protocols.
8. Performs other duties as required or assigned which are reasonably within the scope of the duties enumerated above.

DESIRABLE REQUIREMENTS:

Education and Experience

Requires completion of four years of college, including at least 32 semester hours in chemistry from a recognized college or university, supplemented by one year's professional experience in the practice of analytical chemistry.

Knowledges, Skills and Abilities

Requires working knowledge of principles, practices and techniques of organic and inorganic chemistry as applied to analytical work.

Requires working knowledge of pertinent state and federal laws, rules and regulations.

Requires working knowledge of biochemistry and physics.

Requires ability to assume responsibility for extreme accuracy in analyses and make recommendations based upon results obtained.

Requires ability to interpret applicable state and federal legislation.

Requires skill in the use of laboratory equipment.

Requires ability to prepare and present technical scientific reports.

Requires ability to independently perform difficult chemical analyses.

May require ability to assign, direct and review work of subordinate professional staff.

CHEMIST III

POSITION CODE: 06943

DISTINGUISHING FEATURES OF WORK:

Under direction, performs highly specialized, complex professional chemistry work; conducts chemical analyses where the results of tests produced by highly sophisticated laboratory scientific equipment require a high degree of specialized training and experience, of originality and decisions and commitments to properly identify substances found from other factors in test results; contacts businesses, municipalities, and federal agencies to provide them with analyses findings.

CHEMIST III (continued)

ILLUSTRATIVE EXAMPLES OF WORK:

1. Exercises independent judgment in performing complex analyses of test results obtained from the operation of highly sophisticated laboratory equipment capable of detecting a minute quantity (e.g., a nanogram or less) of a substance from a wide range of clinical and environmental substances present in a sample; ascertains identity of the unknown substance by analyzing test results and eliminating the known substances from the data - much of which is intermingled and confusing.
2. Performs quality control on sophisticated laboratory equipment; calibrates equipment; performs routine and emergency maintenance of the specialized equipment; performs daily checks of many components; assures equipment is in proper operating condition; cross checks repetitive analyses of single samples; compares old and freshly prepared standard solutions; participates in quality control checks from the United States Environmental Protection Agency and the United States Department of Agriculture.
3. Researches and develops analytical methods and procedures (e.g., extraction parameters, extraction efficiencies, calibration and condition determinations; methodologies) for various compounds.
4. Provides expert testimony in court or enforcement hearings concerning procedures, complex instrumentation, analytical results, and the complicated, involved interpretation of data obtained from the tests.
5. Extracts and performs clean up of pesticides and other organic substances from a variety of materials (e.g., milk, water, fish, dirt, air) to prepare the sample for analysis.
6. May serve as designated lead worker of professional laboratory staff; assigns work to subordinates; reviews their test results; provides input into employee performance evaluations.
7. Performs other duties as required or assigned which are reasonably within the scope of the duties enumerated above.

#### DESIRABLE REQUIREMENTS:

##### Education and Experience

Requires completion of four years of college, including at least 32 semester hours in chemistry from a recognized college or university, supplemented by three years' professional experience in the practice of analytical chemistry.

##### Knowledges, Skills and Abilities

Requires thorough knowledge of the principles and practices of analytical chemistry and modern laboratory methods, procedures, materials, and equipment.

Requires extensive knowledge of pertinent state and federal laws, rules and regulations.

Requires working knowledge of physics, biochemistry and related sciences.

CHEMIST III (continued)

Requires ability to assume responsibility for extreme accuracy in conducting difficult analyses, to make recommendations based upon findings and to prepare technical scientific reports of same.

Requires ability to interpret applicable state and federal legislation.

Requires ability to perform independent research and to devise new methods of testing.

Requires ability to repair and calibrate complex, sophisticated laboratory equipment.

May require ability to assign, direct and review work of subordinate professional staff.