

Civil Engineers



Perform engineering duties in planning, designing, and overseeing construction and maintenance of building structures, and facilities, such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation projects, pipelines, power plants, and water and sewage systems.

- Inspect project sites to monitor progress and ensure conformance to design specifications and safety or sanitation standards.
- Compute load and grade requirements, water flow rates, or material stress factors to determine design specifications.
- Provide technical advice to industrial or managerial personnel regarding design, construction, or program modifications or structural repairs.
- Test soils or materials to determine the adequacy and strength of foundations, concrete, asphalt, or steel.
- Manage and direct the construction, operations, or maintenance activities at project site.
- Direct or participate in surveying to lay out installations to guide construction.
- Estimate quantities and cost of materials, equipment, or labor to determine project feasibility.
- Plan and design transportation or hydraulic systems or structures using computer assisted design or drawing tools.
- Prepare or present reports on topics such as bid proposals, deeds, environmental impact.
- Design energy efficient or environmentally sound civil structures.

- Identify environmental risks and develop risk management strategies for civil engineering projects.
- Direct engineering activities ensuring compliance with environmental, safety, or other governmental regulations.
- Analyze survey reports, maps, drawings, blueprints.
- Design or engineer systems to efficiently dispose of chemical, biological, or other toxic wastes.

Knowledge –

- **Engineering and Technology** — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.
- **Building and Construction** — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.
- **Mathematics** — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.
- **Design** — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.
- **English Language** — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.
- **Administration and Management** — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.
- **Physics** — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.
- **Law and Government** — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.
- **Customer and Personal Service** — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.
- **Economics and Accounting** — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.
- **Computers and Electronics** — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

- **Personnel and Human Resources** — Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.

Abilities –

- **Information Ordering** — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).
- **Oral Expression** — The ability to communicate information and ideas in speaking so others will understand.
- **Problem Sensitivity** — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.
- **Mathematical Reasoning** — The ability to choose the right mathematical methods or formulas to solve a problem.
- **Written Expression** — The ability to communicate information and ideas in writing so others will understand.
- **Flexibility of Closure** — The ability to identify or detect a known pattern (a figure, object, word, or sound) that is hidden in other distracting material.
- **Number Facility** — The ability to add, subtract, multiply, or divide quickly and correctly.
- **Fluency of Ideas** — The ability to come up with a number of ideas about a topic (the number of ideas is important, not their quality, correctness, or creativity).
- **Perceptual Speed** — The ability to quickly and accurately compare similarities and differences among sets of letters, numbers, objects, pictures, or patterns. The things to be compared may be presented at the same time or one after the other. This ability also includes comparing a presented object with a remembered object.
- **Originality** — The ability to come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem.
- **Speed of Closure** — The ability to quickly make sense of, combine, and organize information into meaningful patterns.

Personality code – IRE

Qualification – 4 years degree course