

Other Engineering Disciplines Exam Standards and Table of Specifications



Other Engineering Disciplines Exam

Standards and Table of Specifications

Subject Areas

- 1) Mathematical Skills
- 2) Computer Skills
- 3) Information and Presentation Skills
- 4) Engineering Design
- 5) Environment
- 6) Safety and Health
- 7) Measurement, Instrumentation, and Control
- 8) General Skills

T1. Mathematical Skills

GE-T1: Engineers should have the ability to use different mathematical techniques to solve real-life problems; interpret data in tables and graphs; use the language of algebra to write the relationship between variables and solve problems; apply knowledge of functions to solve problems; make estimations and interpret uncertainties in calculations.

Indicators:

- GE-T1-01** Use mathematical techniques to derive relationships between variables, interpret those relationships, analyze and solve real life problems.
- GE-T1-02** Interpret and move flexibly between multiple formats including graphs, tables, and words.
- GE-T1-03** Demonstrate an understanding of the characteristics of functions and apply this knowledge in modeling and problem-solving.
- GE-T1-04** Make estimates and approximations.

T2. Computer Skills

GE-T2: Engineers should be able to perform basic computer tasks, process data using a variety of productivity tools, and be able to perform basic internet tasks.



Indicators:

- GE-T2-01** Perform basic computer operations in a variety of applications.
- GE-T2-02** Process information using multiple productivity tools (word processing, spreadsheet, presentation, database management, ... etc.).
- GE-T2-03** Use common digital devices (such as printer, scanner, camera, mobile...etc.) with a computer to perform specific tasks.
- GE-T2-04** Recognize the fundamentals of the internet. Conduct online search and communicate using the internet tools.

T3. Information and Presentation Skills

GE-T3: Engineers should have the ability to acquire, generate, interpret, and present engineering information in a suitable format, check the relevance and accuracy of data and engineering information, identify possible trends in data, and be aware of legal and ethical issues associated with the use of information.

Indicators:

- GE-T3-01** Acquire, generate, interpret, and present information in oral or written form.
- GE-T3-02** Select appropriate format for communicating and presenting data or information.
- GE-T3-03** Simplify and explain complex information.
- GE-T3-04** Evaluate data or information for accuracy, significance, and relevance.
- GE-T3-05** Identify tendencies and patterns in data or information.
- GE-T3-06** Recognize legal, ethical issues, and intellectual property issues associated with information.

T4: Engineering Design

GE-T4: Engineers should have the ability to understand the design process, make a need analysis, identify constraints and criteria, generate alternative solutions, evaluate the alternatives to select an appropriate solution, and incorporate human, legal, safety, ethical, and environmental factors in the design process.

Indicators:

- GE-T4-01** Recognize the steps of the design process.
- GE-T4-02** Identify problem objectives (primary and secondary), constraints, and criteria.
- GE-T4-03** Judge, critically, the relevancy of the gathered information for decision making.
- GE-T4-04** Generate alternative solutions.
- GE-T4-05** Evaluate solutions and select the most appropriate one.
- GE-T4-06** Recognize and incorporate human factors in the design process.
- GE-T4-07** Consider legal, safety, ethical and environmental factors in the design process.

T5: Environment

GE-T5: Engineers should have the ability to understand the different types of pollution (air, water, solid), the measurement techniques for various emissions, the available regulations, the various methods of pollution control, and the current world environmental issues.

Indicators:

- GE-T5-01** Recognize various types of pollution.
- GE-T5-02** Recognize measurement techniques for various emissions.
- GE-T5-03** Recognize local regulations of emissions.
- GE-T5-04** Recognize air pollution (principles, origins, and treatment techniques).
- GE-T5-05** Recognize water and wastewater pollution (principles, origins, and treatment techniques).
- GE-T5-06** Recognize solid and hazardous wastes (principles, origins, and treatment techniques).
- GE-T5-07** Recognize current environmental issues (climatic change, ozone layer depletion, global warming, acid rain, greenhouse effect,...etc.).
- GE-T5-08** Recognize concepts of sustainable development.

T6: Safety and Health

GE-T6: Engineers should have the ability to understand the various types of hazards (physical, chemical, and biological), compare hazards against the permissible levels, have a knowledge of local regulations, demonstrate knowledge of fire, explosion control, and hazard and operability studies (HAZOP).

Indicators:

- GE-T6-01** Recognize physical hazards (types, measurements, control techniques).
- GE-T6-02** Recognize chemical hazards (types, measurements, control techniques).
- GE-T6-03** Recognize biological hazards (types, measurements, control techniques).
- GE-T6-04** Recognize occupational exposure limits.
- GE-T6-05** Recognize fire and explosion control techniques.
- GE-T6-06** Predict the flammability characteristics of liquid, vapor, and gases.
- GE-T6-07** Apply hazard and operability concepts (HAZOP).
- GE-T6-08** Recognize electrical safety
- GE-T6-09** Recognize basic safety equipment

T7: Measurement, Instrumentation, and Control

GE-T7: Engineers should have an understanding of scientific concepts in the measurement of different physical quantities, understand errors in various measurements, and select suitable measurement devices. Engineers should also possess the ability to understand the basic concepts in automatic control.

Indicators:

- GE-T7-01** Identify instrumentation specifications and perform error and uncertainty analysis in measurement.
- GE-T7-02** Recognize and select suitable devices for the measurement of quantities such as pressure, flow, level, temperature, torque,

velocity, acceleration, force, humidity, density, pH, conductivity, viscosity, ...etc.

- GE-T7-03** Recognize different types of instrumentation for control applications.
- GE-T7-04** Recognize the characteristics of systems and their responses (first order, second order, delay, etc...).
- GE-T7-05** Recognize the basic concepts in control systems (set points, disturbances, controlled, manipulated variables, gain, time constant, controller, ... etc.).

T8- General Skills

GE-T8: Engineers should have the ability to choose and apply technology, exercise leadership, show appreciation of cultural diversity and sociability, show responsibility, have self-management skills, and show flexibility and commitment.

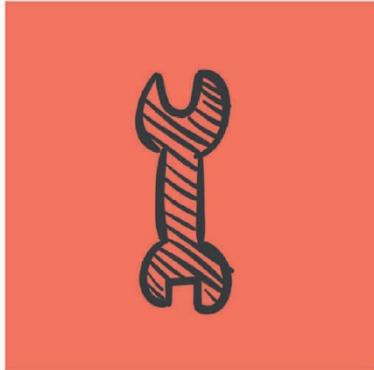
Indicators:

- GE-T8-01** Compare between various technologies to perform specific tasks(s); apply technology for various tasks; evaluate project specifications to select suitable technological tools.
- GE-T8-02** Apply leadership skills by inspiring and motivating other team members, communicating a clear vision, bringing people around common purpose, managing conflicts between team members, and solving problems.
- GE-T8-03** Collaborate with people from different ethnic, social, or educational backgrounds and demonstrate understanding, friendliness, empathy, and civility.
- GE-T8-04** Define clear and realistic personal goals; monitor progress toward goal attainment; works effectively without regular needed instructions
- GE-T8-05** Ranks goals in order of importance; allocates time to activities and understands, prepares and follows schedules; Delegate tasks whenever necessary; Overcome distractions and minimize procrastination
- GE-T8-06** Exhibit self-control and demonstrate a positive attitude towards praise, setbacks, and criticism; Adapt to varied roles and responsibilities. Models behavior that demonstrate self-discipline, reliability and dependability. Share knowledge and engage in active coloration with colleagues.

**Table of Specifications for Other Disciplines Part Two Exam
(3 Hours Exam and Sixty Questions)**

No.	Topic Area	# Q	Percentage %	Engineering Standard	Assigned Allocations among Learning Levels		
					RU	AA	EC
1	Mathematical Skills	6	10	GE-T1	0	3	3
2	Computer Skills	6	10	GE-T2	3	3	0
3	Information and Presentation Skills	6	10	GE-T3	2	2	2
4	Engineering Design	6	10	GE-T4	2	2	2
5	Environment	6	10	GE-T5	3	3	0
6	Safety and Health	6	10	GE-T6	3	3	0
7	Measurement, instrumentation, and control	6	10	GE-T7	3	3	0
8	General Skills	18	30	GE-T8	5	10	3
	Total	60	100		21 (35%)	29 (48%)	10 (17%)





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