

D. Health and Environmental Sciences

D1. Health Sciences

GIO: To acquire the basic knowledge, skills, and behavior about prevention of diseases and nutrition in contemporary society and to contribute to the people's health promotion and improvement of public health.

(1) Public Health

GIO: To acquire basic knowledge and skills on health statistics and epidemiology to learn current status and influential factors of public health.

① Definition of Health and Disease

1. To describe histories of the concepts of health and disease.

② Health Statistics

1. To describe the significance of population statistics in the current situation of public health.
2. To describe the technical terms in population and disease statistics.
3. To describe chronological changes in the demographic statistics (cause-specific mortality, etc.).

③ Epidemiology

1. To describe the role of epidemiology in disease prevention.
2. To describe the three major factors of epidemiology (agent, environment, host, etc.).
3. To describe the types of epidemiology (descriptive epidemiology, analytic epidemiology, etc.) and their methodologies.
4. To describe and calculate odds ratio, relative risk, attributable risk, and confidence interval for risk evaluation.

(2) Disease Prevention

GIO: To acquire the basic knowledge, skills, and behavior in the current situation and prevention of infectious disease, life-style related diseases, and occupational diseases, etc.

① Disease Prevention in Japan

1. To describe disease prevention in terms of three clinical stages such as health care, early diagnosis, and rehabilitation.
2. To describe Japanese health promotion policies (Health Japan 21, etc.).

② Infectious Diseases and Their Prevention

1. To describe contemporary infectious diseases (opportunistic infectious, hospital-acquired infectious, emerging infectious, and reemerging infectious diseases).
2. To describe infectious diseases and their classification in Act on the Prevention of Infectious Diseases and Medical Care for Patients with Infectious Diseases in Japan.
3. To describe the major sexually transmitted diseases and their prevention.
4. To describe the importance and methods of vaccination.

③ Life-style Related Diseases and Their Prevention

1. To describe the types and trends of life-style related diseases.
2. To describe the major risk factors of life-style related diseases and their preventive methods.
3. To discuss the relationship between life-style related diseases and habits such as diet, smoking, etc.

④ Health of Pregnant Women and Children

1. To describe the importance of neonatal mass-screening and to list major inspection items.
2. To describe the major diseases transmitted from a mother to children and the prevention methods of their mother-to-child transmission.

⑤ Occupational Health

1. To describe the major occupational hazards and diseases.
2. To describe the occupational health management.

(3) Nutrition and Food Safety

GIO: To acquire the basic knowledge and skills about nutrition, functions of food, and food hygiene to understand the significance of diet in human health.

① Nutrition

1. To describe the roles of nutrients such as carbohydrates, fats, proteins, vitamins, and minerals.
2. To describe the processes of digestion, absorption, metabolism, and catabolism of each nutrient.
3. To describe the nutritional significance of carbohydrate, fats, and proteins in food.
4. To describe the functions of food ingredients other than the five nutrients mentioned above (dietary fiber, anti-oxidant, etc.).
5. To describe the meanings of basal metabolic rate, respiratory quotient, and estimated energy requirement for catabolism of nutrients.
6. To describe Dietary Reference Intakes for Japanese.
7. To describe the major diseases caused by excess or deficiency of nutrients.
8. To describe the significance of nutrients for disease treatments.

② Putrefaction and Deterioration of Nutrients, Food Additives, and Foods with Health Claims

1. To describe mechanisms for putrefaction of carbohydrates and proteins.
2. To describe mechanisms of deterioration of oil and fat and to perform a deterioration tests of oil and fat.
3. To describe methods to avoid putrefaction and deterioration of food (methods for preservation, etc.).
4. To describe mechanisms for carcinogenesis of food ingredients.
5. To describe the function of food additives according to their usage.
6. To describe the special-use food and health-promoting foods.
7. To describe the legal regulations for food safety.

③ Food Poisoning and Food Contamination

1. To describe the major bacterial and viral food poisonings in Japan, and to describe their pathogens, clinical symptoms, poisoned foods, and prevention methods.

2. To describe naturally occurring poisons that cause food poisonings, and their causal substances, the mechanisms for poisonous action, and the clinical symptoms of food poisoning.
3. To describe food contaminations by chemical substances (heavy metals, pesticide residue, etc.), and their effects on human health.

D2. Environmental Sciences

GIO: To acquire the basic knowledge, skills, and behavior on chemical substances for their effects on human and environmental health, their appropriate use, and their effects on the global ecosystem and our daylife and to contribute to the maintenance of better environment and the improvement and promotion of public health.

(1) Effects of Chemical Substances and Radiation on Health

GIO: To acquire the basics knowledge and behavior about the toxicity of chemical substances to appropriately use chemical substances without their harmful effects on the human and environmental health.

① Toxicology of Chemical Substances

1. To describe the basic processes of absorption, distribution, metabolism, and excretion of major toxic substances.
2. To enumerate major chemical substances that have organ-specific toxicities on liver, kidneys, nerves system, etc.
3. To describe the acute and chronic toxicity of pesticides and toxic substances such as heavy metals, PCBs, dioxins, etc.
4. To describe biofactors to prevent harmful effects caused by heavy metals and reactive oxygen species.
5. To describe and discuss effects of drug abuse on the human and public health.
6. To describe methods of treatment on the toxicosis caused by major chemical substances.
7. To describe methods to treat chemical substances including substance abuse.

② Risk Assessment and Appropriate Use of Chemical Substances

1. To discuss risk communication and appropriate use of chemical substances.
2. To list and describe methods to treat toxic chemical substances.
3. To describe the dose-response relationship, threshold, no-observed-adverse-effect level (NOAEL), etc. to evaluate the toxicity of chemical substances.
4. To describe safe intake levels of chemical substances (acceptable daily intake, etc.).
5. To describe legal regulations (Chemical Substances Control Law, Chemical Substances Managing Law, etc.) for preventing the adverse effects of toxic chemical substances on human and environmental health.

③ Chemical Carcinogenesis

1. To describe mechanisms of metabolic activation of substances such as carcinogens.
2. To describe the principles of genotoxicity tests (Ames-test, etc.).
3. To describe processes of carcinogenesis (initiation, promotion, etc.).

④ Effects of Radiation

1. To describe ionizing radiations and their effects on humans.
2. To describe the interactions between major radioactive nuclides (i.e., naturally occurring and artificial) and the human body.
3. To describe methods to protect from ionizing radiation.
4. To describe non-ionizing radiations (ultraviolet, infrared radiation, etc.) and their effects on the human body.

(2) Regulatory Sciences in Environmental Health

GIO: To acquire basic knowledge, skills, and behavior about the origin, testing methods, health effects, prevention measure, and removal of environmental pollutants to contribute to maintain the sustainable global ecology and environment.

① Global Environment and Ecosystems

1. To describe the global environmental problems and their effects on human health.
2. To describe the members of the ecosystem, and their function and characteristics, and relationships among them in the ecosystem.
3. To describe the dynamics of chemical substances in the environment such as bioaccumulation.
4. To describe protocols for sustainable global environment.
5. To discuss ecological problems as a responsible member of the ecosystem.

② Environmental Conservation and Regulatory Sciences

1. To describe the seven typical pollution (air pollution, water contamination, soil contamination, noise, vibration, land subsidence, and offensive odor), and their present situations as well as the four major pollutions in Japan (Minamata disease, Niigata-Minamata disease, Yokkaichi asthma, and Itai-itai disease).
2. To describe the principles of Environment Basic Law in Japan.
3. To describe the legal regulations to prevent the pollutions in Japan.

③ Water Management

1. To describe sources of tap water.
2. To describe functions of water supply facility and chlorination of tap water.
3. To describe the water quality standards for tap water in Japan and to perform the quality control tests.
4. To describe methods of sewage processing and drainage processing in Japan.
5. To describe and perform methods to measure indices of water contamination.
6. To describe causes and problems of eutrophication and to suggest solution against eutrophication.

④ Air Pollution

1. To describe chronological changes, origin, and health effects of major air pollutants.
2. To measure major air pollutants.
3. To describe meteorological factors affecting air pollution (an inversion layer, etc.).

⑤ Indoor Environment

1. To describe and measure major indices to evaluate indoor environment.
2. To describe the relationship between indoor environment and human health.

⑥ Waste Treatments and Their Regulations

1. To describe categories of waste in Japan and their treatment methods.
2. To describe problems in waste treatment and the countermeasures.
3. To describe the manifest system for waste control in Japan.