

**RIH / ARIH Certification 2019**  
**IH Rubrics (Subject Areas)**

Serial No	Subject Areas	Scope of Coverage
1	Air sampling & Instrumentation	Selection and use of direct-reading instruments and air-sampling equipment for gases, vapours and aerosols, including instrument calibration, set-up and airflow calibration, sampling strategy and calculations related to sampling. Measurement and monitoring of noise, ionizing radiation, non-ionizing radiation, and thermal stressors are included in the rubrics dealing with those specific subject areas.
2	Analytical Chemistry	Laboratory analytical procedures for workplace or environmental samples and related calculations. Gas chromatography, liquid chromatography, mass spectroscopy, wet chemical methods, visible, infrared and ultraviolet spectrophotometry, atomic absorption and emission spectrophotometry, gravimetric method and microscopy are included as are laboratory quality assurance and chain of custody.
3	Basic Science	General scientific concepts including general physics, chemistry, mathematics, biology, anatomy and physiology. Properties of flammable, reactive and incompatible chemicals are included as are calculations such as those related to the Idea Gas Law, airborne concentrations, units of measurement and conditions of non-standard temperature and pressure. Also included are properties, behaviour and measurement of airborne particles.
4	Biohazard	Recognition, evaluation and control of biological agents including microorganisms - virus, bacteria, fungi, allergens, toxins and bloodborne pathogens having the capacity to produce deleterious effects and infectious diseases. Workplace with biohazards and work-related infections including risk group classification. Biohazards containment and biosafety levels (BSL). Safety equipment, laboratory practices, disinfection and sterilization as well as biological waste management.
5	Biostatistics & Epidemiology	Basic biostatistics and statistical interpretation of exposure data in the evaluation of health risks including Normal and Log-normal distributions. Principles of epidemiology, measurement of morbidity and mortality. Types of epidemiological study including prospective and retrospective cohort studies, cross-sectional and case-control studies, animal experimental studies and data distribution.
6	Community Exposure	Air pollution, air cleaning technology, ambient air quality considerations, emission source sampling, atmospheric dispersion of pollutants, ambient air monitoring, health and environmental effects of air pollutants and related calculations. Also included are other IH-related environmental subjects

		such as emergency response, hazardous waste, and environmental fate of pollutants.
7	Compliance Statistics	Occupational exposure standards including Permissible Exposure Levels (PEL) and Threshold Limit Values (TLV) interpretation. Sampling and analytical errors. Classical confidence intervals and standardized concentration approaches to compliance and non-compliance decisions.
8	Engineering Control / Ventilation	Control of chemical and physical hazard exposures through engineering measures such as local exhaust ventilation, dilution ventilation, containment, isolation, and process modification. Also included are fluid mechanics, LEV design principles, hoods and ducting, air cleaners, exhaust fans and motors, static pressure loss, LEV system testing, and related calculations. Engineering control of noise and vibration, ionizing and nonionizing radiation, thermal stressors are included in the rubrics dealing with those specific subject areas.
9	Ergonomics	Human factors engineering, biomechanics, musculoskeletal disorders (MSD), or cumulative trauma disorders (CTD) / repetitive strain injuries (RSI). Causes and symptoms of MSD and their prevention. Office ergonomics and application of anthropometry data to specific ergonomic designs. Ergonomics risk assessment toolkits for manual material handling and repetitive work. Prevention of MSD. Man-machine interfaces including control and display.
10	Health Risk & Hazard Communication	Understanding of principles and requirements for the interpretation and use of guidelines for the assessment of health hazards, including the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), Biological Exposure Indices (BEIs) and industrial ventilation guidelines, relevant Singapore Standards (SS) and CP or guidelines published by MOM and WSH Council. Understanding the risk reduction or mitigation process including the principles and hierarchy of controls, control banding, GHS hazard communication and training of employees.
11	Indoor Air Quality	Indoor air quality (IAQ) parameters (e.g. thermal environment, chemical contaminants, radiological concerns, bio-organisms, particulate matters). Sick building syndrome and building-related illness, IAQ standards including air temperature, relative humidity and CO <sub>2</sub> concentration (SS 554 IAQ for Air-conditioned Buildings). Mitigating IAQ problems including air cleaners or purifiers and dilution ventilation by outdoor air supply. IAQ measurement and IAQ management programme are also included.
12	Lighting	Luminaires and their applications and performance specifications such as efficacy, colour rendering and colour

		temperature. Included are workplace lighting standards (SS 531 Code of Practice for Lighting of Work Places), lighting requirements (quantity and quality aspects), workplace lighting design and illumination level measurement.
13	Management & Ethics	Acquisition, allocation and control of resources to accomplish health hazard anticipation, identification, evaluation and control objectives. Included are topics such as risk management (including risk assessment, risk treatment and risk communication), investigation methods, data management and integration, auditing, establishment of policy, planning, delegation of authority, accountability, organizational structure, decision making and the RIH Code of Ethics.
14	Noise & Vibration	Physics of sound; health effects resulting from exposure to noise and vibration. Included are exposure measurement and evaluation, engineering noise control as well as hearing protection, audiometric testing and hearing conservation programme. Computations related to combining sound pressure levels, octave band measurements, noise dose and equivalent sound pressure level are included. Also included are transmissibility of a vibration system, vibration isolation and control.
15	Non-engineering Control	Personal protective equipment, including the principles governing selection, use and limitations of respirators and protective clothing. Also included are respirator fit testing, protection factor and assigned protection factor of respirators, breathing air specifications, glove permeability, eye protection and the application of administrative controls.
16	Radiation (Ionizing)	Physical characteristics and biological effects associated with exposure to alpha and beta particles, neutrons, gamma rays and x-rays. Activity and exposure dose calculations. Included are exposure measurement and evaluation as well as protection and shielding against ionizing radiation.
17	Radiation (Non-ionizing)	Physical characteristics and health effects associated with electromagnetic fields, static electric and magnetic fields, lasers, radio frequency, microwaves, ultraviolet, visible, and infrared radiation. Included are exposure measurement and evaluation as well as protection against non-ionizing radiation.
18	Thermal Stressors	Adverse health effects associated with heat and cold, symptoms of temperature-related health effects, heat stress and cold stress indicators and assessment, exposure control techniques, first-aid and medical response.
19	Toxicology	Health effects resulting from exposure to toxic chemical substances including single agents and mixtures. Included are symptomatology, pharmacokinetics, routes of entry,

		absorption, metabolism, excretion, target organs (e.g. liver, kidney, lung, skin), mode of action, additive, synergistic and antagonistic effects, toxicity testing protocols, aerosol deposition and clearance in the respiratory system. Also included are allergic reaction, sensory and pulmonary irritation, neurotic, carcinogenic, mutagenic, teratogenic and reproductive hazards.
20	Work Environment	Included are the hazards associated with specific industrial or manufacturing processes. Topics include but are not limited to confined space entry and work, spray painting, welding, abrasive blasting, vapor degreasing, foundry operations, and hazardous waste management, as well as indoor air and environmental quality.