

TECHNICAL COMPETENCY LIST (Rev. - 8 July 2011)

Civil engineering

Architecture

Industrial buildings architectural design/drafting
Civil buildings design/drafting
Finishing details design
Consolidation and renovation analysis
Building diagnostics
Urban planning
Landscaping

Civil work

Finishing and repair work
Industrial and civil building design
Industrial and civil building construction
Metallic structure design
Metallic structure construction
Road and drainage works design
Road and drainage works construction
Underground structure design
Underground structure construction
Concrete structure design
Concrete structure construction
Wooden structure design
Wooden structure construction
Excavation work
Geotechnical studies
Environmental friendly construction design

Land survey

Use of coordinate systems
Planimetric & altimetric measurement
Topometric calculation

High precision survey

Use of high accuracy survey instruments (theodolites, total stations, optical & digital levels)
Expert use of standard compensation software
Use of digital photogrammetry
Laser tracker measurements
Laser scanning
Knowledge of capacitive, inductive and ultrasonic technology sensors
Knowledge of geodesy
Use of global position system

Controls and data acquisition

Control system design

Overall architectural design of large control systems / Design of control systems
Design of Process control functional analysis / Requirement analysis
Design of ergonomic Human machine interface / Design of HMI for control systems
Design of embedded control system
Design of real time control system
Design of PLC based control system
Design of Safety control systems
Design of Motion Control system
Design of robotic control system
Design of automated test systems
Control Standards and regulation

Control software and hardware configuration

Configuration, programming and use of Supervisory Control And Data Acquisition (SCADA) systems
Configuration and programming of PLC and fieldbus system / Programming of PLCs
Configuration and use of fieldbuses
Configuration and use of control specific protocols.
Use data acquisition and treatment software
Development of graphical real-time software
Graphical FPGA programming

TECHNICAL COMPETENCY LIST (Rev. - 8 July 2011)

Configuration of Digital and analogue acquisition board

Control theory

Design of regulation (closed loop system, digital and analog)

Use of modelling and simulation software in process control

Knowledge of Advanced control design (model based predictive control,...)

Knowledge of state diagram theory

Control system commissioning, maintenance and operation

Installation, maintenance & operation of Control systems

Technical infrastructure operation

Installation, maintenance & operation in process control

Management and configuration of data acquisition and test systems

Management and configuration of large control system

Measurements and actuation

Installation and maintenance of Basic Process Instrumentation (Temperature, Pressure, Flow, Level)

Installation and maintenance of Motor and Drives control (AC and DC motors, Steppers, ...)

Installation and maintenance of Actuators (Valves, Electrical, Hydraulic, Pneumatic actuators)

Data acquisition for experiments

Design of data acquisition systems

Design, integration and configuration of modular data processing and storage systems

Development and configuration of online software for data acquisition

Operation and maintenance of data acquisition systems

Electrical engineering

RF technologies

Design of RF accelerating cavities and structures

Design of High gradient structures

Design of Standing wave and travelling wave cavities

Design of Superconducting RF

Design of Linac structures, RF Quadrupoles

Design of RF couplers and HOM couplers

Design of RF power systems and sources

RF design and simulation

Design of beam pick-up devices

Design of beam current transformers

Electromagnetics

Knowledge of Electromagnetic Compatibility, Interference and Susceptibility (EMC, EMI and EMS)

EMC design

EMC testing

Power electronics

Design of line commutated rectifiers

Design of switch-mode power converters

Design of High power systems (> 1 MW)

Analysis and modelling in power electronics

Design of Static Var Compensators (SVC)

Design of uninterruptible power supplies (UPS)

Design of pulsed power systems

Commissioning, maintenance & operation of power systems

Electrical machines

Knowledge of electrical rotating machine

Knowledge of Diesel generator

Commissioning, maintenance & operation of electrical rotating machines

Electrical distribution

Design of HV network & substations

Design of LV network & switchboard

Design of electrical circuit layout

Design of HV supply systems for detectors

Commissioning, maintenance & operation of electrical distribution systems

Electromechanical engineering

Electro-mechanics

Electro-mechanical design

Electro-mechanical construction

TECHNICAL COMPETENCY LIST (Rev. - 8 July 2011)

Electro-mechanical testing
Electromagnetic calculation & modelling
Processing of dielectric insulation
Computational methods for magnetic fields
Analysis of magnetic measurements and inverse problems

Superconducting magnet technology

Knowledge, manufacturing, follow-up and QA of production of SC strands and SC cables
Design and manufacturing of bus bars
Quench and protection of superconducting magnets
Design of tooling and processes for superconducting magnets fabrication
Design, processing and operation of stations for power tests
Design, test and production of magnet interconnections
Joining and QA of superconducting splices
Design of SC links
Design and manufacturing of current leads
Insulation winding in superconducting coils and magnets
Assembly of superconducting magnets
QA of superconducting magnet production including HV testing
Assembly of the cold mass in the cryostat
Design, manufacturing and test of diodes for SC magnets

Normal conducting magnet technology

Dynamic effects in cycled normal conducting magnets
Permanent and hybrid magnets
Manufacture of solid and laminated yokes
Manufacture of air and water cooled coils
Manufacture of radiation resistant magnets
Test methods: hipot, interturn, hydraulic, thermal, magnetic
Correcting field quality after manufacture: assembly, shimming

Commissioning, maintenance & operation of electro-mechanical equipment

Commissioning & maintenance of electro-mechanical equipment
Maintenance & operation of electro-mechanical equipment

Installation & dismantling of electro-mechanical equipment

Installation & dismantling of electro-mechanical equipment

Electronic engineering

Analog

Analog circuit design, modelling and simulation
Analog circuit testing and measurement techniques
Analog microelectronic circuit design
Design of A/D and D/A converters
Design of analog signal conditioning and processing electronics
Design of electronics for analogue sensors and transducers

Digital

Digital circuit design, modelling and simulation
Digital circuit testing and measurement techniques
Digital microelectronic circuit design
Design of digital signal conditioning and processing electronics
Design of microprocessors and controllers
Design of electronics for digital control systems and loops
Design of electronics for clock/timing generation, processing, distribution and recovery
Design of electrical buses, serial links and transmission lines
Design of electronics based on field programmable logic-based devices (FPGA)

Specialized techniques in electronics

Design of electronics for low power DC/DC converters and regulators
Design of electronics for low power high voltage circuits
Design of high frequency electronics
Design of microwave circuits
Application of high level electronic system description languages, techniques and tools
Knowledge of radiation effects on electronics and mitigation techniques
Application of signal theory, mathematical techniques and tools

Fabrication techniques

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Circuit layout, including related techniques and tools
Hybrid circuit and printed circuit board fabrication, including related techniques and tools
Components packaging, including related techniques and tools
Components assembly, including related techniques and tools
Assembly of connectors and cables, including related techniques and tools
Knowledge of quality and reliability assurance techniques and tools

Modular electronics and instrumentation

Design and development of systems based on standardized electronic modules
Design and development of crates and racks
Application of modular low voltage power supplies for electronic systems
Application of modular high voltage power supplies for physics detectors
Application of instrumentation and measurement techniques

Optoelectronics

Design and development of optical data links
Application of optical components: emitters, waveguides and detectors
Light generation and illumination techniques
Optical system modelling, including related simulation techniques and tools

Commissioning, operation & maintenance of electronic systems

Commissioning, operation & maintenance of electronic systems
Commissioning, operation & maintenance of electronic test and measurement equipment

Finance & procurement

Budget and planning

Budgeting, forecasting, statistics
Strategic personnel and material resources planning
Operational personnel and material costs planning

Cost accounting

Costs posting and allocation
Management control
Personnel and material costs analysis and control

Financial management

Financial reporting and analysis
Working with financial markets and instruments
Debt management
Cash management
Actuarial studies
Insurance and transferrable risks management

General accounting

Payables and receivables accounting
Payroll accounting
Taxes and fiscal accounting
Book-keeping
Book-closing
External funds accounting

Supply management

Purchasing and procurement
Sourcing, subcontracting, and insourcing / outsourcing of industrial services
Contract management
Negotiating
Drafting of commercial documents
Technical supervision of contract

Health, safety & environment

Medicine

Practice of occupational medicine
Practice of medical emergency
Knowledge of legal medicine
Knowledge of public health
Medical analysis

Emergency

Incident command and control
Technical rescue operations

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Hazardous materials response operations
Pre-incident planning
Emergency medical care

Radiation protection & radiation safety

Radiation protection design study
Knowledge of measurement techniques for ionising radiation
Knowledge of radiation exposure and protection
Knowledge of nuclear safety engineering

Occupational health & safety

Knowledge of ergonomics
Knowledge of acoustics
Knowledge of biological hazards
Knowledge of occupational health
Knowledge of non-ionization radiations
Knowledge of personal protective equipment
Smoke control and management
Design and installation of safety systems
Maintenance and operation of safety systems
RAMS analysis of safety systems

Safety management

Safety risk management
Fault tree analysis for incident analysis
Safety conformity assessment

Environment

Environmental protection

Human resources

Organisational capability

Organisational design & development
HR process design & development
Organisation's culture shaping
Change management
Organization savvy

HR processes, tools and techniques

Talent management
Recruitment
Learning
Compensation & benefits knowledge
Diversity
Mobility
Workforce planning
Employee relations
Conflict resolution
Coaching

HR systems

Knowledge of the rules and procedures of the host states
Knowledge of administrative rules specific to International Organisations
Knowledge of Organization's jobs
Knowledge of education systems within the Member States

Information technologies

Technical strategy and planning

Solution architecture
Emerging technology monitoring
Continuity management
Software development process improvement
Sustainability management for IT
Network planning
Design and selection of methods & tools
User Relationship Management

Systems & applications development

Requirements definition and management

TECHNICAL COMPETENCY LIST (Rev. - 8 July 2011)

Systems design
Network design
Database/Repository design
Programming/Software development
Information content authoring
Testing
Systems ergonomics
Usability requirements analysis
Usability evaluation

Installation and integration

Systems integration
Porting/software integration
Systems installation/decommissioning
Technical Advice and Guidance

Service strategy

IT management
Financial management for IT

Service design

Capacity management
Availability management
Service level management

Service transition

Configuration management
Change management
Release management

Service & systems operation

System software administration
Security administration
Radio frequency engineering
Application support
IT Operations
Network control and operation
Database administration
Network support
Problem management
Service desk and incident management
Customer Relationship Management

Using Software Packages

Use of Office software packages,
Use of Database software packages,
Use of Scientific and Engineering software packages,
Use of Financial and Business Processes software packages.

Languages

English

English speaking
English listening comprehension
English writing
English reading

French

French speaking
French listening comprehension
French writing
French reading

Other languages

Other languages speaking
Other languages listening comprehension
Other languages writing
Other languages reading

Legal

Legal knowledge

TECHNICAL COMPETENCY LIST (Rev. - 8 July 2011)

Knowledge of commercial law
Knowledge of private law
Knowledge of Intellectual property law
Knowledge of public international law and the law of treaties
Knowledge of environmental law
Knowledge of health and safety legal issues
Knowledge of EU regulations
Knowledge of international administrative law
Knowledge of social security legal issues
Knowledge of criminal law
Knowledge of immigration law
Knowledge of tax law

Legal skills

Litigation
Legal drafting

Managerial

Strategy

Strategy agility
Process improvement

Operations management

Organisation, planning and control
Risk management
Crisis management
Project management
Quality management
Knowledge management

People management

Performance management

Materials science & surface engineering

Materials

Knowledge of metallic materials properties
Knowledge of superconducting materials and High Temperature Superconductivity
Processing of superconductors
Knowledge of magnetic materials
Knowledge metallic materials processing
Knowledge of polymers properties
Processing of polymers
Knowledge of composite materials properties
Processing of composite materials
Knowledge of ceramic materials properties
Processing of ceramic materials
Materials failure analysis
High temperature thermal treatment of materials
Knowledge of radiation hardness & ageing

Surface science & engineering

Knowledge of surface properties
Knowledge of surface finishing
Surface finishing processing
Knowledge of thin film coating
Thin film processing
Plasma processing of surfaces
Knowledge of high voltage breakdown properties of materials
High voltage breakdown processing of surfaces
Knowledge of corrosion and protection
Corrosion testing

Microscopy and analytical techniques

Knowledge of materialgraphy theory
Materialgraphic preparation and observation
SEM use and microanalysis
Chemical & electro-chemical analysis

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Use of diffraction based techniques
Use of optical spectroscopy based techniques
Electrical current transport properties measurement
Magnetisation properties measurement
Surface analysis

Non destructive tests

Die penetrant testing
X-rays testing
Ultrasound testing

Mechanical testing of material

Destructive testing

Magnetic testing of materials

Measurements of strand and SC cables
Measurements and characterisation of magnetic materials
Development of low temperature magnetic measurement systems
Processing of magnetic measurements data to extract field harmonics

Chemistry

Knowledge of inorganic chemistry
Knowledge of electro-chemistry
Knowledge of organic chemistry
Knowledge of radio-chemistry

Vacuum materials & surfaces

UHV production and measurement
Residual gas analysis
Knowledge of cryopumping
Knowledge of chemical pumping: getters
Simulation of UHV systems
Knowledge of materials for UHV technology
Knowledge of surface treatments for UHV technology
Knowledge of dynamic outgassing for UHV materials
Knowledge of vacuum thermal treatment & bake-out
Design of bake out for vacuum applications

Mechanical engineering

Structures and machines design

Design of mechanical systems
3D & 2D technical drawing
Mechanical analysis & modelling
Mechanical systems integration
Product lifecycle management

Thermodynamics, heat transfer & fluid mechanics

Thermo-mechanical design
Thermo-mechanical assembly & installation
Thermal design
Thermal analysis & modelling
Knowledge of thermodynamics
Fluid-mechanics design
Fluid-dynamics analysis & modelling

Manufacturing, fabrication technology and processes

Precision assembly and construction
Assembly in clean rooms
Use of numerical control & conventional machine tools
Use of assembly and mounting techniques
Definition of manufacturing method, process, preparation, planning, drawing, and control
Turning, milling, erosion, grinding
Gluing, welding, brazing

Metrology & mechanical measurements

Knowledge of surface metrology reference standards (GPS)
Perform conventional dimensional metrology on marble
Perform micrometric 3D metrology
Mechanical dynamic and static measurements

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Commissioning, maintenance & operation of mechanical equipment & systems

Commissioning & maintenance of mechanical equipment & systems
Maintenance of handling & lifting equipment
Operation of handling & lifting equipment
Maintenance & operation of heating production plants
Maintenance & operation of demineralised water production plants
Maintenance & operation of water treatment plants
Maintenance & operation of water distribution networks
Maintenance & operation of water cooling plants
Maintenance & operation of compressed air production and distribution plants
Maintenance & operation of distribution and air treatment plants
Maintenance & operation of detector cooling systems
Maintenance & operation of cryostats
Maintenance & operation of cryogenics distribution systems
Maintenance & operation of gas/liquid storage/distribution, liquid helium purification systems
Maintenance & operation of refrigerators
Maintenance & operation of rotating machines for cryogenics
Use of maintenance management systems
Commissioning, maintenance & operation of vacuum systems
Commissioning, maintenance & operation of gas systems

Installation & dismantling of mechanical equipment & systems

Installation & dismantling of mechanical equipment & systems
Installation of heating production plants
Installation of demineralised water production plants
Installation of water treatment plants
Installation of water distribution networks
Installation of water cooling plants
Installation of compressed air production and distribution plants
Installation of distribution and air treatment plants
Installation of detector cooling systems
Installation of cryostats
Installation of cryogenics distribution systems
Installation of gas/liquid storage/distribution, liquid helium purification systems
Installation of refrigerators
Installation of rotating machines for cryogenics
Installation of vacuum systems
Installation & dismantling of gas systems

Hydraulic plants

Design of heating production plants
Design of demineralised water production plants
Design of water treatment plants
Design of water distribution networks
Design of water cooling plants
Cooling process and regulation
HVAC process and regulation

Pneumatic plants

Design of compressed air production and distribution plants

Ventilation systems

Design of distribution and air treatment plants

Detector gas distribution & cooling systems

Design of detector cooling systems
Design of detector gas distribution systems

Cryogenics

Design of cryostats
Design of cryogenics distribution systems
Design of gas/liquid storage/distribution, liquid helium purification systems
Design of cryo-instrumentation
Design installation, maintenance & operation of cryo-instrumentation
Knowledge of cryogenic processes
Design of refrigerators

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Design of rotating machines for cryogenics

Vacuum technology

Design, analysis and modelling of vacuum systems

Design of thin-walled and bellows compensation structures

Knowledge of leak detection

Knowledge of pumping technology

Knowledge of high vacuum production and measurement

Physics

Accelerator and beam physics

Knowledge of accelerator physics theory

Knowledge of beam optics (rings and transfer lines)

Knowledge of transverse single-particle dynamics

Knowledge of longitudinal single-particle dynamics

Knowledge of collective effects (beam-beam, space charge, cooling)

Impedance computation

Beam injection and extraction methods, beam transfer and dumping

Application of beam pick-up devices

Application of beam current transformers

Application of beam imaging devices

Application of beam loss detectors

Design and development of beam sources

Beam production

Beam dynamics simulation

Magnetic model used in accelerator operation

Machine integration for setting magnet parameters

Accelerator performance analysis & optimization

Accelerator operation

Primary and secondary beam line design

Beam-machine interaction simulation

Experimental particle physics

Physics analysis

Physics simulation

Physics reconstruction

Simulation of radiation environments

Application of statistical and numerical mathematical methods

Experimental data reduction and triggering

Theoretical particle physics

Computational and mathematical physics

Particle physics, phenomenology

Astro-particle physics, cosmology

Particle detectors and interaction of particles with matter

Detector design, construction, testing and operation

Detector assembly and integration: techniques, procedures and coordination

Detector performance simulation and analysis

Solid-state based particle detection technologies

Liquid based particle detection technologies

Gas based particle detection technologies

Optical particle detection technologies

Particle tracking methods and techniques

Calorimetry methods and techniques

Particle identification and tagging methods and techniques

Nuclear physics

Knowledge of nuclear structure

Knowledge of radioactive decay and spectroscopy

Knowledge of nuclear reactions

Nuclear reaction modelling

Neutronics

Optics

Simulation and design of imaging, illumination or laser optics

Simulation and design of laser-based systems

TECHNICAL COMPETENCY LIST (Rev. - 8 July 2011)

Simulation and design of X-ray-based systems

Application of particle physics techniques to other sciences

Knowledge of biomedical physics

Design and development of detectors for biomedical applications

Image analysis, visualisation and simulation techniques and tools

Services

Communication

Marketing, promotion, sponsoring, fundraising

Public relations

Relations with the media

Exhibition design and management

Science writing, scientific popularization

Internal corporate communication

Knowledge transfer

Knowledge transfer methodology

Technology transfer

Managing relations and partnerships with non profit as well as corporate entities

Setting up of international collaborations

Logistics

Import / export including transport organization (shipping)

Goods reception and distribution, and mailing service

Warehousing, stores management

Logistics management

Customs & VAT expertise

Waste management

Transport of dangerous goods

Heavy vehicles fleet management

Product standardisation

Catalogue codification

Corporate fleet management

Audit

Compliance auditing, certification of financial statements

Performance auditing

Assessment of internal control, risks and governance processes

Risks assessment for the purpose of auditing

Fraud detection

Administrative assistance & event organisation

Customer service

Secretarial service

Knowledge of protocol (precedence and etiquette)

Conference, workshop & event organisation

Scientific information and document management

Archiving and records management

Library and documentation management

Text editing and proof-reading

Digital curation

Digitizing collections

Minute-writing and translation

Minute writing

Translation

Consecutive interpreting

Knowledge of terminology

Knowledge of Computer Assisted Translation tools

Information management

Corporate governance on information

Information strategy

Information systems coordination

Information policy formation

Information security

Information analysis

TECHNICAL COMPETENCY LIST (Rev. - 8 July 2011)

Information content publishing