ASTTBC Areas of Practice

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Applied Science Technologists & Technicians of British Columbia (ASTTBC)

ASTTBC TECHNOLOGY PROFESSIONALS

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Purpose of this document

The purpose of this document is to provide an overview of the disciplines regulated by ASTTBC and to identify areas of practice, specialties, and fields of work in which ASTTBC registrants may be engaged. It is intended as a reference resource for registrants, employers, government, regulators, and the public to better understand the breadth of professional practice undertaken by Certified Technicians (CTech), Applied Science Technologists (AScT), Registered Technical Specialists (RTS) and other ASTTBC registrants.

These specialties and areas of practice are intended to generally describe the types of work and professional fields registrants may be working in BC. The document does not define specific tasks, activities, competencies, or scopes of practice associated with those specialties. Rather, it serves as a high-level catalogue of practice areas across ASTTBC disciplines and is intended to support a common understanding of the profession and its diverse areas of application.

ASTTBC TECHNOLOGY PROFESSIONALS

Overview of ASTTBC disciplines

ASTTBC recognizes a broad range of disciplines, each representing a major technical or scientific field of practice. These disciplines define the overall scope of professional practice and provide the framework within which technologists and technicians apply their knowledge, skills, and experience. Each discipline may include one or more Areas of Practice and Specialties that further describe the nature of work performed within that field. A list of recognized disciplines of registration is provided below.

Architecture & Building Construction

Bioscience Technology

Biomedical Engineering Technology

Chemical Engineering Technology

Civil Engineering Technology

Electrical Engineering Technology

Electronic Engineering Technology

Energy & Renewable Technology

Environmental Engineering Technology

Forest Engineering Technology

Industrial Engineering Technology

Information Technology

Instrumentation Engineering Technology

Marine Engineering Technology

Mechanical Engineering Technology

Metallurgical Engineering Technology

Mineral Resources Technology

Naval Architecture Technology

Petroleum & Gas Engineering Technology

Survey / Geomatics Technology

Areas of Practice and Specialties

ASTTBC registrants work in a diverse range of technical fields across 20 disciplines of registration. Within each discipline of registration, registrants may practise in a variety of Areas of Practice that reflect the breadth and diversity of the profession.

The Areas of Practice shown below are intended to provide examples of the types of work and specialties that may be found within each discipline of registration. They are not intended to be exhaustive or comprehensive; rather, they represent a sampling of the broader range of technical fields and specialties in which registrants may be engaged.

As technology, industry, and professional practice continue to evolve, new Areas of Practice will emerge and existing Areas of Practice may change. As a result, this list may be reviewed and updated over time to reflect the ongoing evolution of the applied science technology profession.

Areas of Practice represent major domains of professional practice within a discipline. Specialties represent more focused areas of professional practice within an Area of Practice, reflecting particular technical applications, industry sectors, or subject matter expertise.

This structure helps define the scope of professional practice in a consistent manner across disciplines and provides a framework for identifying and describing the work performed by registrants.

Areas of Practice

Architecture & Building Construction

Architectural Design & Documentation
Building Science & Performance
Building Systems Coordination
Construction & Project Delivery
Existing Buildings, Heritage & Retrofit
Other

Bioscience Technology

Laboratory Bioscience
Molecular Biotechnology
Bioprocessing & Manufacturing
Environmental Bioscience
Agricultural & Food Bioscience
Quality & Regulatory Systems
Bioscience Instrumentation & Operations
Synthetic Biology
Other

Biomedical Engineering Technology

Clinical & Therapeutic Equipment Systems
Diagnostic & Imaging Systems
Laboratory & Analytical Systems
Sterilization & Infection Control Systems
Rehabilitation & Assistive Technologies
Biomedical Systems Integration & Digital Health
Biomedical Equipment Testing, Safety & Compliance
Other

Chemical Engineering Technology

Process Design & Optimization
Unit Operations & Process Systems
Process Operations, Control & Automation
Analytical & Laboratory Systems
Environmental & Sustainability Systems
Hydrocarbon & Energy Processing
Biotechnology & Bioprocessing
Chemical & Pharmaceutical Manufacturing
Materials & Corrosion Technology
Other

Civil Engineering Technology

Structural Systems (Applied Civil)
Geotechnical & Earth Systems
Hydraulic & Water Resources Infrastructure
Surveying & Geospatial Support (Civil-Limited)
Transportation Infrastructure
Environmental & Groundwater Systems (Civil Interface)
Municipal Infrastructure & Public Works
Other

Electrical Engineering Technology

Building Electrical Systems
Industrial Electrical Systems
Power & Utility Electrical Systems
Industrial Control & Instrumentation Systems
Electronics & Embedded Electrical Systems
Renewable & Energy Integration Systems
Nuclear Technology
Other

Electronic Engineering Technology

Electronic Circuit & Hardware Systems
Power Electronics & Energy Systems
Embedded & Microprocessor-Based Systems
Control, Automation & Mechatronic Systems
Communication & Signal Systems

Electronic Systems Integration, Testing & Maintenance
Instrumentation & Measurement Systems
Other

Energy & Renewable Technology

Renewable Energy Systems
Solar Energy Systems
Wind Energy Systems
Hydrogen & Fuel Cell Systems
Energy Storage Systems
Microgrid & Distributed Energy Systems
Clean Energy Systems Integration
Other

Environmental Engineering Technology

Environmental Monitoring & Field Systems
Water & Hydrologic Systems
Waste Management Systems
Air Quality & Pollution Control
Environmental Management & Compliance
Ecology & Restoration
Contaminated Sites & Remediation
Other

Forest Engineering Technology

Forest Resources & Operations
Forest Measurements & Inventory
Forest Ecology, Stewardship & Restoration
Forest Roads & Resource Infrastructure
Wildfire & Forest Protection
Forest Geomatics & Spatial Technologies
Other

Industrial Engineering Technology

Manufacturing & Production Systems
Quality & Process Improvement
Operations & Supply Chain Systems
Industrial Automation & Systems Integration
Work Design, Ergonomics & Human Factors
Industrial Project & Operations Management
Business Systems & Industrial Analytics
Other

Information Technology

Software Development & Application Systems
Network & Infrastructure Systems
Cybersecurity & Information Assurance
Database & Data Management Systems
Systems Administration & Technical Support
Business & Enterprise Information Systems
Other

Instrumentation Engineering Technology

Process Control & Industrial Automation
Instrumentation & Measurement Systems
PLC, DCS & Supervisory Systems
Industrial Communications & Network Systems
Analyzer & Process Analytical Systems
Electrical & Drive Systems
Safety & Reliability Systems
Other

Marine Engineering Technology

Marine Systems Engineering
Marine Electrical & Control Systems
Shipbuilding & Retrofit
Marine Technical Documentation
Marine Project Management
Other

Mechanical Engineering Technology

Building Mechanical Systems
Thermal & HVAC Systems
Fluid & Piping Systems
Fire Protection Systems

Industrial Mechanical Systems & Machinery
Energy & Power Systems
Materials Handling & Mechanical Equipment Systems
Other

Metallurgical Engineering Technology

Corrosion & Asset Integrity
Metallurgical Testing & Characterization
Materials Processing & Manufacturing
Failure Analysis & Quality Systems
Extractive & Process Metallurgy
Advanced Materials Technology
Other

Mineral Resources Technology

Mineral Exploration & Geoscience
Mining Operations & Development
Hydrogeology & Environmental Resources
Resource Evaluation & Mineral Deposits
Surveying & Spatial Technologies
Other

Naval Architecture Technology

Vessel Design & Naval Architecture
Marine Structural Systems
Ship Construction & Refit
Marine Inspection & Survey
Marine Outfit & Equipment Systems
Other

Petroleum & Gas Engineering Technology

Drilling & Well Construction
Reservoir & Subsurface
Production & Well Operations
Surface Facilities & Pipeline Systems
Field Operations & Maintenance
Project Management & Delivery
Other

Survey / Geomatics Technology

Land & Engineering Surveying
Geospatial Data Acquisition
GIS & Spatial Data Management
Mapping & Geospatial Products
Remote Sensing & Photogrammetry
Geodetic & Control Survey Systems
Survey Project Coordination
Other

Practice Specialties

Specialties represent more focused areas of professional practice within an Area of Practice. They reflect particular technical applications, industry sectors, or subject matter expertise that may be found within a broader field of practice.

The specialties shown below are intended to provide examples of the specialized fields in which registrants may practise within a given Area of Practice. They are not intended to be exhaustive or comprehensive; rather, they represent a sampling of the diverse technical specializations that exist within the profession. (Disciplines listed in BLUE) The following sections are organized by discipline of registration and identify example Areas of Practice and specialties associated with each discipline.

Architecture & Building Construction

Practice Areas	Specialties	
Architectural Design & Documentation	· Architectural Design (Residential & Light Commercial) · Construction Documentation & Detailing	· Building Information Modelling (BIM) · Code Analysis (Building Code Compliance)
Building Science & Performance	· Building Envelope Consulting · Indoor Environmental Quality (IEQ) · Energy Modelling & Energy Consulting	· Building Materials & Performance Testing · Sustainable Design (LEED / Net-Zero)
Building Systems Coordination	· Building Systems Coordination (Arch/Mech/Electrical)	· Fire Protection Systems Coordination · Building Automation Systems (BAS/BEMS)
Construction & Project Delivery	· Project Management (Construction) · Contract Administration	· Construction Inspection & Field Review (QA/QC)
Existing Buildings, Heritage & Retrofit	· Building Condition Assessment (BCA) · Renovation & Retrofit Design · Heritage Conservation & Adaptive Reuse	· Post-Occupancy Evaluation (POE) · Strata Depreciation / Reserve Fund Studies

Bioscience Technology

Practice Areas	Specialties	
Laboratory Bioscience	· Immunological & Microbiological Analysis · Advanced Laboratory Operations	· Analytical Laboratory Testing
Molecular Biotechnology	· Molecular Biology & Genomics · Genomic Sequencing & Analysis	· Cell Culture Technologies
Bioprocessing & Manufacturing	· Cell Culture & Bioprocessing · Bioreactor & Fermentation Systems · Biomanufacturing Operations	· Pharmaceutical Manufacturing Systems · Renewable Bioprocess Systems
Environmental Bioscience	· Aquatic Ecosystem Analysis · Pollution Monitoring & Control · Environmental Monitoring & Field Analysis	· Ecological Restoration & Monitoring · Bioremediation Systems · Sustainable Resource Management
Agricultural & Food Bioscience	· Agricultural Biotechnology · Food Processing Systems · Food Safety & Quality Systems	· Nutraceutical Manufacturing & Quality · Animal Care & Biosystems Support · Precision Agriculture & Agricultural Technology
Quality & Regulatory Systems	· Quality Control & Assurance Systems · GLP & GMP Compliance	· Biosafety & Laboratory Compliance · Animal Ethics & Care Compliance
Bioscience Instrumentation & Operations	· Laboratory Instrumentation & Calibration · Bioprocess Control Systems	· Laboratory & Process Equipment Operations · Laboratory Systems Maintenance
Synthetic Biology	· Genetic & Biological System Engineering · Synthetic DNA & Molecular Systems	· Engineered Cell & Microbial Systems · Synthetic Biology Laboratory & Production Systems

Biomedical Engineering Technology

Practice Areas	Specialties	
Clinical & Therapeutic Equipment Systems	· Bedside & Central Patient Monitoring Systems · Ventilation & Respiratory Support Systems · Anesthesia & Perioperative Systems	· Biopotential & Physiological Measurement Systems · Dialysis & Renal Therapy Systems · Infusion & Drug Delivery Systems
Diagnostic & Imaging Systems	· Radiographic & CT Imaging Systems · Magnetic Resonance Imaging (MRI) Systems · Nuclear Medicine & PET Systems	· Ultrasound Imaging Systems · Imaging Performance Verification & Calibration
Laboratory & Analytical Systems	· Clinical Chemistry & Hematology Systems · Molecular Diagnostics & Microbiology Systems · Laboratory Automation Systems	· Blood Gas & Critical Care Laboratory Systems · Point-of-Care Diagnostic Systems
Sterilization & Infection Control Systems	· Steam Sterilization Systems (Autoclaves) · Washer-Disinfector & Decontamination Systems	· Low-Temperature Sterilization Systems · Infection-Control Equipment & Biohazard Systems
Rehabilitation & Assistive Technologies	· Rehabilitation & Therapy Equipment · Assistive & Mobility Devices · Prosthetic Systems	· Orthotic Systems · Rehabilitation Robotics & Advanced Assistive Devices
Biomedical Systems Integration & Digital Health	· Medical Device Networking & Integration · Clinical Monitoring & Alarm Integration Systems · Device Data Integration & Interoperability	· Telehealth & Remote Monitoring Systems · Wearable & Home-Based Monitoring Devices
Biomedical Equipment Testing, Safety & Compliance	· Electrical Safety Testing · Performance Verification & Calibration · Preventive Maintenance Programs	· Acceptance Testing & Commissioning · Risk Management & Compliance Verification

Chemical Engineering Technology

Practice Areas	Specialties	
Process Design & Optimization	· Process Design Documentation · Process Simulation & Optimization · Process Equipment Selection & Specification	· Reactor & Reaction Systems · Batch & Continuous Processing · Process Hazard & Risk Analysis
Unit Operations & Process Systems	· Separation Process Systems · Membrane & Filtration Systems · Thermal Process Systems	· Fluid Flow Systems · Mass Transfer Operations · Heat Transfer & Separation Operations
Process Operations, Control & Automation	· Process Control Systems · Process Automation Systems · Industrial Process Monitoring	· Process Safety & Hazard Management · Process Data Acquisition & Monitoring · Process Data Analytics & SPC
Analytical & Laboratory Systems	· Instrumental Chemical Analysis · Wet Chemistry & Electrochemical Analysis · Laboratory QA/QC & Calibration	· Laboratory Data Management · Fuel & Petroleum Testing
Environmental & Sustainability Systems	· Industrial Water & Wastewater Treatment · Air Emissions & Pollution Control · Contaminated Site Remediation	· Environmental Compliance & Reporting · Carbon Capture & Emissions Reduction
Hydrocarbon & Energy Processing	· Petroleum Refining · Natural Gas Processing · Heavy Oil & Bitumen Processing	· Lubrication & Petroleum Product Testing · Hydrogen Processing Systems
Biotechnology & Bioprocessing	· Fermentation & Bioprocessing · Molecular Biotechnology Testing · Downstream Bioprocess Operations	· Food & Bioprocess Laboratory Analysis · Microbiological & Quality Testing
Chemical & Pharmaceutical Manufacturing	· Pharmaceutical Formulation & Sterile Processing · Advanced Drug Delivery Systems	· Pharmaceutical QA/QC · Chemical Manufacturing Operations
Materials & Corrosion Technology	· Metallurgical Testing & Analysis · Corrosion Monitoring & Mitigation · Composite Materials Technology	· Metallurgical Process Technology · Non-Destructive Testing

Civil Engineering Technology

Practice Areas	Specialties	
Structural Systems (Applied Civil)	· Structural Analysis & Design · Structural Drafting & Detailing · Structural Condition Assessment & Inspection · Seismic Assessment (Applied / Code-Based)	· Structural Rehabilitation & Retrofit · Structural Health Monitoring · Structural Design Coordination · Materials Testing & Quality Control (Civil Structures)
Geotechnical & Earth Systems	· Soil Mechanics & Classification · Rock Mechanics (Applied) · Geotechnical Site Investigations · Foundation Engineering · Slope Stability & Landslide Assessment	· Earthworks & Compaction Quality Control · Ground Improvement Techniques · Geohazard Identification & Assessment · Geotechnical Instrumentation & Monitoring · Groundwater & Dewatering Support
Hydraulic & Water Resources Infrastructure	· Open Channel & Drainage Design · Floodplain Mapping & Analysis · Culvert & Hydraulic Structure Assessment · Watershed & Catchment Analysis	· Erosion, Scour & Bank Stability · Hydraulic Infrastructure Rehabilitation · Flood Mitigation & Control Measures
Surveying & Geospatial Support (Civil-Limited)	· Engineering & Construction Surveys · Site Control & Construction Layout · Quantity & Volume Surveys	· Route & Alignment Surveys · Civil GIS & Spatial Data · As-Built, Verification & Record Surveys
Transportation Infrastructure	· Roadway & Highway Design · Pavement Design, Evaluation & Rehabilitation · Transportation Drainage Systems · Culverts, Retaining Walls & Appurtenances	· Earthworks for Transportation Corridors · Construction QA/QC for Transportation Works · Transportation Asset Condition Assessment
Environmental & Groundwater Systems (Civil Interface)	· Environmental Site Investigations (Civil-Driven) · Contaminated Soil & Groundwater Assessment · Remediation Support for Infrastructure Projects	· Monitoring Wells & Sampling Programs · Groundwater Flow & Dewatering Assessment · Environmental Compliance for Civil Works · Infrastructure-Related Environmental Monitoring
Municipal Infrastructure & Public Works	· Municipal Servicing & Subdivision Infrastructure · Water Distribution Systems · Sanitary Sewer Collection Systems · Stormwater Management Systems	· Municipal Infrastructure Assessment & Rehabilitation · Public Works Infrastructure · Municipal Construction Inspection & QA

Electrical Engineering Technology

Practice Areas	Specialties	
Building Electrical Systems	· Building Electrical Power Distribution Systems · Building Lighting Systems	· Emergency & Backup Power Systems · Electrical Integration of Life Safety Systems
Industrial Electrical Systems	· Industrial Electrical Power Distribution Systems · Industrial Power Quality & Correction Systems	· Industrial Motor Systems · Industrial Electrical Equipment Systems · Industrial Generation Electrical Systems
Power & Utility Electrical Systems	· High-Voltage Transmission Systems · Electrical Substation Systems · Utility Distribution Systems	· Utility Generation Electrical Systems · Utility Protection & Coordination Systems · Utility System Planning & Analysis
Industrial Control & Instrumentation Systems	· PLC & DCS Control Systems · HMI & SCADA Systems · Industrial Instrumentation & Process Measurement Systems	· Motor & Drive Control Systems · Industrial Communication Systems · Control System Integration · Robotic & Motion Control Systems
Electronics & Embedded Electrical Systems	· Embedded & Microcontroller Systems · Electronic Circuit Systems	· Power Electronic Systems · Printed Circuit Board (PCB) Systems
Renewable & Energy Integration Systems	· Solar PV Electrical Systems · Wind Electrical Systems · Energy Storage Systems · Microgrid Electrical Systems	· Renewable Interconnection & Protection Systems · Hydrogen & Fuel Cell Systems
Nuclear Technology	· Nuclear Instrumentation & Monitoring · Reactor Control & Protection Systems · Nuclear Electrical Power Systems	· Radiation Monitoring Instrumentation · Nuclear Safety & Support Systems

Electronic Engineering Technology

Practice Areas	Specialties	
Electronic Circuit & Hardware Systems	· Analog & Digital Circuit Design · PCB Design & Hardware Implementation	· Hardware Prototyping & Design Validation · Programmable Logic Systems (FPGA)
Power Electronics & Energy Systems	· Power Conversion Systems · Energy Storage & Battery Systems	· Backup & Continuity Power Systems · Renewable Energy Power Systems
Embedded & Microprocessor-Based Systems	· Microcontroller-Based Systems · Internet of Things (IoT) Device Development	· Firmware Development · Real-Time Operating Systems (RTOS) · Sensor Integration & Data Acquisition
Control, Automation & Mechatronic Systems	· Embedded Control Systems · Robotics & Motion Control Systems · Motor Control & Drive Systems (VFD)	· HMI & Supervisory Interface Systems · Sensor & Actuator Integration
Communication & Signal Systems	· Wireless Communication Systems · RF & Signal Engineering Systems · Satellite Communication Systems	· Fiber Optic Communication Systems · Network & Unified Communication Systems · Spectrum Management & Regulatory Systems
Electronic Systems Integration, Testing & Maintenance	· Functional & Performance Testing · Environmental & Stress Testing	· Compliance & Regulatory Testing · Test Equipment Calibration & Maintenance
Instrumentation & Measurement Systems	· Sensor Systems & Signal Acquisition · Data Acquisition Systems (DAQ) · Signal Conditioning & Processing	· Calibration & Measurement Accuracy Systems · Test & Measurement Instrumentation

Energy & Renewable Technology

Practice Areas	Specialties	
Renewable Energy Systems	· Geo-Exchange & Thermal Energy Systems · Biomass Combustion Technology · System Resource Assessment & Modeling	· Renewable Energy QA/QC & Commissioning · Life-Cycle Asset Management Technology
Solar Energy Systems	· Photovoltaic (PV) Array Design · Solar Inverter & Balance of System (BOS) · Photovoltaic Structural Layout	· Commercial Solar Field Surveying · PV Performance Diagnostics & Testing
Wind Energy Systems	· Wind Turbine Technology · Wind Resource Micro-Sitting & Telemetry · Turbine Electrical & Grid Interfacing	· Wind Infrastructure – Civil Support · Turbine Condition Monitoring and Monitoring Systems
Hydrogen & Fuel Cell Systems	· Electrolyzer Integration Technology · Fuel Cell Mechanical Power Assembly · Hydrogen Storage & Piping Systems	· H2 Process Instrumentation & Controls · Hazardous Area Classification & Safety Systems
Energy Storage Systems	· Battery Energy Storage Systems (BESS) · Battery Management Systems (BMS) · Thermal Management Systems Design	· ESS Power Conversion Systems (PCS) · Battery Lifecycle Health Analytics
Microgrid & Distributed Energy Systems	· Microgrid Controller Programming · Distributed Energy Resources Modeling · Protection & Coordination Technology	· Remote Systems · Smart Metering
Clean Energy Systems Integration	· Multi-Asset Power Plant Design · Substation & Grid Interconnection Technology · Power Quality Auditing & Diagnostics	· Energy Management Database Systems · SCADA & Energy Management Systems (EMS)

Environmental Engineering Technology

Practice Areas	Specialties	
Environmental Monitoring & Field Systems	· Environmental Sampling & Field Studies · Environmental Laboratory Analysis · GIS & Spatial Environmental Analysis	· Remote Sensing & Land Analysis · Environmental Monitoring Programs
Water & Hydrologic Systems	· Water Treatment Systems · Wastewater Treatment Systems · Stormwater Management · Water Quality Monitoring & Analysis	· Hydrology & Watershed Analysis · Hydrogeology & Groundwater Systems · Aquatic Systems Monitoring
Waste Management Systems	· Solid Waste Management · Hazardous Waste Management · Hazardous Materials Management	· Landfill & Waste Disposal Systems · Composting & Organic Waste Systems · Recycling & Resource Recovery Systems
Air Quality & Pollution Control	· Air Quality Monitoring · Industrial Emissions Monitoring · Air Pollution Control Systems	· Indoor Air Quality Assessment · Greenhouse Gas Monitoring & Mitigation
Environmental Management & Compliance	· Environmental Management Systems · Environmental Auditing & Compliance · Environmental Permitting	· Environmental Impact Assessment · Occupational Health, Safety & Emergency Management
Ecology & Restoration	· Wetlands & Riparian Systems · Habitat Assessment & Management · Ecosystem Monitoring	· Ecological Restoration · Biodiversity & Conservation Systems
Contaminated Sites & Remediation	· Environmental Site Assessment (ESA) · Soil & Groundwater Assessment · Soil & Groundwater Remediation · Site Assessment & Remediation Planning	· Remediation System Applications · Site Reclamation & Rehabilitation · Environmental Risk Assessment

Forest Engineering Technology

Practice Areas	Specialties
Forest Resources & Operations	· Harvesting Systems & Rigging Engineering Specialist · Heavy Industrial Logistics & Haul Optimization · Operations QA/QC & Site Conformance · Mechanical Site Prep Engineering Technology Specialist · Sort Yard Automation & Digital Assets
Forest Measurements & Inventory	· Spatial Biometrics & Statistical Sampling · Field Data Systems & Instrument Calibration · Digital Compilation Engine Systems · Volumetric Data Auditing & Systems QA · Long-Term Sample Plot Geomatics
Forest Ecology, Stewardship & Restoration	· Riparian Areas · Erosion & Settlement Control (ESC) · Environmental Instrumentation & Water QA Specialist
Forest Roads & Resource Infrastructure	· Geometric Road Design · Hydrologic Infrastructure & Drainage · Resource Crossing Structural Support Specialist · Geotechnical Aggregates & Quarrying Specialist · Access Deactivation & Terrain Stabilization
Wildfire & Forest Protection	· Fuel Management · Wildfire Telemetry & Weather Stations Specialists · Protection Infrastructure Layout · Post-Wildfire Geotechnical Hazards · Forest Health Spatial Vectors
Forest Geomatics & Spatial Technologies	· LIDAR & Remote Sensing Data Analysis · GIS Database Architecture & Modelling · High-Precision Field Geomatics · UAV Operations & Photogrammetry · Web Mapping & Mobile GPS Development

Industrial Engineering Technology

Practice Areas	Specialties	
Manufacturing & Production Systems	· Production Planning & Scheduling · Manufacturing Process Engineering	· Plant Layout & Facility Design · Lean Manufacturing & Continuous Improvement
Quality & Process Improvement	· Quality Assurance & Quality Control · Six Sigma & Continuous Improvement	· Process Analysis & Optimization · Statistical Process Control (SPC)
Operations & Supply Chain Systems	· Supply Chain & Logistics · Inventory & Materials Management	· Operations Management · Demand Planning & Forecasting
Industrial Automation & Systems Integration	· Manufacturing Automation (PLC / SCADA) · Robotics & Automated Systems	· Industrial Control Systems · Industrial Data Systems / IIoT
Work Design, Ergonomics & Human Factors	· Human Factors & Ergonomics · Work Measurement & Time Studies	· Workforce Planning & Productivity Analysis
Industrial Project & Operations Management	· Industrial Project Management · Cost Estimation & Economic Analysis	· Maintenance & Reliability Planning · Operations Improvement Projects
Business Systems & Industrial Analytics	· Operations Research & Optimization · Industrial Data Analytics	· Business Process Improvement · Simulation & Modelling

Information Technology

Practice Areas	Specialties	
Software Development & Application Systems	· Software Development · Web & Application Systems · Systems Analysis & Design	· Software Testing & QA · Systems Integration
Network & Infrastructure Systems	· Network Systems · Server & Operating Systems Administration · Cloud & Virtual Infrastructure	· Infrastructure Automation & DevOps · IT Infrastructure Operations · IoT & Connected Systems
Cybersecurity & Information Assurance	· Information Security Systems · Network Security	· Vulnerability Assessment & Security Testing · Security Risk & Compliance
Database & Data Management Systems	· Relational Database Systems · Database Administration	· Data Modeling & Architecture · Data Analytics & Reporting
Systems Administration & Technical Support	· Enterprise Systems Administration · Technical Support Operations · IT Service Management	· System Deployment & Configuration · Change & Release Management · Systems Automation & Scripting
Business & Enterprise Information Systems	· Enterprise Information Systems · Business Systems Analysis · ERP & Business Application Systems	· IT Project Coordination · Business Continuity & Disaster Planning

Instrumentation Engineering Technology

Practice Areas	Specialties	
Process Control & Industrial Automation	· Industrial Process Control · Process Loop Design & Tuning · Industrial Automation Systems	· Process Optimization & Advanced Control · Industrial Robotics & Embedded Control Systems
Instrumentation & Measurement Systems	· Process Instrumentation · Sensor & Measurement Systems · Calibration & Instrument Testing	· Control Valves & Final Control Elements · Smart Instrumentation Systems
PLC, DCS & Supervisory Systems	· PLC Systems · DCS & SCADA Systems	· Industrial Control Programming
Industrial Communications & Network Systems	· Industrial Communication Systems · Fieldbus & Industrial Network Systems	· Industrial Data Acquisition Systems
Analyzer & Process Analytical Systems	· Process Analyzer Systems · Combustion & Environmental Analyzer Systems	· Chromatography Systems · Analyzer Calibration & Sampling Systems
Electrical & Drive Systems	· Industrial Electrical Systems · Motor Control Systems	· Variable Frequency & Drive Systems
Safety & Reliability Systems	· Safety Instrumented Systems (SIS) · Hazard & Operability Analysis Support	· Functional Testing & Commissioning · Reliability & Quality Systems

Marine Engineering Technology

Practice Areas	Specialties
Marine Systems Engineering	· Ship Piping Systems · Propulsion & Auxiliary Systems · Marine Mechanical Systems · Fluid & Thermal Systems Analysis · Mechanical Ship Systems · HVAC & Piping Systems
Marine Electrical & Control Systems	· Ship Electrical Power Systems · Marine Control & Automation Systems · Electrical Ship Systems
Shipbuilding & Retrofit	· Ship Construction & Fabrication · Vessel Retrofit & Upgrades · Shipyard Production Coordination
Marine Technical Documentation	· Marine CAD Modelling & Drafting · Technical Specifications & Documentation
Marine Project Management	· Project Planning & Management · Cost Estimation & Scheduling · Construction Coordination & QA/QC

Mechanical Engineering Technology

Practice Areas	Specialties	
Building Mechanical Systems	· Plumbing & Drainage Systems (Building Scale) · Domestic Hot Water Systems · Building Mechanical Systems Coordination	· Mechanical Code Compliance (Building Systems) · Building Mechanical System Assessments · Mechanical Renovation & Retrofit
Thermal & HVAC Systems	· HVAC System Design · Heating & Cooling Plant Systems · Ventilation & Air Distribution Systems · Refrigeration Systems	· Thermal Load Calculations & Analysis · Building Automation Systems (BAS) · HVAC System Optimization · HVAC Performance Verification
Fluid & Piping Systems	· Process & Mechanical Piping Systems · Pumping Systems · Compressed Air & Gas Systems · Fluid System Analysis	· Pipe Stress & Flexibility Analysis · Mechanical Equipment & Valve Selection · Fluid System Integration · Fluid System Performance Assessment
Fire Protection Systems	· Fire Suppression Systems · Fire Pumps & Water-Based Fire Protection Systems · Fire Protection Code Compliance (Mechanical Scope)	· Fire Protection System Layout & Coordination · Fire Protection Testing & Verification · Fire Protection System Assessments · Fire Protection Controls Coordination (Mechanical)
Industrial Mechanical Systems & Machinery	· Rotating Equipment Systems · Process Machinery Systems · Mechanical Power Transmission Systems · Industrial Equipment Layout & Integration · Robotic & Automated Mechanical Systems · Industrial Mechanical Equipment Selection	· Machinery Installation & Alignment · Mechanical Guarding & Safety Systems · Industrial Mechanical System Assessments · Welding & Fabrication Systems · Welding Inspection & Quality
Energy & Power Systems	· Renewable Energy Systems (Mechanical) · Energy Storage Systems (Mechanical) · District Energy Systems (Mechanical) · Boilers & Steam Systems	· Mechanical Power Generation Equipment · Energy Recovery Systems · Thermal Energy Storage Systems · Wind Turbine Mechanical Systems
Materials Handling & Mechanical Equipment Systems	· Materials Handling Systems · Conveying Systems · Bulk Materials Handling Equipment · Mechanical Equipment Layout & Integration	· Mechanical Lifting & Hoisting Equipment · Packaging & Production Line Mechanical Systems

Metallurgical Engineering Technology

Practice Areas	Specialties
Corrosion & Asset Integrity	· Corrosion Testing · Corrosion Monitoring & Mitigation · Protective Coatings Systems · Asset Integrity Assessment · Materials Degradation Analysis
Metallurgical Testing & Characterization	· Metallurgical Testing · Metallographic Analysis · Mechanical Materials Testing · Materials Characterization · Laboratory Metallurgy
Materials Processing & Manufacturing	· Heat Treatment Processes · Welding Metallurgy · Metal Forming & Fabrication Processes · Metallurgical Manufacturing Operations · Process Quality Control
Failure Analysis & Quality Systems	· Failure Investigation · Root Cause Analysis · Metallurgical Inspection · Reliability Testing · Materials Performance Evaluation
Extractive & Process Metallurgy	· Mineral Processing · Hydrometallurgy · Pyrometallurgy · Metallurgical Refining Operations
Advanced Materials Technology	· Composite Materials Technology · Ceramics Technology · Specialty Alloy Systems

Mineral Resources Technology

Practice Areas	Specialties
Mineral Exploration & Geoscience	· Mineral Exploration · Geological Mapping & Interpretation · Geophysical Surveys · Mineralogy · Geochemical Exploration
Mining Operations & Development	· Drilling Operations · Blasting Operations · Mine Development · Mine Ventilation
Hydrogeology & Environmental Resources	· Hydrogeology · Soil & Groundwater Assessment · Contaminant Assessment & Monitoring · Mine Reclamation
Resource Evaluation & Mineral Deposits	· Mineral Deposit Evaluation · Resource Estimation · Orebody Modeling
Surveying & Spatial Technologies	· Mine Surveying · Hydrographic Surveying · GIS & Spatial Analysis

Naval Architecture Technology

Practice Areas	Specialties
Vessel Design & Naval Architecture	· Hull Design · Stability & Hydrostatics · Vessel Performance Analysis · Engineering Analysis (FEA, Weight & Stability)
Marine Structural Systems	· Structural Design · Structural Analysis · Ice-Class & Specialized Structures
Ship Construction & Refit	· Ship Construction · Vessel Modification & Refit · Production & Fabrication Planning
Marine Inspection & Survey	· Vessel Condition Assessment · Structural Damage Assessment · Regulatory & Classification Surveys · Refit & Repair Specifications
Marine Outfit & Equipment Systems	· Marine Equipment Selection · Mooring & Anchoring Systems · Cargo Handling Systems · Lifesaving & Safety Systems · Corrosion Protection & Coating Systems

Petroleum & Gas Engineering Technology

Practice Areas	Specialties	
Drilling & Well Construction	· Drilling Operations · Directional Drilling	· Drilling Fluids & Cementing · Well Completions & Intervention
Reservoir & Subsurface	· Reservoir Engineering · Formation Evaluation & Well Logging · Geological & Subsurface Data Analysis	· Geomechanics (Rock Mechanics) · Enhanced Oil Recovery (EOR)
Production & Well Operations	· Production Operations · Artificial Lift Systems	· Well Testing & Performance Analysis · Production Optimization
Surface Facilities & Pipeline Systems	· Surface Facilities Operations · Pipeline & Gathering Systems · Gas Processing & Treatment	· Compression Systems · Process Control & Instrumentation
Field Operations & Maintenance	· Field Operations · Equipment Maintenance & Reliability	· Asset Integrity & Inspection
Project Management & Delivery	· Project Management (Oil & Gas) · Cost Estimation & Economic Evaluation	· Environmental & Regulatory Compliance

Survey / Geomatics Technology

Practice Areas	Specialties
Land & Engineering Surveying	· Legal / Boundary Surveying · Construction & Engineering Surveying (layout, as-built) · Topographic Surveying · Hydrographic Surveying
Geospatial Data Acquisition	· GNSS / GPS Surveying · Terrestrial Surveying (Total Station, Leveling) · UAV / Drone Surveying · Terrestrial Laser Scanning (LiDAR)
GIS & Spatial Data Management	· Geographic Information Systems (GIS) · Spatial Data Management & Databases · Spatial Analysis & Modelling
Mapping & Geospatial Products	· Cartography · Digital Mapping & Plan Production · 3D Terrain Modelling
Remote Sensing & Photogrammetry	· Remote Sensing Analysis · Photogrammetry · Aerial Image Processing & Interpretation
Geodetic & Control Survey Systems	· Control Surveying · Geodetic Surveying · Coordinate Systems & Datum Transformation
Survey Project Coordination	· Survey Project Coordination · QA/QC & Data Validation · Survey Planning & Scheduling

Prospective Disciplines

Prospective Disciplines identify additional fields of applied science and engineering technology that ASTTBC is considering or developing for recognition as distinct Disciplines of Registration. The absence of a standalone Discipline of Registration does not mean that practice in these fields falls outside ASTTBC's current registration framework. Individuals whose education, experience, or professional practice is primarily associated with these fields may currently be assessed for registration under an existing ASTTBC discipline that appropriately aligns with their education, competencies, experience, and area of practice.

- Biotechnology
- Building Information Modeling Technology
- Computer Systems Technology
- Design and Drafting Technology
- Electro-Mechanical Engineering Technology
- Geotechnical Engineering Technology
- Hydrogen Technology
- Mechatronics Engineering Technology
- Power Systems Technology
- Renewable Resources Technology
- Welding Engineering Technology
- Wind Turbine Technology

Prospective Areas of Practice

The following Prospective Areas of Practice provide a high-level overview of the major fields of practice associated with each Prospective Discipline. They are intended to illustrate how practice within these fields may be organized and are not intended to be exhaustive.

Biotechnology

Laboratory Biotechnology
Cell & Molecular Biotechnology
Bioprocessing & Biotechnology Production
Quality & Regulatory Systems
Other

Building Information Modeling Technology

BIM Modelling & Documentation
BIM Coordination & Integration
BIM Information Management
BIM Project Delivery
Other

Computer Systems Technology

Computer Systems & Infrastructure
Network Systems
Systems Security & Data Protection
Systems Automation
Technical Systems Support
Other

Design and Drafting Technology

Engineering Design & Drafting
CAD & Technical Documentation
Technical Detailing & Drawing Coordination
Other

Electro-Mechanical Engineering Technology

Electromechanical Systems & Equipment
Industrial Control & Automation
Robotics & Automated Equipment
Electromechanical Maintenance & Reliability
Other

Geotechnical Engineering Technology

Geotechnical Investigation & Characterization
Soil, Rock & Materials Testing
Foundation & Earth Systems
Geotechnical Construction & Monitoring
Other

Hydrogen Technology

Hydrogen Production & Processing
Hydrogen Storage & Distribution
Hydrogen Energy & Fuel Systems
Hydrogen Applications & Infrastructure
Hydrogen Safety & Compliance
Other

Mechatronics Engineering Technology

Mechatronic Systems Design & Integration
Automation & Control Systems
Robotics & Autonomous Systems
Embedded, Intelligent & Connected Systems
Smart Manufacturing & System Optimization
Other

Power Systems Technology

Power Generation Systems
Power Transmission & Distribution

Power System Protection & Control
Power System Operations & Reliability
Electrical Power Equipment & Maintenance
Other

Renewable Resources Technology

Forest Management & Operations
Forest Health & Silviculture
Ecosystem & Land Resource Management
Wildlife & Fisheries Resource Management
Water & Watershed Resources
Parks & Recreational Land Management
Resource Inventory & Geospatial Systems
Other

Welding Engineering Technology

Welding Technology & Fabrication
Welding Inspection, Testing & Quality
Welding Metallurgy & Materials
Other

Wind Turbine Technology

Wind Turbine Systems & Installation
Wind Turbine Operations & Maintenance
Wind Turbine Electrical & Control Systems
Other

Prospective Practice Specialties

The following Prospective Practice Specialties identify more focused technical fields associated with each Prospective Area of Practice. They are illustrative and are intended to provide additional detail on the types of technical practice that may fall within each Prospective Discipline.

Biotechnology

Practice Areas	Specialties
Laboratory Biotechnology	· Biological & Biochemical Analysis · Microbiological Analysis · Laboratory Instrumentation & Equipment · Analytical Testing
Cell & Molecular Biotechnology	· Cell Culture · Molecular Biology & Genomics · DNA Analysis & Molecular Techniques
Bioprocessing & Biotechnology Production	· Fermentation & Bioprocessing · Biotechnology Production & Manufacturing
Quality & Regulatory Systems	· Biotechnology QA/QC · Laboratory Compliance & GLP · Scientific Data & Documentation

Building Information Modeling Technology

Practice Areas	Specialties
BIM Modelling & Documentation	· BIM Model Development · Digital Design & Documentation · Model Quality & Validation
BIM Coordination & Integration	· Multidisciplinary Model Coordination · Clash Detection & Coordination · Model Federation & Systems Integration
BIM Information Management	· BIM Data & Information Management · Common Data Environment (CDE) · Data Exchange & Interoperability
BIM Project Delivery	· BIM Execution Planning · BIM Standards & Implementation · As-Built & Asset Information Models

Computer Systems Technology

Practice Areas	Specialties
Computer Systems & Infrastructure	· Computer Hardware & Systems · Operating Systems & Administration · Systems Installation & Configuration · Data Storage & Recovery
Network Systems	· Network Implementation & Administration · Network Infrastructure & Connectivity · Network Monitoring & Troubleshooting · Remote & Wireless Systems
Systems Security & Data Protection	· Systems & Network Security · Security Monitoring & Threat Protection · Access & Information Protection · Backup & Recovery
Systems Automation	· Systems Scripting & Automation · Software Deployment & Migration
Technical Systems Support	· Systems Diagnostics & Troubleshooting · Client Technical Support · Systems Maintenance & Configuration

Design and Drafting Technology

Practice Areas	Specialties
Engineering Design & Drafting	· Civil & Structural Drafting · Mechanical & Industrial Drafting · Electrical & Electronic Drafting · Architectural & Building Drafting
CAD & Technical Documentation	· Computer-Aided Design & Drafting (CADD) · Engineering Drawings & Plans · Design Documentation & Drawing Sets · Drawing Verification & Quality Control
Technical Detailing & Drawing Coordination	· Structural & Fabrication Detailing · Technical Layouts & Schematics · Multidisciplinary Drawing Coordination

Electro-Mechanical Engineering Technology

Practice Areas	Specialties
Electromechanical Systems & Equipment	· Electrical, Electronic & Mechanical Systems · Motors, Drives & Power Transmission · Fluid Power Systems
Industrial Control & Automation	· PLC & Industrial Controls · Sensors & Instrumentation · Motor & Motion Control · Industrial Automation Systems · Machinery & Controls Integration
Robotics & Automated Equipment	· Industrial Robotics · Automated Manufacturing Equipment · Robotic System Integration · Computer-Integrated Manufacturing Systems
Electromechanical Maintenance & Reliability	· Equipment Testing & Troubleshooting · Installation & Commissioning · Preventive & Predictive Maintenance · Equipment Repair & Modification

Geotechnical Engineering Technology

Practice Areas	Specialties
Geotechnical Investigation & Characterization	· Site & Subsurface Investigation · Soil & Rock Characterization · Field Sampling & Testing
Soil, Rock & Materials Testing	· Soil Laboratory Testing · Rock & Aggregate Testing · Compaction & Density Testing
Foundation & Earth Systems	· Foundation Systems · Slopes & Earthworks · Retaining & Earth-Retention Systems · Ground Improvement
Geotechnical Construction & Monitoring	· Geotechnical Construction Inspection · Field Instrumentation & Monitoring · Excavation & Earthwork Monitoring · Construction Quality Testing

Hydrogen Technology

Practice Areas	Specialties
Hydrogen Production & Processing	· Water Electrolysis · Hydrogen Production Processes · Hydrogen Purification & Processing
Hydrogen Storage & Distribution	· Hydrogen Storage Systems · Hydrogen Compression & Handling · Hydrogen Distribution & Delivery Systems
Hydrogen Energy & Fuel Systems	· Fuel Cell Systems · Hydrogen Power Generation · Hydrogen Combustion & Blending
Hydrogen Applications & Infrastructure	· Hydrogen Refueling Systems · Transportation Applications · Industrial Hydrogen Systems · Hydrogen Infrastructure Integration
Hydrogen Safety & Compliance	· Hydrogen Detection & Safety Systems · Pressure & Leak Testing · Codes, Standards & Compliance · System Inspection & Commissioning

Mechatronics Engineering Technology

Practice Areas	Specialties
Mechatronic Systems Design & Integration	· Mechanical & Electromechanical System Design · Electrical & Electronic Systems Integration · Sensors, Actuators & Motion Systems · Power Electronics & Drives
Automation & Control Systems	· PLC, HMI & Industrial Controls · SCADA & DCS Systems · Control System Design & Tuning · Industrial Instrumentation & Networks
Robotics & Autonomous Systems	· Industrial Robotics · Robotic Systems Integration · Robot Programming & Motion Control · Collaborative & Automated Robotic Systems
Embedded, Intelligent & Connected Systems	· Embedded Systems & Controllers · Industrial IoT & Connected Systems · Intelligent Automation & AI Applications · Real-Time Monitoring & Control
Smart Manufacturing & System Optimization	· Smart Factory & Digital Manufacturing Systems · Digital Twins & Simulation · Production Automation & Optimization · System Testing, Commissioning & Reliability

Power Systems Technology

Practice Areas	Specialties
Power Generation Systems	· Electrical Generation Systems · Generators & Rotating Electrical Machines · Generation Controls & Synchronization
Power Transmission & Distribution	· Transmission & Sub-Transmission Systems · Distribution Systems · Substations & Electrical Equipment · System Planning & Upgrades
Power System Protection & Control	· Protective Relays & Protection Schemes · SCADA & Supervisory Control Systems · Automated Protection & Control · Metering & Instrumentation
Power System Operations & Reliability	· Power System Operations & Switching · System Monitoring & Contingency Analysis · Grid Reliability & NERC Standards · Emergency Operations & System Restoration · Load, Voltage & Reactive Power Management
Electrical Power Equipment & Maintenance	· Electrical Equipment Testing & Troubleshooting · Equipment Commissioning · Electrical Equipment Maintenance

Renewable Resources Technology

Practice Areas	Specialties
Forest Management & Operations	· Forest Inventory & Mensuration · Forest Operations & Harvest Planning · Forest Roads & Transportation Systems · Sustainable Forest Management
Forest Health & Silviculture	· Silviculture & Forest Regeneration · Forest Health & Pest Management · Wildfire & Fuel Management · Stand Management
Ecosystem & Land Resource Management	· Ecosystem Classification & Assessment · Ecosystem Restoration · Land & Resource Planning · Range Management
Wildlife & Fisheries Resource Management	· Wildlife Resource Management · Wildlife Habitat Assessment & Monitoring · Fisheries & Aquatic Resource Management · Aquatic Habitat Assessment & Monitoring
Water & Watershed Resources	· Forest Hydrology · Watershed Assessment & Management · Stream & Drainage Assessment · Flood & Hydrologic Analysis
Parks & Recreational Land Management	· Park & Protected Area Management · Recreational Land Management · Visitor & Public Access Management · Recreation Hazard Assessment
Resource Inventory & Geospatial Systems	· Resource Surveys & Field Data Collection · GIS & Resource Mapping · GPS & Geospatial Data · Resource Monitoring & Analysis

Welding Engineering Technology

Practice Areas	Specialties
Welding Technology & Fabrication	· Welding Processes & Equipment · Welding Procedure Development & Qualification · Welded Fabrication & Joint Design · Automated & Robotic Welding
Welding Inspection, Testing & Quality	· Welding Inspection · Non-Destructive Testing (NDT) · Weld Testing & Quality Assurance · Welding Codes & Standards
Welding Metallurgy & Materials	· Welding Metallurgy · Material Weldability · Heat Treatment & Thermal Effects · Weld Failure & Defect Analysis

Wind Turbine Technology

Practice Areas	Specialties
Wind Turbine Systems & Installation	· Wind Turbine Mechanical Systems · Turbine Assembly & Installation · Drivetrain, Rotor & Blade Systems
Wind Turbine Operations & Maintenance	· Turbine Inspection & Preventive Maintenance · Mechanical & Hydraulic System Maintenance · Fault Diagnosis & Troubleshooting · Turbine Repair & Component Replacement
Wind Turbine Electrical & Control Systems	· Electrical Generation & Power Systems · Turbine Control & Monitoring Systems · Sensors, Instrumentation & PLC Systems · Electrical Testing & Troubleshooting

Questions or feedback

ASTTBC recognizes that professional practice continues to evolve and that new Areas of Practice and specialties may emerge over time. Feedback on this document, including suggestions for additional Areas of Practice or specialties, may be submitted to ASTTBC for consideration in future reviews and updates.

Questions regarding this document may be directed to ASTTBC at practiceinfo@asttbc.org.