COMPETENCY ASSESSMENT

APEGS Test: Competency Report

Name APEGS Test

Discipline of Application

Jurisdiction

EDUCATION

Institution	Degree	Discipline	Location	Date

COMPETENCY SUMMARY

Category	Applicant	Required
Technical Competence	3.2	3
Communication	3.0	3
Project and Financial Management	3.0	2
Team Effectiveness	3.5	3
Professional Accountability	3.0	3
Social, Economic, Environmental and Sustainability	3.2	2
Personal Continuing Professional Development	3.0	3

EMPLOYMENT HISTORY

	Employe	Positio	Superviso	Locatio	Date
1	Employer Three				
2	Employer Two				
3	Employer One				

Period 1

Employer:
Position:
Supervisor:
Location:
Date

Major Responsibilities and Projects:

-

Period

Employer:
Position:
Supervisor
: Location:
Date

Major Responsibilities and Projects:

Period

Employer:
Position:
Supervisor
: Location:
Date

Major Responsibilities and Projects:

COMPETENCY ASSESSMENT				
Competency Category 1: Technical Competence				**Required Average Level: 3**
1.1 Regulations, Codes & Standards: Demonstrate knowledge of regulations, codes, standards, and safety - this includes local engineering procedures and practices as applicable.				
Employer	**Position**	**Validator**	**Date**	**Canadian Environment?**
Thabat Construction Co.	Sr. Mechanical Engineer			

Situation

During the mechanical design review, shop drawing preparation, and installation of HVAC, plumbing and firefighting systems, I applied industry-leading standards and regulations, including SMC, SBC, ASHRAE, NFPA, and ASME, which enabled me to uphold safety and quality in projects.

Action

- I ensured compliance with local authorities and international standards while performing building cooling and heating load calculation, equipment selections, ductwork design, and ventilation rates like ASHRAE 90 and 62.1.
- For fire protection systems, I followed standards like NFPA 13 & 14 for sprinkler design, NFPA 20 for pump head calculations, and NFPA 2001 for NOVEC system design.
- For plumbing calculations, I adhered to codes like IPC, UPC, and Saudi Mechanical Codes.
- I upheld energy efficiency standards through compliance with the Saudi Building Energy Efficiency Code (SBEEC), ASHRAE, and LEED- USGBC.
- I ensured that the design and installation of process piping and selection of materials followed the guidelines provided by ASTM and ASME standards.
- In the design process, I created detailed shop drawings using AutoCAD Revit and coordinated with other disciplines to maintain clearance.
- If any design changes are necessary, I raised technical queries to ensure code compliance. During construction, I implement the approved design and shop drawings, following local authority regulations and international standards.
- I ensured OSHA and NEBOSH are strictly implemented on-site

Outcome

By following international codes, standards, and local regulations, I reviewed the design, completed shop drawings, and prioritized efficient, safe, and sustainable operations

1.1 Competency Level

1.2 Project & Design Constraints: Demonstrate knowledge of materials, or operations as appropriate, project and design constraints, design to best fit the purpose or service intended and address inter-disciplinary impacts.

Employer	Position	Validator	Date	Canadian Environment?

Situation

I played a crucial role in the procurement process by reviewing material and drawing submittals. I also prepared cost estimates and budgets. Once approved by the client and consultant, I ensured timely procurement to align with the project schedule and cost constraints at Dar Al Arabia and Thabat Contracting Co.

Action

When it comes to materials selection, I thoroughly evaluated various factors such as mechanical properties, strength, corrosion resistance, compatibility, and cost. By considering project-specific criteria like environmental conditions, load-bearing capacity, and system longevity, I choose the most suitable materials.
I developed cost-effective solutions without compromising quality by considering short-term and long-term expenses related to material selection, system installation, energy efficiency, maintenance, and operation.
I optimized use of available labor resources by considering the complexity of mechanical systems, the availability of skilled workers, and the project timeline. This ensures efficient implementation, operation, and maintenance.
I designed mechanical systems that align with the project schedule and coordinated with other engineering disciplines, contractors, and suppliers to ensure timely material delivery and seamless integration by employing Building Information Modeling (BIM) and digital building tools.
I collaborated closely with project managers and cost estimators to develop accurate cost projections, monitor project costs, and explore cost-saving options

Outcome

By following all project constraints, I ensured that the mechanical systems were well-designed, cost-effective, and seamlessly integrated, meeting the project's budget, timeline, and quality requirements.

1.2 Competency Level

Applicant: 3

1.3 Risk Identification & Mitigation: Analyze technical risks and offer solutions to mitigate the risks.

Employer	Position	Validator	Date	Canadian Environment?
Riyadh Airport Co.	Sr. Mechanical Engineer			No

Situation

I encountered a technical risk while managing a project in Terminal 5 of Riyadh Airport, specifically related to the operation of the chiller pump. The pump experienced cavitation due to lack of periodic maintenance, which posed a significant hazard to the project's success.

Action

- The impact of the technical risk on the project was substantial. Cavitation in the pump could lead to system outages, decreased productivity, and potential delays in project completion. It could also affect the overall functionality of the building, cause malfunctioning of the mechanical system, increase energy usage, and create discomfort for occupants. To address these potential consequences, I employed various strategies.
- I focused on proper pump selection, ensuring that the pump chosen was appropriate for the application and maintained a positive margin of net positive suction head (NPSH) above the required level to prevent cavitation.
- I developed contingency planning, developing backup plans to minimize downtime and maintaining strong relationships with suppliers for efficient equipment replacement.
- I followed manufacturer guidelines and relevant international standards, considering factors such as pump location, suction pipe length and diameter, vertical distance (suction head), and minimizing friction losses to ensure proper installation of new equipment
- I did regular pump maintenance by checking filters and strainers, assessing the entire pump system design, monitoring pressure differentials, and inspecting pipes for any signs of cracks or damage.
- Furthermore, I implemented comprehensive quality control and testing procedures throughout the project, including factory acceptance testing for equipment, on-site testing and commissioning, and performance verification

Outcome

After proper maintenance, the pump stopped experiencing cavitation and became operational again.

1.3 Competency Level

Applicant: 3

1.4 Application of Theory: Apply engineering knowledge to design solutions.

Employer	Position	Validator	Date	Canadian Environment?
				No

Situation

While reviewing the design of a potable water pipe system for the Driyiah Gate, I identified technical issues related to changes in pipe sizes from 450mm Dia to 100mm and pressure class from PN 20 to PN16. The designed pipe size and pressure classification of pipes which, posing risks of high pressure, increased energy consumption, and potential pipe failure.

Action

- I thoroughly assessed the project's design requirements, including relevant regulations and standards such as the Saudi Building Code and Saudi Plumbing Code to identify recommended pressure classification for potable water pipes.
- Using Water CAD and Bentley software, I conducted hydraulic calculations considering system demand, pressure requirements to identify the requirement of PRV when the pressure is reducing from PN20 to PN16
- There was missing Pressure regulating valve on the drawing which
- Ensuring the modified pipe diameter fit within the available space, I accounted for clearance requirements, building structures, and route restrictions
- I updated system layout to incorporate the adjusted pipe sizes, ensuring the required drainage slope, and considering fittings, valves, and compliance with codes and regulations.
- I verified the system's performance by conducting further hydraulic calculations, including pressure drop calculations to ensure adequate pressure and flow throughout the network

Outcome

After diagnosing the issues related to velocity, pipe size, and friction loss, I rectified them and documented the changes in the project case study register. By addressing these factors, the overall performance and efficiency of the potable water pipe system were significantly improved

1.4 Competency Level

Applicant: 4

1.5 Solution Techniques: Be able to understand solution techniques and independently verify the results.

Employer	Position	Validator	Date	Canadian Environment?
				No

Situation

I reviewed the design requirements and discovered that the designed pipe size of 450mm dia PN 20 with an operation pressure of 17 Bar to 100mm dia PN16 with an operation pressure of 14 Bar in the potable water pipe system which further may disrupt the pipe upon operation and not maintain minimum velocity as per regulation to be 2.5m/s.

Action

- As a project management consultant responsible for reviewing the calculation and ensuring its accuracy, I found that the design was completed using the latest software, such as Water CAD Bentley. To perform the hydraulic calculation, I inputted the system demand, required pressure, and available supply, taking into account various factors like projected future growth, pressure losses, and peak demand. The result of this thorough analysis was more precise calculations that confirmed the need for an increase in pipe size to achieve the required velocity, as well as the addition of a pressure-regulating valve.
- Upon utilizing the software, it became evident that the estimated velocity exceeded the recommended limits. To address this issue, my focus shifted to reducing the pipe size while still meeting the system requirements. At the same time, I widened the pipe to slow down the flow and reduce friction losses. Recalculations were carried out for flow rate and pressure drop, this time taking the adjusted pipe size into account, ensuring they aligned with the design specifications. Additionally, a pressure-regulating valve (PRV) was introduced to maintain velocity below 2.5m/s while minimizing pressure.
- Throughout the process, I used my expertise by considering any space or physical restrictions that could impact the revised pipe sizing. I carefully evaluated factors like clearance requirements, and route restrictions by using BIM as a new PRV was added and reviewed the clash detection to ensure no clashes, etc. to ensure the modified pipe diameter would fit seamlessly into the system.

Outcome

Using engineering principles, I was able to address the inaccuracies in the initial results and provide an optimized design for the potable water pipe system along with additional PRV where required by using BIM Clash detection.

1.5 Competency Level

Applicant: 4

Commented [hm1]: In this section, I rewrite the previous example to show your computer knowledge to identify a technical issue. If you another example, then please send out to me specifically focusing on your engineering knowledge to analyse or verify the calculations results using a software and then independently verify the issues existed and then doing recalculations to overcome the problem: Please focus on the following key elements for providing the example from your project experience:

Demonstrate an understanding of the engineering principles used in the application of computer design programs and show/describe how the results were verified as correct.
Participate in an independent review and verification of solution techniques or analysis methods.

1.6 Safety Awareness: Safety awareness: be aware of safety risks inherent in the design; and Demonstrate Safety Awareness - on-site and possible safety authorization/certificate as appropriate.

Employer	Position	Validator	Date	Canadian Environment?
				No

Situation

I ensured adherence to relevant international safety standards such as NEBOSH and OSHA on-site. In collaboration with HSE Engineers or Managers, I prepare and review the HSE Plan, aligning it with local authorities, regulations, company policies, and codes

Action

- I was responsible for preparing and reviewing the HSE (Health, Safety, and Environment) plan in collaboration with the HSE Engineer or Manager. This plan needed to align with local authorities, regulations, company policies, and codes.
- To ensure safety on-site, I conducted regular site safety inspections to identify potential hazards and assess safety risks. These inspections involved mechanical experts to specifically address mechanical-related safety issues.
- I also contributed to the creation and enforcement of safety policies and procedures for construction projects. These policies outlined expectations and rules for safe work practices, and I ensured that all employees on the site were informed and adhered to these rules.
- I initiated Safety training programs tailored to the specific tasks and equipment used in mechanical construction activities.
- I handled hazardous materials properly, ensuring proper storage, labeling, and disposal according to guidelines. I conducted regular inspections, risk assessment, and maintenance checks on mechanical equipment, verifying their safe and correct operation.

Outcome

By implementing these safety measures and practices, I ensured a safe working environment for all personnel involved in mechanical construction activities, promoting the well-being of workers and minimizing the potential for accidents or harm

1.6 Competency Level

Applicant: 4

1.7 Systems & Their Components: Demonstrate an understanding of systems as well as of components of systems.

Employer	Position	Validator	Date	Canadian Environment?
				No

Situation

I was responsible for the installation of HVAC and firefighting systems during the Thuwal Town Development.

Action

- I understood the design criteria and data to install the system and I reviewed the Heat Load Calculation considering building requirements and size along with civil, electrical and structural details.
- Next, for duct sizing, I reviewed the project specifications and equipment schedule on the drawings and design data provided for the proper selection of the AHUs, ACCU's.
- I procured vibration isolators was calculated considering the weight of the AHU and ACCU, RPM and location.
- After, I did installation of the concrete pad based on the project design requirement of Civil and Structural Load.
- I made connection between ACCU and AHU using Copper pipe "k type" with welded fittings and applied pressure test on it along with installation of Rubber insulation for the Indoor area and Aluminium cladding for the Outdoor area.
- Then, I performed indoor and outdoor supply duct installation.
- I performed installation of volume control dampers to regulate the required CFM on the diffuser, volume with damper operator attached to assembly allowing flow range modulation from 100 percent of design airflow to 25 percent nominal airflow.
- I installed Sound attenuators for noise reduction and performed smoke or pneumatic pressure test on the duct as per SMACNA standards with proper sealing of joints and its insulation. Installation of flexible connected at supply and return of AHU
- I performed testing and balancing to get the required CFM (Flow) and velocity as per the design calculation.
- I installed Exhaust fans as per ASHRAE 60.2 indoor air quality standards and project specifications.
- I integrated Building Management System with AHUs, VAVs, and motorized control damper to control the equipment and its accessories

Outcome

My knowledge and experience in HVAC design and installation, along with a deep understanding of the system's parts, helped me install an advanced HVAC system that perfectly met the client's requirements while following industry standards and environment regulations.

1.7 Competency Level

Applicant: 3

1.8 Project & Process Lifecycle: Exposure to all stages of the process/project life cycle from concept and feasibility analysis through implementation.

Employer	Position	Validator	Date	Canadian Environment?
				No

Situation

As a construction manager working for the renowned company WSP as a Project Management Consultant on the Diriyah Gate Development Authority - Wadi Safar Infrastructure project, I am responsible for overseeing the project from its initiation stage to its closeout

Action

- I was involved in the initial conceptualization and approval of the project by identifying stakeholders, performing feasibility studies, developing the project charter, and obtaining authorization to start the project and I participated in tender process i.e. design, submission and review
- I lead planning activities by creating a comprehensive project management plan after obtaining a comprehensive understanding of all phases of engineering construction related to MEP, Civil, Architectural, and Structural disciplines, work breakdown structure (WBS), allocation of project activities, financial planning by estimating resources, defining project budgets, and identifying risks and mitigation strategies.
- I prepared all the plumbing and firefighting systems drawings, floor plan layout, isometric and section/elevation layouts and coordinated with the design team to discuss the submitted drawings and then I did corrections as per comments. I also attended meetings to do initial design planning of the HVAC system, plumbing, irrigation system, utilities development, etc. as per design requirements.
- I supervised the design and installation work according to the shop and engineering drawings to ensure that the drawings accurately represent the design intent and adhered to the project's specifications and standards.
- I monitored the progress of the projects against the developed plan and coordinated with the sub-contractors for work quality assurance and developed necessary technical documents.

Outcome

Through proper planning and monitoring, all work was executed and completed in accordance with the clients' requirements, schedule, and project design and specifications

1.8 Competency Level

Applicant: 3

1.9 Quality Control: Understand the concept of quality control during design and construction including independent design checks and independent reviews of design, field checks, and reviews.

Employer	Position	Validator	Date	Canadian Environment?
				No

Situation

During the KAUST Research Park Administration Building project, I implemented quality control and management plans while selecting equipment for HVAC and plumbing installation, etc. to mitigate potential high-risk situations that could impact the project.

Action

- While sectioning equipment for HVAC designing, I carefully evaluated the factors, such as, HVAC load, space availability, noise level, and the cost. Then, I assessed both short-term and long-term expenses associated with material choices, system installation, energy efficiency & consumption, maintenance, and operation and I planned affordable solutions without compromising execution quality.
- I implemented comprehensive quality processes by conducting factory acceptance testing (FAT) for equipment, performing on-site testing and commissioning, and verifying the performance of mechanical systems. I supervised regular pump maintenance activities, such as checking filters and strainers, assessing the entire pump system design, evaluating the pump curve, monitoring pressure differentials, and inspecting pipes for cracks, which are crucial for extending the pump's life and optimizing its performance.
- I performed thorough checks of the shop drawings and I generated monthly reports that provide insights on the approval and rejection percentages for shop drawings, design calculations, work inspection requests, method statements, material submittals, and material testing. These reports weres submitted to the project consultant for external review and also shared internally with the project management team for further actions and information

Outcome

By conducting internal audits, testing, checking shop drawings, and closely monitoring documentation, I maintained a strong focus on quality assurance throughout the project and I minimized errors, reduced rework, and enhanced the overall quality of the project.

1.9 Competency Level

Applicant: 3

1.10: Engineering Documentation: Transferring design intentions to drawings and sketches

Employer	Position	Validator	Date	Canadian Environment?

Situation

While reviewing the design of the Fire sprinkler system for a new building, I identified corrections in the layout drawings with additional sprinklers to meet NFPA 13 requirements. To address these issues, I developed a comprehensive design document with accurate drawings reflecting the necessary modifications for optimal functionality

Action

- During my review process, I identified an issue with additional sprinklers as per NFPA 13 inside the toilet as the area was above 5.1m2 and need sprinklers to be added to comply with the fire safety code and local standard
- I performed hydraulic calculations using Elite Fire software as the additional sprinkler needed to be installed was the furthest end of the sprinkler and also reconfirmed by using the pipe schedule method.
- I collaborated with the Draftsperson to redesign the sprinklers with additions in the toilet and corridor area near it by considering the standard distance of ordinary hazard area as per NFPA standards
- Then, I developed a new layout of the fire protection system in AutoCAD and updated the design document. I submitted updated drawings with new dimensions and documents to the project manager and senior design team for review.
- Further, as per regulation we need a NFPA Certified Engineer or a professional engineer to certify the drawing to meet the local authority requirement

Outcome

I prepared the finalized design drawings considering design requirements which helped me to avoid errors during the designing and implementation phase of the system. These drawings were accepted by the NFPA Certified Engineer and submitted to Local Fire Authority and obtained final approval.

2.1 Competency Level

2.1 Communication: Oral

Employer	Position	Validator	Date	Canadian Environment?

Situation

Being a senior mechanical engineer and manager, I excel in effectively communicating official project data with team members, clients, and contractors through regular meetings and coordination efforts.

Action

- I attended preliminary technical meetings to discuss the proposed design work and their implementation strategies. Moreover, I was actively involved in design review meetings to thoroughly discuss and analyze the discrepancies between software and manual calculations. Together with the design team, I proposed adjustments to the layout and dimensions that would align with the project specifications and then I sketched revised drawings and documented all the necessary changes.
- During the initial phase, I have experience of coordinating a workforce team of 10+ subcontractors, allocating budgets, and conducting analysis to ensure efficient project execution.
- I organized regular meetings with the design team, project managers, consultants, and contractors involved in the Sewage Network Phase II projects to discuss the progress, challenges, and gave presentations to explain the design modifications required to achieve optimal system performance and meet the specific project requirements.
- I attended meetings with the subcontractors to address any questions and I provided technical guidance and support to the subcontractors throughout the installation process.
- I attended regular meetings with other departments involved in the project, such as electrical and structural engineering teams for consulting issues associated with a project.

Outcome

Through these meetings, I facilitated effective coordination and communication, ensuring that all aspects of the construction project aligned seamlessly

2.2 Competency Level

Applicant: 3

2.2 Communication: In writing

Employer	Position	Validator	Date	Canadian Environment?

Situation

I was responsible for developing design review and modification documents to explain the new developments in the design process. Furthermore, I reviewed and managed all the project documents

Action

I prepared and reviewed technical documents related to engineering designs, specifications, and calculations. After reviewing the details, I submitted detailed feedback so that required modifications can be done on the mechanical design work to avoid issues.
I prepared contract agreements, work orders, or scope of work documents, that outline the specific responsibilities, deliverables, timelines, and terms and conditions for the contractors involved in a project to ensure that all parties involved understand and fulfill their contractual obligations.
While developing calculation sheets and design documents, I added mechanical layout diagrams and equipment installation drawings so that the project manager can review my calculations with respect to the drawings to avoid errors.
I also managed various types of documents such as design drawings, technical reports, correspondence, and project schedules to ensure that these documents are organized, up-to-date, and readily accessible to the project team, stakeholders, and regulatory authorities as needed.
I maintain a comprehensive and accurate record of the project's progress, ensuring transparency and facilitating effective communication among team members and relevant parties.

Outcome

Through proper documentation and review of design work, I ensured the flow of information from one department to another along with management of the technical details which would be used for future project work.

2.2 Competency Level

Applicant: 3

2.3 Reading & Comprehension: Reading and Comprehension.

Employer	Position	Validator	Date	Canadian Environment?

Situation

I thoroughly reviewed technical documents and drawings related to engineering designs, specifications, reports, and calculations. Also, I studied contract documents provided by the contract document.

Action

I studied the contract terms, specifications, and legal requirements related to installation of irrigation systems, plumbing, HVAC, and firefighting systems. By reviewing and signing off on contracts, I ensured compliance with contractual obligations and promote successful project execution
After reviewing, I identified the key points that are essential for decision-making, problem-solving, and then I communicated with team members and stakeholders.
I coordinated with the utility design team to review utilities design by studying the details, such as dimensions, specifications, and layout, to comprehend the proposed design intent. I also analyzed the calculations to ensure their alignment with the design drawings and project specifications. Furthermore, I cross-referenced the design drawings with the calculations to verify their accuracy and consistency and then I provided suggestions for improvement.

Outcome

By utilizing my reading skills, I accurately interpreted the technical information presented in the design documents and I timely identified discrepancies and potential issues that may impact the performance or efficiency of the systems

2.3 Competency Level

Applicant: 3

3.1: Awareness of project management principles

Employer	Position	Validator	Date	Canadian Environment?

Situation

I was responsible to deliver shop drawings by changing from BIM LOD 300 to BIM LOD 400 which incorporate planning, cost, resource, and risk

Action

- I was responsible to support the team in developing BIM LOD 300 IFC drawing to BIM LOD 400 Shop Drawing in 3D Models for a better understanding of the layout and different sections with standard details and compliance with codes.
- By using integrated Primavera P6 Planning software, I managed to create a detailed Work Breakdown Structure (WBS) for the project, considering all milestones and stakeholder management.
- I conducted quantities takeoff to accurately assess the required resources. With a well-prepared resource schedule, I ensured the achievement of milestones and identified any potential risks related to material and manpower, particularly during peak mobilization and demobilization
- Through the software, material procurement, especially for long lead items, became more efficient and flexible, enabling me to order and track deliveries to meet the planned milestones effectively.
- I also made sure to notify stakeholders of any additional requirements and potential risks that could impact the project's timeline and cost.
- Moreover, the software proved invaluable in preparing the Cost to Complete (dry cost) by aligning the project's estimated and awarded budget, providing a clear overview of the financial status.
- I also worked with a project manager to develop a financial plan based on the project scope, specifications, and design requirements.
- I helped in preparation of unforeseen risk by risk register.
- I carefully reviewed all clashes with utilities and finding ways to incorporate the latest technologies without any additional cost or time impact.

Outcome

By considering all the factors the project has minimum delays due to COVID-19 which was an unforeseen risk but achieved its target and closed.

3.1 Competency Level

Applicant: 3

3.2- Demonstrate an increasing level of responsibility for project planning and implementation

Employer	Position	Validator	Date	Canadian Environment?

Situation

As a Construction Manager with extensive experience in managing multi-million Riyal projects, I demonstrated increasing responsibility for client contact and management. Over the course of my training period, my project-planning activities and interactions with others have significantly increased

Action

- I initiated comprehensive planning sessions involving key stakeholders to develop a plan including clear roles and responsibilities, estimating resources, allocation of proper resources, budget calculations, etc. I also developed a risk management plan with proper mitigation measures to avoid issues during the execution and implementation phases.
- I actively participated in the tender process, including design, submission, and review. I collaborated with the design team to prepare comprehensive proposals that met the client's requirements while ensuring competitiveness and adherence to the project's budget and schedule
- I established realistic timelines for each phase of the project and closely monitored progress against those deadlines. By closely coordinating with subcontractors and suppliers, I ensured timely delivery of materials and equipment, minimizing delays and meeting project milestones.
- During the HVAC system's ductwork clashed with the electrical conduits, hindering the smooth installation of both systems. I organized a coordination meeting, bringing together representatives from the HVAC and electrical teams. During the meeting, I suggested adjusting the HVAC ductwork layout, rerouting electrical conduits, or utilizing space-saving techniques such as utilizing ceiling voids or wall cavities. This decision was based on factors such as cost-effectiveness and minimal disruption to the project schedule.

Outcome

I recognized my responsibilities by developing a proper management and financial plan to handle the resources and I also coordinated with relevant design teams to handle the issues to avoid an increase in the cost and resource utilization.

3.2 Competency Level

Applicant: 3

3.3-Manage expectations in light of available resources

Employer	Position	Validator	Date	Canadian Environment?

Situation

During the construction of a large-scale residential project, I encountered challenges that required me to update the schedule and budget considering the client's defined deadline.

Action

As the project progressed, unforeseen circumstances such as weather delays and material shortages impacted the original schedule and budget. To address these challenges, I implemented a proactive approach to regularly updating the schedule and budget.

For instance, I did a thorough market assessment to identify suitable alternative materials that could be used as replacements. After careful consideration, I determined that fiberglass reinforcement bars would be a viable substitute. These bars offered comparable strength and durability while being more readily available in the market and cost-effective.

Considering this, I also checked the weather forecast and then accordingly, I redeveloped the schedule to readjust working hours, for example, I requested the workforce to do necessary activities during the night hours to avoid delays. I estimated the working load of each member as well to maintain productivity.

Outcome

This proactive approach not only enabled to meet project deadlines but also demonstrated my commitment to finding innovative solutions that balance cost-effectiveness and durability in construction material selection

3.3 Competency Level

Applicant: 3

3.4-Understand the financial aspects of their work

Employer	Position	Validator	Date	Canadian Environment?

Situation

I carefully handled the project's financial requirements by developing proper cost management plans and documents.

Action

I was tasked with providing a technical and financial report to compare different options for the HVAC system. To fulfill this requirement, I first conducted a comprehensive analysis of the project's financial implications and the potential benefits of each option.

I collaborated with the finance team to understand the place of finance in business decisions. By considering factors such as the initial investment, operating costs, and long-term maintenance expenses, I gained a deep understanding of how financial considerations impact decision-making processes. This knowledge enabled me to assess the feasibility and profitability of each HVAC system option

I carefully evaluated the costs associated with each alternative, including equipment procurement, installation, and ongoing maintenance. I worked closely with suppliers, contractors, and vendors to obtain accurate cost estimates, ensuring that the financial aspects of the project were well-documented and aligned with the allocated budget.

I developed a report included detailed cost projections, return on investment analysis, and potential risks associated with each option. This allowed the stakeholders to make informed decisions based on both technical and financial considerations.

I also ensured that the contracts aligned with project requirements, budgetary constraints, and legal standards

Outcome

By developing a thorough technical and financial report including a comprehensive comparison of the HVAC system options, I provided the project stakeholders to make informed decisions based on the financial implications and potential benefits of each option.

3.4 Competency Level

Applicant: 3

3.5-Ask for and demonstrate response to feedback

Employer	Position	Validator	Date	Canadian Environment?

Situation

Upon preparation of the business case and cost break down a meeting was arranged to finalize the business case with the client and stakeholder. I received some constructive feedback related to scope creep from the stakeholder for more additions and some criticism as well

Action

As the project progresses, I begin to receive suggestions from various stakeholders, including other engineers and stakeholders from within the organization. They propose additional mechanical systems and energy-efficient features, such as installing a state-of-the-art HVAC system, integrating renewable energy sources, and implementing smart building automation.

While these ideas have the potential to enhance the building's sustainability, energy efficiency, and overall functionality, they were not initially included in the project's scope

As I evaluated these additional suggestions, I realized that incorporating these new features could lead to scope creep. The changes would not only increase the project's complexity but also impact the budget and timeline. The integration of advanced technologies and systems would require extensive planning, design modifications, and additional resources.

During subsequent meetings, I facilitated discussions with the stakeholders, aiming to find a middle ground that met their requirements while managing scope creep. We carefully analyzed the potential cost implications and assessed the impact on the project timeline.

In the end, we reached a consensus that allowed for the inclusion of certain well-prioritized enhancements, while ensuring that the project remained within its approved budget and timeline.

To address any foreseen risks and additional requirements without incurring additional costs or delays, I took proactive step of creating a lessons-learned register, which is being incorporated into the project's business case.

Outcome

The project did avoid all the scope creeps which have cost and time impact and was completed according to the codes, standards, local authority regulations and handed over to operations which further did modification as they wanted as an end user.

3.2 Competency Level

Applicant: 3

4.1Team Effectiveness

Employer	Position	Validator	Date	Canadian Environment?

Situation

I considered teamwork an important factor to achieve all construction stages and I focused on working with the Site Engineers, Quantity surveyors, Design Team, and Supervisors closely to take their feedback positively to avoid execution errors.

Action

- I conducted regular meetings with my team to discuss our daily plans, established targets and milestones, and allocated tasks to team members based on their skills and expertise.
- I actively encouraged feedback from my team, valuing their input on enhancing our work processes. Additionally, I took feedback from the design team, utilizing advanced technologies to address any challenges encountered along the way.
- I have arranged a training program for the supervisors and technicians for any specialized installation works such as welding activity needs to be trained and certified, HDPE fusion welding, grooving machines steel pipes at the site and Fabrication of ducts.
- Conducting safety workshops weekly or monthly by coordinating with the safety manager so the work on site is according to OSHA requirements.
- During our review sessions, I respectfully listened to the opinions and perspectives shared by my teammates. Their valuable insights and expertise provided a fresh perspective on the design and calculation aspects of the project
- Upon milestone achievement, a get-together along with supervisors and labor to increase commitment toward achieving the deadlines and reward.

Outcome

By actively seeking and respecting the opinions of my teammates and engaging in collaborative discussions, I was able to leverage their expertise to expedite the work on site maintaining proper quality, safety and planning.

4.1 Competency Level

Applicant: 3

4.2 Work to resolve differences

Employer	Position	Validator	Date	Canadian Environment?

Situation

I was involved in reviewing the design as part of the project management team and Identified the designer has not generated LOD 300 and Clash free report as per his project scope

Action

Upon reviewing the design drawing the designer has only completed LOD 200 on some drawings which further was communicated and changed to LOD 300

A major part of the BIM 3D Design was the clash detection report which was commented on by the contractor to resolve the clash on site. As per the contract was the designer to resolve and provide IFC's Issued for construction drawings so that the contractor can prepare shop drawings and proceed with the execution. I arranged a meeting by including the client, stakeholders and the designer and I displayed contractual terms and the design consultant agreed to comply with and provide a minimal clash report.

I held multiple workshops related to finalizing the clash report which the contractor can further produce to shop drawing and finalize the clash on-site to resolve and accept it by the design consultant

Outcome

The design consultant obeyed his contractual requirement and provided with a clash-freed report which further helped the contractor to finalize the shop drawings and approvals.

4.2 Competency Level

Applicant: 3

5.1 Professional Accountability (Ethics & Professionalism)

Employer	Position	Validator	Date	Canadian Environment?

Situation

I deal with the relevant potential suppliers for critical construction materials throughput procurement process. Also, to show professional accountability, I thoroughly reviewed the calculations and selected equipment as per design standards and regulations to meet the project technical requirements

Action

potential for disputes among team members

I also made ethical choices concerning the selection of refrigerants, opting for R134a due to its lower impact on the environment and I followed safety standards (OSHA and NEBOSH) requirement at site and with strict compliance.

Outcome

By adhering to international standards, prioritizing environmental responsibility, ensuring safety and quality, and embracing advanced technologies, I maintained the company’s values and avoiding any legal or regulatory issues that might arise from non-compliance.

5.1 Competency Level

Applicant: 3

5.2 Demonstrate an awareness of your own scope of practice and limitations

Employer	Position	Validator	Date	Canadian Environment?

Situation

While designing and installing the HVAC system for a commercial building project in Saudi Arabia, I took help from the project senior design engineers to select the suitable dimensions and installation of other factors considering environmental factors with careful consideration of airflow patterns.

Action

Outcome

The senior design team reviewed the calculations and sizing performed by me, ensuring that all values were accurately determined. I received valuable feedback on the appropriateness of the chosen equal friction method and gauges, ensuring that the HVAC system's efficiency and performance met the building's requirements and complied with industry standards

5.2 Competency Level

Applicant: 3

5.3 Understand how the conflict of interest affects your practice

Employer	Position	Validator	Date	Canadian Environment?

Situation

As a mechanical engineer responsible for the HVAC and Fire Protection design of a new building project, I encountered a conflict of interest while selecting equipment suppliers.

Action

Outcome

By taking these measures, I aimed to mitigate the conflict of interest and guarantee a fair selection process. I prioritized the project's success and the client's best interests above personal connections, ensuring that the chosen supplier would provide the most suitable and efficient equipment for the HVAC and Fire Protection system

5.1 Competency Level

Applicant: 3

5.4 Demonstrate awareness of professional accountability

Employer	Position	Validator	Date	Canadian Environment?

Situation

I demonstrated professional accountability through a thorough review and adherence to industry standards and regulations during the design and installation process

Action

Outcome

By ensuring compliance with guidelines and standards, I contributed to the successful implementation of the HVAC system, guaranteeing optimal performance, energy efficiency, and overall project integrity.

5.1 Competency Level

Applicant: 3

5.5 Demonstrate an understanding of the appropriate use of the stamp and seal

Employer	Position	Validator	Date	Canadian Environment?

Situation

During the review process of the fire protection system design, I identified a critical issue that required immediate attention. The sprinkler distance was not matching the standard requirement and hazard classification and missing in the corridor as per NFPA 13, necessitating the addition of sprinklers to comply with fire safety codes and local standards.

Action

Outcome

Through this, I ensured well-designed and approved fire protection system that enhanced the safety and security of the building.

5.1 Competency Level

Applicant: 3

5.6 Understand own strength/weaknesses & know how they apply to one's position

Employer	Position	Validator	Date	Canadian Environment?

Situation

I keep on evaluating my professional knowledge to learn additional and advanced engineering concepts to develop the best design and installation work considering the client's requirements.

Action

Outcome

This self-study approach allowed me to gain a broader understanding of the software's potential and explore innovative ways to address project challenges.

5.6 Competency Level

Applicant: 3

6.1 Demonstrate an understanding of the safeguards required to protect the public and the methods of mitigating adverse impacts

Employer	Position	Validator	Date	Canadian Environment?

Situation

During the project tenure, I focused on considering factors affecting the public safety, affecting environmental conditions, and then I proposed methods with HSE engineer to overcome their impacts.

Action

Outcome

I took proactive stance in identifying potential risks and implementing effective solutions to maintain the safety and functionality of mechanical systems, thereby safeguarding the public and minimizing potential disruptions that could arise from equipment failures.

6.1 Competency Level

Applicant: 3

6.2 Demonstrate an understanding of the relationship between the engineering activity and the public

Employer	Position	Validator	Date	Canadian Environment?

Situation

During the Wadi Safar Package WEST Infrastructure project, I encountered a challenge related to traffic management during earthling work. The original plan involved a partial closure of the existing road, which would have caused significant inconvenience to the public, especially during peak hours.

Action

Outcome

By prioritizing safety and considering the public's convenience, I successfully completed the construction of infrastructure utilities with minimal disruption to the community.

6.2 Competency Level

Applicant: 3

6.3 Understand the role of regulatory bodies on the practice of engineering

Employer	Position	Validator	Date	Canadian Environment?

Situation

I showed a high importance on respecting regional traditions and native regulations throughout the project. I ensure compliance with local authorities, such as the Saudi Mechanical Codes, Saudi Fire Protection Codes, Saudi Building Codes, and other relevant international standards

Action

Outcome

By understanding the regulations and requirements of each discipline and proper collaboration among the teams, I managed to overcome the challenges posed by overlapping installations and ensured a well-coordinated and compliant design for the entire project

6.3 Competency Level

Applicant: 3

6.4 Be aware of any specific sustainability clauses that have been added to practice guidelines that apply to their area

Employer	Position	Validator	Date	Canadian Environment?

Situation

I considered safety and sustainability clauses throughout the project and I implemented necessary measures to ensure the safety of our team, the occupants of the building, and the overall community to deliver a reliable and cost-efficient HVAC system.

Action

Outcome

By incorporating these sustainability clauses and guidelines into the HVAC system design and installation, I achieved our project goal of minimizing energy usage and cost. The building's occupants benefit from a comfortable and environmentally responsible indoor environment, while my company reduced operational expenses over the long term.

6,4 Competency Level

Applicant: 3

6.4: To the extent possible, recognizing the applicant's position of influence, consider how sustainability principles could be applied and promoted in his/her specific work

Employer	Position	Validator	Date	Canadian Environment?

Situation

With a deep commitment to sustainability, I applied and promoted sustainability principles throughout the construction process

Action

Outcome

By integrating green building practices, eco-friendly materials, renewable energy solutions, and efficient systems, I showcased the positive impact that sustainability can have on commercial construction projects.

5.1 Competency Level

Applicant: 3

6.5 To the extent possible, recognizing the applicant's position of influence, consider how sustainability principles could be applied and promoted in his/her specific work

Employer	Position	Validator	Date	Canadian Environment?

Situation

Change in design by segregating black water and grey water line along with changes on the sanitary fixture type for low consumption of water

Action

During the Design stage, I managed to work on a USGBC LEED Gold project and to achieve the requirement of LEED grey water line was separated and a filtration system was installed to process grey water and use it for irrigation purposes. Type of sanitary fixtures to be used considering Minimum indoor plumbing fixture and fitting efficiency.
During execution, low-flow faucets and fixtures were selected such as the TORO brand was following project specifications and LEED requirements
Using filtered grey water as irrigation helps in achieving the prerequisite of LEED Gold

Outcome

The project was updated considering the sustainability requirements and also was executed and achieved LEED Gold.

6.5 Competency Level

Applicant: 3

7.1 Demonstrate completion of professional development activities

Employer	Position	Validator	Date	Canadian Environment?

Situation

I am deeply committed to the learning process, and it reflects in my active participation in various professional development activities and memberships in relevant industry associations

Action

Outcome

By integrating new knowledge and skills into my projects and initiatives, I implemented innovative design practices and promoted sustainable practices. I firmly believe that the pursuit of knowledge is vital in driving positive change and making a meaningful impact in the industry.

7.1 Competency Level

Applicant: 3

7.2 Demonstrate awareness of gaps in knowledge and areas requiring further development

Employer	Position	Validator	Date	Canadian Environment?

Situation

Outcome

By implementing these strategies, I successfully overcame my limited knowledge and stayed updated with the latest trends and technologies in HVAC design.

7.2 Competency Level

Applicant: 3

7.3 Develop a professional development plan to address gaps in knowledge and maintain currency in field of practice

Employer	Position	Validator	Date	Canadian Environment?

Situation

I developed the performance development plan (PDP), where I rated myself on a scale of one to five by observing my current level of skills.

Action

Outcome

By working on my career plan, I managed to gain knowledge and expertise on both design and project management and have further plans to improve based on latest technologies.

7.3 Competency Level

Applicant: 3