

Certification Exam Handbook

Engineering Design and Drafting Technology

Offered by:



QUALIFIED. REGISTERED. ACCOUNTABLE.



CTTAM

*Certified Technicians & Technologists
Association of Manitoba*

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Introduction

The **Engineering Design and Drafting Technologist Certification Exam Handbook** has been prepared for engineering design and drafting technology applicants who are required to pass a certification exam to achieve registration as a Certified Engineering Technologist or Applied Science Technologist. The handbook is designed to provide candidates with essential information regarding the certification examination.

Examination Information

Purpose of Examination

The purpose of the Engineering Design and Drafting Technologist Certification Examination is to identify competent engineering technologists who possess technical competencies in their discipline, as outlined in a discipline-specific competency profile. The ultimate goal is to protect the public by granting designations only to those professionals who have the skill and knowledge necessary to perform their job in a safe and competent manner.

Examination Development Process

The Engineering Design and Drafting Technologist Certification Examination consists of 110 multiple-choice questions, including questions with graphs, diagrams, and schematics and questions that require calculations. There are 10 experimental questions of the 110 that are not counted towards the candidate's exam score. These items are used for future exam development following the Embedded Field Testing Method. Each multiple-choice question has four answer options, only one of which is correct. Exam questions vary in the level of cognitive difficulty. The exam is closed-book and is three hours in duration.

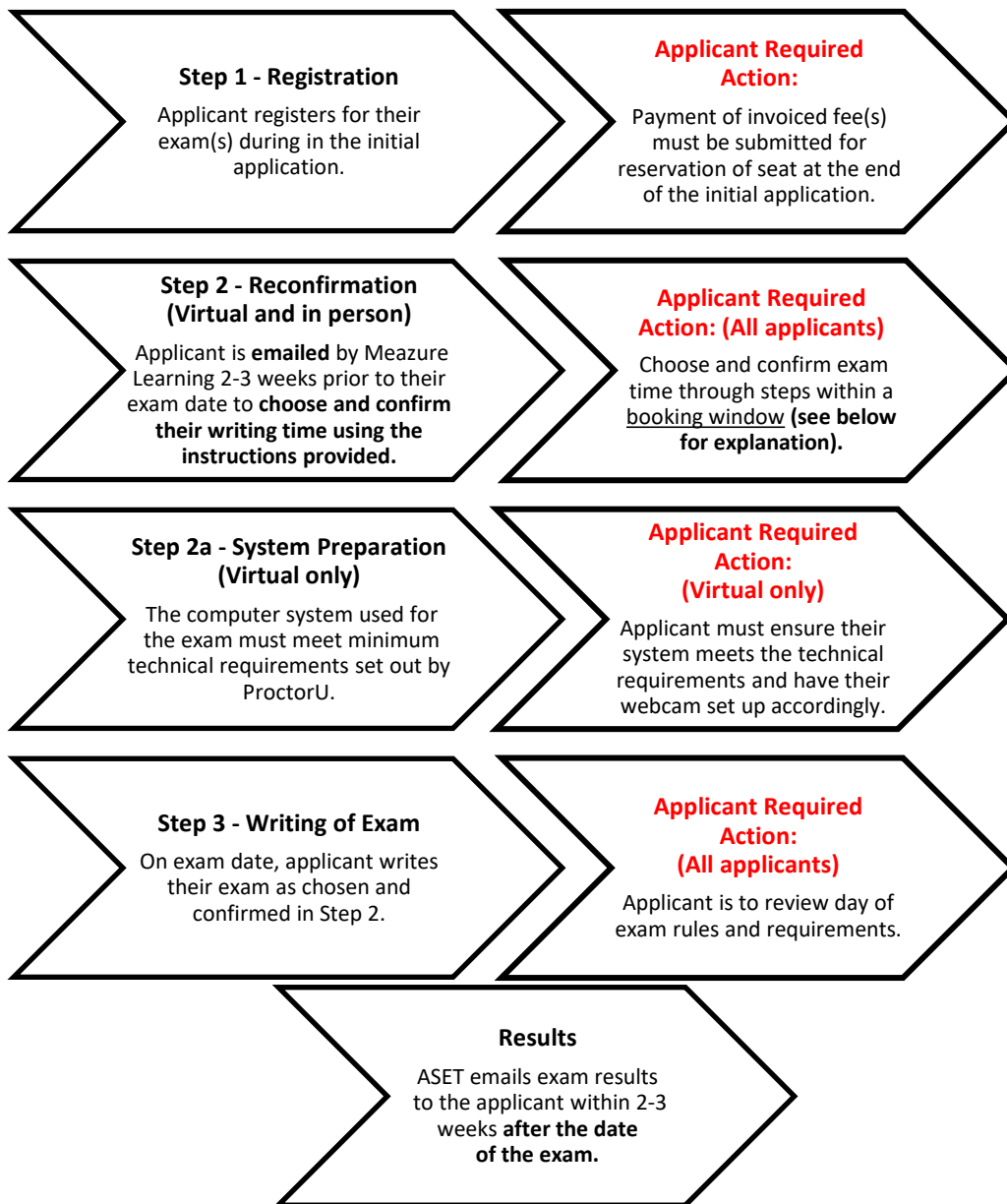
A rigorous exam development process was implemented to ensure that the resultant exam meets professional testing standards as specified in the Standards for Educational and Psychological Testing. Exam development involved numerous consultations with experienced engineering design and drafting technologists, as well as education providers and industry representatives. These individuals contributed their expertise to seven stages of exam development, including: 1) competency development; 2) exam blueprinting; 3) item writing; 4) group item review; 5) pilot testing; 6) standard setting; and 7) exam form assembly.

Eligibility

To be eligible to write the exam, candidates must have at least 24 months of work experience at the technologist level. For this reason, student and T.T. members may not register to write the exam.

Examination Registration

Applicants who are required to complete the Engineering Design & Drafting Technology Certification Examination will register for the examination at the time of application. Please see the ASET, CTTAM, or ASTTBC websites for current information on examination dates and deadlines.



Booking Window

Two to three weeks prior to the exam, you will receive a booking email from Meazure Learning. This email will include the instructions on how to book a seat for your exam. We recommend watching this [quick video demonstration](#) on how to reserve your seat. Please note that these instructions are for the Virtual Booking; however, it is the same process if you are scheduled to write the exam at a brick-and-mortar (physical) location.

Location of Examination Centres and Virtual Proctoring

The Engineering Design & Drafting Technology Certification Exam is administered on a computer in one of Meazure Learning's exam centres or through the virtual proctoring service.

Physical locations in Alberta include Edmonton, Calgary, Grande Prairie*, and Lethbridge*.

Please contact ASTTBC or CTTAM for information on testing centres in British Columbia and Manitoba. **limited seating**

Virtual Proctoring: This method of exam delivery uses a webcam with a virtual proctor to allow the candidate to write the exam from a home or work office. This method has the following additional requirements:

Exam room requirements

- Quiet and private room; **if anyone enters the room during the exam other than the above the candidate, the exam results may be invalidated**
- Location can be at personal residence or from the office**(see note at end)
- Good quality lighting in the room; no bright lights or windows behind candidate
- Desk must be clear of any notes, books, or electronics with access to power outlets and internet connection (Ethernet plugged or high quality password protected Wi-Fi)

Internet requirements

- Stable, secure (must be password protected if Wi-Fi) high speed internet connection with download speeds of at least 3 Mbps and upload speeds of at least 1.5 Mbps (a free internet speed testing tool is available at www.speedtest.net to test the internet connection).

Computer requirements

- Laptops or desktop computers are permitted so long as they have the following minimum requirements:
 - <https://support.proctoru.com/hc/en-us/articles/115011772748-Equipment-Requirements>
 - Candidates must source their own computers with the minimum specifications for the exam.
 - No virtual machine desktops, must be on the host desktop or tablets or smartphones.
 - Google Chrome required
 - Please ensure that laptops are plugged in during the exam to prevent the exam terminating early due to battery failure.
- Functioning free standing or integrated webcam w/ microphone or independent microphone

NOTE: It is the candidate's responsibility to ensure that the internet and computer requirements are met prior to the exam administration date. The **compatibility check** information will be located in your BOOKING CONFIRMATION email which is sent by Meazure Learning.

- **Applicants must conduct a compatibility check using the computer they will use, in the room they will write in to test their connectivity prior to the virtually proctored exam. If they do not complete the compatibility check, there is no guarantee that the exam will happen. *The ProctorU exam program cannot be downloaded until the day of your exam so there is no way to check if it will work prior to exam day.***
- Meazure Learning has an [FAQ page](#) with a short tutorial video on the ProctorU program.

***Keep in mind administrative privileges on the computer you will use (some company's IT policies block download of the required program to use with ProctorU and can cause issues). As stated above, it will be important to complete the compatibility check **PRIOR** to the*

examination date.

Exam Time and Location Confirmation

All candidates will receive a confirmation email with the writing time and address of the testing centre location (physical location only) that was chosen at the time of application by **email from Meazure Learning one to two weeks before the exam date**. The confirmation email is important to review and a printed copy is required for admission to write the exam. Candidates can contact Meazure Learning directly at testingsupport@meazurelearning.com to have the exam registration information re-sent if they did not receive the confirmation email by the deadline above.

Policy for Reschedules, Rewrites, and Attempts

Alberta Candidates

Candidates who wish to reschedule their exam must email the ASET Registration Department (exams@aset.ab.ca) with the new exam date. Candidates who reschedule **after the registered exam's Registration Deadline Date** are required to pay **the full exam fee** to reschedule. If the request is received **before** this deadline date, then there are no fees to reschedule.

Candidates who are required to re-write the examination must email the ASET Registration Department (exams@aset.ab.ca) with the requested exam date. ASET Staff will follow up to obtain payment of the full exam fee in order to register for the requested date.

Candidates may attempt the exam **a maximum of three times** within one year from the date of application and must pass the exam within this time period.

British Columbia and Manitoba Candidates

Please contact ASTTBC or CTTAM directly to confirm the policy for reschedules, rewrites, and exam attempts.

COVID-19 Cancellation Policy

If a candidate falls ill on the day of the exam and has flu/cold symptoms, please contact exams@aset.ab.ca immediately. If writing at a testing centre, candidates will be denied entry and will be unable to write the exam.

Upon contacting ASET, the exam will be cancelled. To waive the examination fee to reschedule again, proof of positive test will be required.

Exam Accommodations for Candidate with Disabilities

According to Canadian human rights legislation and test industry standards, exam developers are responsible for providing candidates with disabilities with exam accommodations where appropriate and feasible. Exam accommodations are designed to remove barriers related to individual characteristics of candidates that may prevent them from demonstrating their technical competencies on the exam. "An appropriate accommodation is one that responds to specific individual characteristics but does so in a way that does not change the construct the test is measuring or the meaning of scores."¹

Candidates with disabilities should request accommodations to write the certification exam at the time of application. To protect the integrity of the examination, documented evidence of the candidate's disability must be submitted to ASET, CTTAM, or ASTTBC along with the application form. Such evidence includes a formal detailed diagnosis of the specific disability from an appropriate professional (e.g., physician, psychologist, rehabilitation counsellor) and supporting documentation citing the need for exam accommodations and what accommodations the candidate received in the past.

ASET, CTTAM, or ASTTBC will review the candidate's written request for accommodation and determine if it can be supported. Depending on the candidate's individual needs, ASET, CTTAM, or ASTTBC may modify exam administration conditions, including exam setting, exam presentation, or the addition of individuals to the exam (e.g., readers, scribes). Each request will be reviewed on a case-by-case basis.

Below is a list of reasonable exam accommodations for candidates with a disability.

1. *Separate Room*

A separate room is provided to candidates who due to the nature of their disability require an exam environment that minimizes distractions resulting from noise or movement or process information by talking aloud.

2. *Additional Time*

Extending additional time to candidates is a frequently used exam accommodation that is used with a variety of disability-related conditions. Often candidates are offered time- and-one-half to complete the exam (e.g., a 3-hour exam is extended to 4.5 hours).

3. *Interpreter*

Candidates with hearing impairment may request an interpreter who has proficiency in sign language.

4. *Reader*

A reader is an individual who reads exam instructions and/or exam questions to a candidate. Candidates with visual impairment or those with a learning disability may benefit from services of a reader during the examination.

5. *Recorder*

A recorder is an individual who fills in the answers for a candidate who has difficulty writing independently.

All costs related to exam accommodations will be the responsibility of the candidate.

¹ American Educational Research Association (2014). *Standards for Educational and Psychological Testing*. Washington, DC (p. 67)

Examination Content

The Engineering Design and Drafting Technologist Certification Examination tests candidates' competencies in four areas (**see Appendix A for detailed information on examination content**).

- 1. Technical Analysis:** In this competency area, candidates are expected to be able to collect and analyze technical data for development of engineering designs and drawings from preliminary concepts and specifications.
- 2. Technical Design:** This competency area deals with candidates' ability to apply engineering knowledge in developing a design and creating drawings that meet technical specifications, regulations, and client requirements.
- 3. Technical Evaluation:** In this competency area candidates are expected to be able to review one's design and drawings in relation to technical specifications, regulations, and client requirements.
- 4. Project Coordination:** This competency area deals with candidates' ability to assist in the management of projects to ensure high quality of deliverables, customer satisfaction, adherence to schedules, and budgets.

Exam questions will also vary in cognitive level. *Knowledge* questions require that candidates recall information and provide its interpretation. *Application* questions require that candidates apply their knowledge to practical situations, while *Critical thinking* questions require that candidates analyze complex situations and provide solutions. There will also be a percentage of source based questions that may include an image, figure, tables, schematics, etc. **Refer to Appendix A for more detailed information.**

Study Resources for Examination

The following resources may be of use to candidates interested in refreshing their knowledge prior to writing the examination as these resources were among those used to create the examination. **Candidates are not expected to study or purchase each of these resources.** Rather, candidates may wish to review particular content areas in which they feel they would like to update their current knowledge. For detailed information on the content areas covered on the exam, candidates should refer to **Appendix A**.

Atkins, H. (2003). Highway Materials, Soils and Concretes, 4th

Edition. Festus, T. (2016). Introduction to Engineering Drawing with CAD Application.

Giesecke, F. (2016). Technical Drawing with Engineering Graphics, 15th

Edition. Madsen, D. (2018). Civil Drafting Technology, 8th Edition.

Mott, R. (2006). Applied Fluid Mechanics, 6th

Edition. Mott, R. (2008). Applied Strength of

Materials, 5th Edition. Parisher, R. (2012). Pipe

Drafting and Design, 3rd Edition.

Tippens, P.E. (2007). Physics, 7th Edition.

Underwood, R. (2007). Structural Design: A Practical Guide for Architects, 2nd

Edition. Walker, K. (2008). Applied Mechanics for Engineering Technology, 8th

Edition.

Washington, A.J. (2014). Basic Technical Mathematics with Calculus, 10th Edition.

Practice Exam for Purchase

Practice exam questions are available for purchase through [Meazure Learning](#). As these questions are hosted by a third-party educational partner, candidates will need to create a new account to access the practice exam. This login is **not associated** with the candidate's ASET ID.

A one-time attempt practice exam of 25 questions* is available.

*While the candidate is able to repurchase the same practice exam at a later date; the questions will not change.

Examination Administration

The Engineering Design and Drafting Technologist Certification Examination will be administered on a computer in one of Meazure Learning's exam centers in Alberta, Manitoba, or British Columbia. Generally, exam centers are located in colleges and universities. An experienced proctor will oversee the examination. Please contact ASET, CTTAM, or ASTTBC for more information.

Admissions to the Exam Centre

ASET, CTTAM, and ASTTBC provide Meazure Learning with a list of examination candidates for each exam sitting. When an exam appointment is made, candidates will receive a booking confirmation email from Meazure Learning. **It is important that candidates bring this email with them to an examination center on the day of the examination.**

Upon entering the examination center, candidates will be asked to register with the proctor. The following information will need to be provided to the proctor.

- Candidate's first and last name
- Valid, non-expired government-issued photo ID
- Candidate's booking email as provided by Meazure Learning

After the initial verification of identity, candidates will be asked to sign a roster.

Candidates' personal belongings, such as bags and jackets, will be stored in a designated area. Electronic devices, including but not limited to cell phones, tablets, and reference books, may not under any circumstances be brought into the exam center. The only exception to this rule is personal calculators. The proctor is responsible for inspecting candidate's calculators prior to the exam.

Calculator Policy

- Candidates can bring in a Scientific Calculator that is non-programmable, non-graphing and have no memory storage capabilities.
 - Please review the [Calculator Policy](#) prior to examination day. it contains a list of approved and non-approved calculator models
- **It is highly recommended that the candidate bring their own calculator as the centre does not have any on site.**
- It is the candidate's responsibility to ensure their calculator is approved prior to the exam, either by being indicated on the approved list or by obtaining approval from ASET, CTTAM, or ASTTBC. If a candidate does not obtain approval prior to the exam, their calculator may be deemed inadmissible and prohibited from the exam.

Candidates may bring with them into the exam center water, juice, coffee or another drink in a spill proof container with no label and, only if approved by the proctor, a sweater without pockets, and disposable ear plugs.

The use of scratch paper is permitted. The proctor will provide scratch paper to the candidates before the exam and collect it after the exam.

Taking the Exam

At the beginning of the examination, candidates will hear verbal examination instructions from the proctor and read the Candidate's Statement of Understanding and/or Non-disclosure Agreement in the software. Failure to comply with the regulations outlined in these documents will result in the candidate's results being invalidated. Candidates will not be able to begin the examination without agreeing to the conditions outlined in the document.

The exam is closed-book and is three hours in duration. Once a candidate starts an exam they must complete the exam they started. If the candidate notices they have started the wrong examination, they must notify the proctor within the first 5 minutes of the exam sitting to switch to the correct exam.

Next, exam candidates will be given written exam instructions in the software. These exam instructions will emphasize the fact that some exam questions contain images and/or require calculations. If the images appear too small on the screen, candidates will be advised to hover their mouse over them to get an expanded view. The exam is closed-book and is three hours in duration.

Following exam instructions, there will be a tutorial available to candidates before they proceed to the exam.

After the Examination

Upon submitting their exam responses, candidates will be offered an opportunity to provide feedback on exam material and exam administration conditions by completing a short online survey. Then, candidates will submit their scrap paper to the proctor, sign out from the candidate roster, and leave the examination center.

Examination Scoring

Multiple-choice examination questions are scored dichotomously, using a score of "0" for an incorrect response and a score of "1" for a correct response. The Technologist Certification Examinations are criterion-referenced exams, which means that a candidate should obtain a score that is equal or higher than an exam pass mark to pass the examination.

Pass Mark

Each Certification Examination has its own pass mark. The pass mark for the Engineering Design and Drafting Technologist Certification Examination was determined by the Exam Committee, which took into account the difficulty of exam questions and the expected level of performance for a minimally competent engineering technologist. A psychometrically acceptable standard-setting methodology was used to set examination pass marks.

The pass mark for the Engineering Design and Drafting Technology Certification Exam is 70%

Examination Results

The examinations are electronically scored. Candidates can expect to obtain their exam score and the associated pass/fail decision **within two to three weeks after the date of exam administration.**

Unsuccessful candidates will also receive a performance report indicating a failure to pass, their score, and areas of strength and weakness in the four tested competency areas. The unsuccessful candidates will be able to retake the exam.

Review and Appeal Process

A candidate who fails the Certification Examination may request that their exam score be verified. Due to the automated scoring and extensive quality control procedures, errors in scoring are extremely unlikely. However, candidates may request that ASET, CTTAM, or ASTTBC manually rescore their exam to verify the original score.

Appendix A: Engineering Design and Drafting Technologist Exam Blueprint

ASET Engineering Design and Drafting Technology Certification Examination Blueprint		
Competency	Multiple Choice Questions	
	Target Range (% of Qs)	Target Range (# of Qs)
1. Technical Analysis	25-35%	25-35
1.1 Analyze codes, standards, and specifications to determine their effect on design.		
1.2 Collect qualitative and quantitative data to better understand technical requirements.		
1.3 Identify the scope of work in consultation with one's supervisor.		
1.4 Explain geometric dimensions and tolerances.		
1.5 Interpret fabrication and/or construction drawings.		
1.6 Perform mathematical calculations to develop details (e.g., algebraic and trigonometric equations, functions, and proportions)		
1.7 Check dimensions on drawings.		
1.8 Interpret data from field notes.		
1.9 Convert and apply appropriate units of measure.		
1.10 Identify the quantity of required materials.		
1.11 Analyze collected data to propose technical solutions.		
1.12 Maintain records of measurements, calculations, field notes, and sketches.		
2. Technical Design	35-45%	35-45
2.1 Explain basic drafting principles (e.g., labeling, dimensioning, orientation, and multi-view projection, and plotting).		
2.2 Use computer-assisted drafting software to produce 3D models.		
2.3 Create drawings using principles of multi-view projection and appropriate drawing standards.		
2.4 Troubleshoot drawings using knowledge of the software and general drafting principles.		
2.5 Maintain drawings, including dimensions, coordinates, and manipulation of objects for colour, visibility, and presentation.		
2.6 Maintain design history to allow for ease of reference by other staff members.		
2.7 Modify and revise drawings to address design changes.		
2.8 Create as-built drawings to reflect actual conditions.		
2.9 Create a design in accordance with technical specifications, codes, regulations and client requirement.		
2.10 Coordinate with and consult other workers to design, lay out, or detail components and systems and to resolve design or other problems.		
2.11 Incorporate into one's design the information from drawings produced by other disciplines.		
2.12 Create a list of materials and quantities for construction or manufacturing.		
2.13 Use appropriate geographic coordinates in engineering documents.		

2.14 Follow internal documentation control standards (e.g., naming, storage, plotting, and disseminating).		
2.15 Explain the life cycle of drawings, including as-built drawings.		
3. Technical Evaluation	15-25%	15-25
3.1 Check one's design for accuracy and functionality.		
3.2 Review one's drawings for accuracy and readability before submission.		
3.3 Mark up existing drawings with as built information.		
3.4 Perform calculations to confirm elevations and dimensions.		
3.5 Perform quantity takeoff from design drawings, sketches, and calculations.		
4. Project Management	10-20%	10-20
4.1 Calculate materials and quantities required for projects.		
4.2 Prioritize own work activities to ensure that products and services are delivered on time.		
4.3 Use resources in a cost-effective manner.		
4.4 Deliver quality work within budget constraints.		
4.5 Quantify one's work that is completed to-date.		
4.6 Report changes in own scope of work to the appropriate authorities.		
4.7 Establish and maintain effective working relationships with internal and external clients.		
4.8 Explain the value of workplace safety legislation.		
4.9 Comply with workplace safety legislation.		
Total	100%	100

Cognitive Level	Multiple-choice Questions	
	Target Range (% of Qs)	Target Range (# of Qs)
Knowledge	40-50%	40-50
Application	35-45%	35-45
Critical Thinking	15-25%	15-25
Total	100%	100

Question Type	Multiple-choice Questions	
	Target Range (% of Qs)	Target Range (# of Qs)
Questions with Images	35-45%	35-45
Questions without Images	55-65%	55-65
Total	100%	100