

Building Systems Technician Certificate Program



Candidate guide

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The Building Systems Technician Certificate program is dedicated to removing barriers and broadening the access to programs at SIAST. We believe that adults acquire knowledge and skills through life and work experience that may align with courses within our programs.

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Why consider a PLAR assessment?

PLAR refers to the combination of flexible ways of evaluating people's lifelong learning, both formal and informal against a set of established standards. You can receive academic credit for your relevant lifelong learning. The Building Systems Technician program recognizes prior learning in a number of ways.

We recognize:

- Previous formal learning from an accredited training institution through transfer of credit.
- Previous informal learning or experiential learning through a comprehensive prior learning and recognition process.

What are the PLAR options?

To be eligible for PLAR, an applicant must first register or already be registered as a SIAST student.

Option A: Individual course challenge

If you have 2 years of successful experience in the building systems or related field, and have learned the skills and knowledge for **one or more** of the Building Systems Technician courses, you may apply to be assessed for each applicable course.

Fees:

- There will be a fee for each individual course assessment.
- For a listing of the specific PLAR fees, check the [PLAR database](#) or call SIAST and ask to speak to the PLAR advisor/counsellor assigned to the Building Systems Technician program at: 1-866-467-4278 or 1-866-goSIAST.

Option B: Block assessment

Eligibility criteria:

- Completed 2 or more years of recent (within the past 5 years) successful experience in the building systems area or related field.

1. ELEC 135/188 - Block assessment for ELEC 135 & 188

An individual with considerable knowledge and skills in the area of electricity may wish to challenge both ELEC 135 & 188 as a block. The PLAR assessment methods are determined by the type of evidence a candidate submits. The candidate must first submit an evidence file (refer to the assessment methods listed on pages [54](#) & [58](#)). The BST Program head will determine if a written exam and/or a demonstration is needed after evaluation of your submitted evidence. Please refer to the individual course self-audits for detailed information on the learning outcomes of both courses (pages [53](#) & [56](#) of this guide).

2. ENGP104/180 – Block assessment for ENGP 104 and 180

An individual with considerable knowledge and skills in the operation of steam boilers may wish to challenge both ENGP 102 and 180 as a block. The PLAR assessment methods are determined by the type of evidence a candidate submits. The candidate must first submit an evidence file (refer to the assessment methods listed on pages [67](#) & [72](#)). The BST Program head will determine **if** a written exam **and/or** a demonstration is needed after evaluation of your submitted evidence. Please refer to the individual course self-audits for detailed information on the learning outcomes of both courses (pages [66](#) & [69](#) of this guide).

3. RFRG 103/195 – Block assessment for RFRG 103 and 195

An individual with considerable knowledge and skills in the area of refrigeration may wish to challenge both RFRG 103 & 195 as a block. The PLAR assessment methods are determined by the type of evidence a candidate submits. The candidate must first submit an evidence file (refer to the assessment methods listed on pages [83](#) & [91](#)). The BST Program Head will determine if a written exam and/or a demonstration is needed after evaluation of your submitted evidence. Please refer to the individual course self-audits for detailed information on the learning outcomes of both courses (pages [82](#) & [88](#) of this guide).

Fees:

- There will be a fee for **each** block assessment.
- For a listing of the specific PLAR fees, check the [PLAR database](#) or call SIAST and ask to speak to the PLAR advisor/counsellor assigned to the Building Systems Technician program at: 1-866-467-4278 or 1-866-goSIAST.

Option C: Program level certification (please refer to [Appendix D](#) for detailed instructions)

Eligibility criteria:

- completed 2 or more years of recent (within the past 5 years) successful experience in a building systems facility that has a minimum size boiler of 300 k. w. and a minimum size chiller of 50 tonnes as chief or 20 tonnes as shift engineer.
- hold a designation in one of the following areas:
 - 1) Refrigeration Engineers certificate
 - 2) 5th class certificate

Fees:

- There will be one fee for the whole program challenge.
- For a listing of the specific PLAR fees, check the [PLAR database](#) or call SIAST and ask to speak to the PLAR advisor/counsellor assigned to the Building Systems Technician program at: 1-866-467-4278 or 1-866-goSIAST.

How many courses can be challenged through PLAR in the Building Systems Technician certificate program?

Currently we have 32 out of 32 certificate courses with PLAR challenges available. There is no limit. You may challenge as many of these courses as you are able to prove prior skills and knowledge through assessment.

[Total program challenge](#) is also available for individuals with extensive knowledge and skills in the building systems industry.

Which courses are PLAR-ready?

Building Systems Technology Certificate program profile		
COURSE CODE	COURSE NAME	PLAR Challenge(s) <i>available</i> through program
Associated Studies courses*		*see note below*
COMP 172	Intro to Microsoft Word and Excel*	✓
CHEM 100	Chemistry*	✓
DRFT 103	Basic Mechanical Drafting*	✓
MATH 116	Mathematics*	✓
TCOM 100	Technical Communications 1*	✓
TCOM 101	Technical Communications 2*	✓
THER 182	Thermodynamics*	✓
THER 183	Mechanics*	✓
Program courses		
BLDG 100	Auxiliary Power Systems	✓
BLDG 101	Building Administration	✓
BLDG 103	Building Envelope	✓
BLDG 106	Groundskeeping	✓
BLDG 107	Hydronic Heating	✓
BLDG 109	Building Computer Operations	✓
BLDG 110	Ventilation Systems	✓
ELEC 135	Electrical Systems	✓
ELEC 188	Basic Electricity	✓
ENGP 100	Heating Systems 1	✓
ENGP 101	Heating Systems 2	✓

Building Systems Technology Certificate program profile		
COURSE CODE	COURSE NAME	PLAR Challenge(s) <i>available</i> through program
ENGP 103	Legislation and Codes	✓
ENGP 104	Advanced Power Lab	✓
ENGP 180	Power Lab 1	✓
ENGP 181	Plant Maintenance 1	✓
ENGP 188	Plant Maintenance 2	✓
PLMB 101	Plumbing Systems	✓
RFRG 103	Refrigeration Systems 2	✓
RFRG 183	Air Conditioning	✓
RFRG 195	Refrigeration Systems	✓
SEM 101	Technology Seminars	✓
SFTY 172	Safety	✓
WORK 108	Work Experience	✓
WTER 100	Water Treatment	✓
Block challenges		
ELEC 188 / 135	Electricity	✓
ENGP 104 / 180	Steam Boilers	✓
RFRG 103 / 195	Refrigeration	✓
Total program challenge		
Total program challenge – Information & requirements		✓

Note: Some courses common to many programs at SIAST (i.e. communications, math, social sciences, and computer applications) are managed by Associated Studies Faculty. To see if the shared courses in your program are PLAR-ready, visit the “To find a PLAR-ready course” section on the [PLAR homepage](#) for further details.

For assistance call SIAST and ask to speak to the PLAR advisor/[counsellor](#) assigned to the Building Systems Technician program at: 1-866-467-4278 or 1-866-goSIAST.

Is PLAR available at any time of the year?

PLAR challenges are currently being offered from the beginning of September to the end of June.

Is it *easier* to challenge a course through PLAR - OR - take the course?

Neither is easier. By using PLAR you may reduce the repetition of studying information that you already know. The PLAR process allows you to demonstrate knowledge you already have.

PLAR is not an easy way to certification, rather a “different” way to obtain certification. Your personal level of skill and experience will dictate which courses you choose to challenge. The self-audit section found later in this guide will help you decide if you have a good match of skill and knowledge for a specific course.

Methods of assessing prior learning

Assessment methods measure an individual's learning against course learning outcomes. The assessment methods listed below are the ones most commonly used, but other forms of flexible assessment may be considered. These assessments may include one or a combination of the following assessment tools:

- product validation & assessment
- challenge exam
- formal and non-formal learning
- performance evaluations (including skill demonstrations, role plays, clinical applications, case studies)
- interviews and oral exams
- equivalency (evaluations of learning from non-credit training providers)
- evidence or personal documentation files (providing evidence of learning from life and work experiences and accomplishments)

If I live out of town, do I have to travel to a main campus to do PLAR?

There will be times that you will need to meet with the program on campus. However, we will try to keep travel to a minimum.

What if I have a disability & need equity accommodations?

At SIAST, we understand that sometimes services must be provided to students in a variety of ways to achieve the goals of fair representation. Therefore, the range of services provided for Education Equity students is as diverse as the needs of those students. We strive for equity (not uniformity) and provide varied services for students with differing needs. If more information is required, please contact a SIAST counsellor at a campus closest to you or refer to the SIAST Web site: http://www.siastr.sk.ca/stuservices/advising_counselling.shtml

Are there other methods to gain SIAST course credits for prior learning?

Transfer Credit

Yes, SIAST will grant credit for previous training that is similar in content, objectives, and evaluation standards to SIAST training. Transfer of credit is different from the PLAR process. Transfer Credit guidelines may be found at:

http://www.siastr.sk.ca/admissions/transfer_credit.shtml

It is the student's responsibility to check with [Registration Services](#) for specific campus procedures on this policy. For specific information and guidelines regarding transfer of credit, contact a [SIAST educational counsellor](#).

An online provincial transfer credit guide is now available at www.saskcat.ca

Note: *If you are a recent high school graduate, check the Saskatchewan Learning Web site for any articulated agreements that may apply for Computer Courses or Practical and Applied Arts Courses.*

[SaskLearning Credit Transfer Guide](#)

[SaskLearning website](#)

Equivalency Credit

Equivalency credit refers to the application of credit you may have earned in a previously taken SIAST course to your current SIAST course. Apply at registration services for *equivalency credit*. This process should also be completed prior to your PLAR challenge. If these credits cannot be used for *equivalency credit*, you may use these accredited courses as part of your evidence for your PLAR challenge.

The Power Engineering Technician certificate program shares common courses with the Building Systems Technician program. Please contact the BST Program Head at (306) 775-7754 for information on equivalency credit.

Contact us

If more information is required, please contact a designated PLAR counsellor at a campus closest to you.

Kelsey Campus, Saskatoon, SK

1-866-goSIAST or 1-866-467-4278

Palliser Campus, Moose Jaw, SK

1-866-goSIAST or 1-866-467-4278

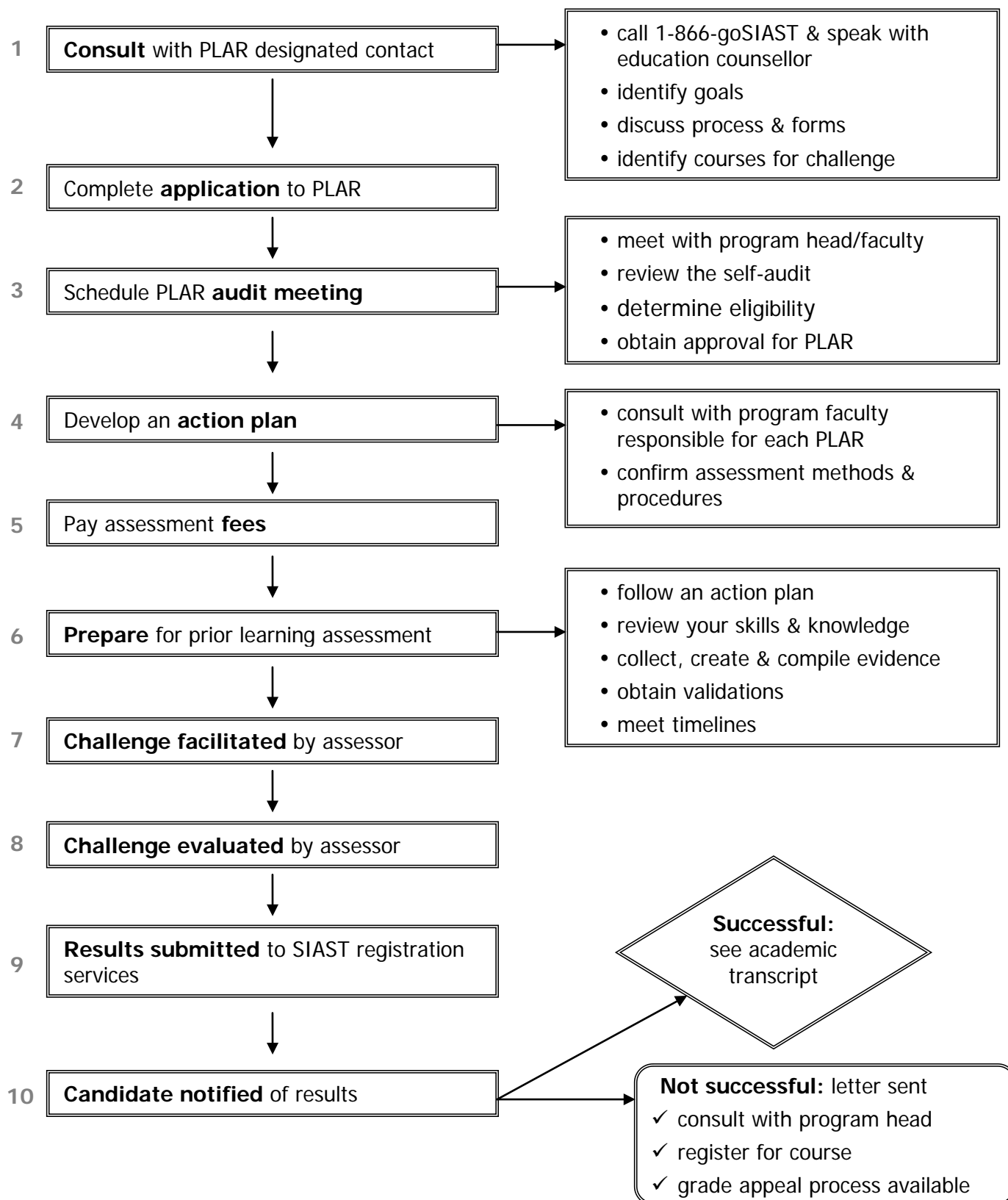
Wascana Campus, Regina, SK

1-866-goSIAST or 1-866-467-4278

Woodland Campus, Prince Albert, SK

1-866-goSIAST or 1-866-467-4278

Prior Learning Assessment and Recognition process



Guiding principles for developing a PLAR evidence file

1. As you begin the PLAR process you will be advised if any evidence is required. This will be identified in your [action plan](#). Check with the PLAR designated contact **before** you begin to gather evidence.
2. Evidence must be valid and relevant. Your evidence must match the learning outcomes identified for each course.
 - It is your responsibility to create, collect and compile relevant evidence – if required.
3. Learning must be current; 2 years within the last 5 years.
4. The evidence should demonstrate the skills and knowledge from your experiences.
5. The learning must have both a theoretical and practical component.

Types of evidence

There are three types of evidence used to support your PLAR request:

1. Direct evidence – what you can demonstrate for yourself.
2. Indirect evidence – what others say or observe about you.
3. Self-evidence – what you say about your knowledge and experience.

Ensure that you provide full evidence to your Building Systems Technician faculty assessor so that your prior learning application is assessed appropriately. Well organized, easy to track evidence will also ensure that none of the evidence is missed or assessed incorrectly.

Here are some examples of evidence that you may be requested to submit as part of your evidence file (if required):

- written descriptions and analysis
- resume
- certificates to document any previous training
- job descriptions with comments
- details of any workplace/industry training
- workplace evaluations
- observations
- workplace validations
- work samples
- photos of environments

All documents that are submitted to SIAST may be returned to the student after the final results have been given and the grade appeal deadline of seven days has passed. A copy of transcripts and certificates may be included in your evidence file, but be prepared to show original documents at the PLAR audit meeting for validation.

How long will it take to prepare evidence for PLAR?

Since the requirements are different for each course, and each candidate has different experiences, the amount of time it takes to prepare your evidence will vary.

Steps to complete a self-audit

1. Read through the levels of competence as listed below.

Mastery:	I am able to demonstrate the learning outcome well enough to teach it to someone else.
Competent:	I can work independently to apply the learning outcome.
Functional:	I need some assistance in using the outcome.
Learning:	I am developing skills and knowledge for this area.
None:	I have no experience with the outcome.
Learning outcomes	
For each learning outcome listed, please self-evaluate your competency levels and record in the appropriate column for each self-audit.	

2. Take a few minutes and read through the following self-audit for each course you are interested in as a PLAR candidate.
3. Check your level of competence as you read through each of the learning outcomes for each course. The information will help you in your decision to continue with your PLAR application.
4. In order to be successful in a PLAR assessment, your abilities must be at the competent or mastery level for the majority of the learning outcomes. Some things to consider when determining your level of competence are:
 - How do I currently use this outcome?
 - What previous training have I had in this outcome: workshops, courses, on-the-job?
 - What personal development or volunteer experience do I have in this area?

Be prepared to explain the reason you chose this level if asked by an assessor.
5. Bring the completed self-audit to a consultation meeting with the program head or faculty member in [step 3 – PLAR process](#) of the candidate process for prior learning assessment.

Self-audit guide(s)

Associated studies courses

COMP 172 – Intro to Microsoft Word & Excel

Your studies will introduce you to the purpose and uses of a word processor and electronic spreadsheet. You will develop the basic skills of creating, editing and formatting documents and spreadsheets.

Credit unit(s): 1.0

Equivalent course(s): COAP 120, COAP 172, COAP 381, COMP 120

COMP 172 – Intro to Microsoft Word and Excel	Mastery	Competent	Functional	Learning	None
Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.					
1. Create Word documents.					
▪ Describe the function of a word processor					
▪ Navigate in a word processing application					
▪ Begin a new document					
▪ Save documents, open and close existing documents					
▪ Use file management to organize word documents					
▪ Use the help feature					
2. Edit Word documents.					
▪ Correct spelling and grammar usage					
▪ Use various techniques to select text					
▪ Use delete and undelete functions					
▪ Move text within a document					
▪ Use the Clipboard					
3. Format documents.					
▪ Apply character formatting techniques					
▪ Apply paragraph formatting techniques					
▪ Apply document formatting techniques					
4. Create a spreadsheet.					

COMP 172 – Intro to Microsoft Word and Excel	Mastery	Competent	Functional	Learning	None
Mastery: I am able to demonstrate it well enough to teach it to someone else.					
Competent: I can work independently to apply the outcome.					
Functional: I need some assistance in using the outcome.					
Learning: I am developing skills and knowledge for this area.					
None: I have no experience with the outcome.					
▪ Describe the features of a spreadsheet					
▪ Navigate in a spreadsheet application					
▪ Enter data in a worksheet					
▪ Edit a worksheet					
▪ Apply common formatting features to a worksheet					
▪ Define the page setup					
5. Use spreadsheet features.					
▪ Use simple formulas and functions					
▪ Use the fill handle to extend a series					
▪ Create simple charts using the chart groups					
▪ Modify charts					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

Assessment methods to be determined by SIAST assessor:
Challenge exam OR combination of evidence file and/or structured interview

1. Evidence file

(A list of the required evidence will be given to the PLAR candidate at the PLAR audit meeting in step 3 of the candidate process for prior learning.) *Note:* An interview may be required to support the Evidence file.

2. Challenge exam – 60% pass mark

- A two (2) hour exam
- Consisting of both theory (20 - multiple choice questions & 10 – true/false questions) and practical assignments.

Sample theory question:

A hanging indent:

- a) moves text away from the left and right margin
- b) moves the first line of text away and the rest stays at the margin
- c) creates a margin release so all the text prints in the margin
- d) leaves the first line at the margin and moves the rest away

Sample practical question:

Insert a formula into the worksheet which calculates the total sales for all 7 days sales.

3. Practical demonstration

The PLAR candidate will successfully complete (60% or >) a 60 minute practical demonstration (assessing learning outcomes 1 – 5). The performance test will be administered in a computer lab with the assessor present.

4. MOS certification

Microsoft Office Word Core or Expert Certification in Office version 2000 (or more recent). AND, Microsoft Office Excel Core or Expert Certification in Office version 2000 (or more recent). The PLAR candidate will submit both ORIGINAL certificates to the assessor. The certificates are required to receive credit for this course.

CHEM 100 – Chemistry

You will receive a general overview of the fundamental principles in the structure, formation and interaction of chemical compounds and the importance of chemistry in industrial operations.

Credit unit(s): 2.0

CHEM 100 – Chemistry Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Describe basic chemistry concepts.					
<ul style="list-style-type: none"> ▪ Identify the importance of chemistry in industry 					
<ul style="list-style-type: none"> ▪ Define elements, atoms, molecules, ions, isotopes and ionic compounds 					
<ul style="list-style-type: none"> ▪ Describe how to use the periodic table to determine the characteristics of elements 					
<ul style="list-style-type: none"> ▪ Recognize chemical terminology 					
2. Discuss the principles of chemical bonding.					
<ul style="list-style-type: none"> ▪ Discuss intramolecular forces versus intermolecular forces 					
<ul style="list-style-type: none"> ▪ Define bond and bond energy 					
<ul style="list-style-type: none"> ▪ Explain ionic character versus covalent character bonding 					
<ul style="list-style-type: none"> ▪ Define the concept of electronegativity 					
<ul style="list-style-type: none"> ▪ Describe how to use electronegativity to predict bond type 					
3. Identify names and formula of chemical compounds.					
<ul style="list-style-type: none"> ▪ Explain the difference between inorganic compounds and organic compounds 					
<ul style="list-style-type: none"> ▪ Discuss the origin of chemical names with respect to IUPAC convention and common names 					
<ul style="list-style-type: none"> ▪ Define binary compounds of Type I, Type II and Type III 					
<ul style="list-style-type: none"> ▪ Describe compounds containing polyatomic ions 					
<ul style="list-style-type: none"> ▪ Discuss the IUPAC rules used for formal naming of compounds 					
<ul style="list-style-type: none"> ▪ Name compounds, given their formulas 					
<ul style="list-style-type: none"> ▪ Discuss the naming of acids 					
<ul style="list-style-type: none"> ▪ Write the formula of an inorganic compound given its name 					

CHEM 100 – Chemistry Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
4. Balance simple chemical equations.					
▪ Identify chemical reactants and products					
▪ Use chemical reaction notation					
▪ Identify changes that indicate a chemical reaction has taken place					
▪ Balance simple chemical reactions by inspection					
5. Describe acids, bases and salts.					
▪ Identify neutralization reaction and its components (acid, base, salt)					
▪ Discuss Arrhenius concept of acids/bases					
▪ Discuss Bronstead-Lowry model of acids/bases					
▪ Identify conjugate acid/base pair					
▪ Explain properties of acids and bases					
▪ Qualitatively explain pH and pOH					
6. Perform basic chemical calculations.					
▪ Discuss the mole concept					
▪ Define Avogadro's number					
▪ Define atomic mass					
▪ Calculate moles and number of atoms, given mass of atom present					
▪ Define molar mass					
▪ Convert back and forth between moles and mass of a compound					
▪ Calculate masses of reactants and products in chemical reactions					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Challenge exam

- Passing mark is 60%
- The test is 25 multiple choice questions. Percentage of questions per learning outcome: LO1 - 20%, LO2 - 12%, LO3 - 20%, LO4 - 16%, LO5 - 16%, LO6 - 16%.

Example:

The chemical name for FeCl_2

- a) iron chloride
- b) iron dichloride
- c) iron (I) chloride
- d) iron (II) chloride**

Correct answer is bolded

CHEM 100 – Chemistry: Exam blueprint

Resources

1. *Chem 100 Chemistry*, course pack, SIAST Building Systems Technician and Power Engineering Technician
2. Periodic Table (included with test)
3. Table of electronegativities (included with test)
4. Table of Common Ions and Charges (included with test)
5. Any introductory Chemistry text

DRFT 103 – Basic Mechanical Drafting

You will learn the basic fundamentals used in the interpreting and sketching of technical drawings.

Credit unit(s): 2.0

Equivalent course(s): GRPH 181

DRFT 103 – Basic Mechanical Drafting Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Apply drafting fundamentals.					
▪ Identify standard views used in technical drawing					
▪ Utilize proper drawing instruments					
▪ Sketch orthographic views from a pictorial view					
▪ Sketch isometric view from orthographic views					
▪ Apply engineering lettering					
▪ Apply dimensioning to orthographic views					
▪ Apply proper use of extension lines					
▪ Apply proper use of labels, notes and leaders					
2. Read drawings.					
▪ Identify standard symbols used in mechanical drawings					
▪ Identify standard symbols used in P and ID drawings					
▪ Obtain information from drawings					
3. Sketch system diagrams.					
▪ Sketch heat exchanger					
▪ Sketch a motor-driven boiler feedwater pump					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

Requirements for evidence file:

- Detailed resume
- [PLAR Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any current approved certificates. These documents must be confirmed by program assessor.
- Details of any workplace/industry training **AND/OR**

2. Demonstration – candidate will be provided with a set of blueprints and asked to identify the subject matter described in learning outcomes 2 & 3.

3. Interview (clarification of evidence)

DRFT 103 – Basic Mechanical Drafting: Blueprint

Resources

1. Instructor handouts
2. ISA Reference book on P&ID's ISA-5.1-1984(r1992)
3. Instrumentation Drawing Symbols DFTG 6003 (SAIT Energy and Natural Resources Dept)
4. Flow Diagrams-Mechanical Flow DFTG 6006 6003 (SAIT Energy and Natural Resources Dept)
5. Flow Diagrams-Line symbols, Drawings, and Sections 6603 (SAIT Energy and Natural Resources Dept)
6. Flow Diagram Reading 6003 (SAIT Energy and Natural Resources Dept)

MATH 116 – Mathematics

You will review the fundamentals of mathematics, algebra and trigonometry. Topics include fractions, decimals, percents, equations, ratio and proportion, metric, areas, volumes and basic trigonometry.

Credit unit(s): 2.0

MATH 116 – Mathematics Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Use basic mathematics.					
▪ Use whole numbers					
▪ Use fractions					
▪ Use decimals					
▪ Use powers and roots					
▪ Use the order of operations					
▪ Use fractions and decimals					
▪ Use percent					
2. Use algebra.					
▪ Use signed numbers					
▪ Apply the laws of exponents					
▪ Solve linear equations					
▪ Solve equations involving exponents					
▪ Transform formulas and literal equations					
▪ Solve percent word problems					
▪ Solve ratio and proportion problems					
3. Use measurement systems.					
▪ Convert between metric units					
▪ Convert between imperial units					
▪ Convert between metric and imperial units					
4. Calculate perimeter, area and volume.					

MATH 116 – Mathematics Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
▪ Use the Pythagorean theorem					
▪ Calculate perimeter					
▪ Calculate area					
▪ Calculate volume					
5. Use basic trigonometry.					
▪ Define angles					
▪ Define the trigonometric functions					
▪ Evaluate trigonometric functions					
▪ Determine angles from trigonometric values					
▪ Solve right triangles					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Challenge exam

- Passing mark is 60%
- The test is 30 questions: 18 multiple choice and 12 calculation questions.
Percentage of questions per learning outcome: LO1 27%, LO2 30%, LO3 10%, LO4 30%, LO5 3%.

Example:

The outside diameter of a pipe is 2.8 cm and the thickness of the pipe 2mm. The inside diameter of the pipe is

- a) 2.6 cm
- b) 2.4 cm**
- c) 2.2 cm
- d) 0.8 cm

Correct answer is bolded

Example:

Find the surface area of a cylindrical tank 2.4 m high and 0.84 m in diameter.

$$A = 2 \pi r^2 + \pi d h$$

$$A = 2(3.14)(0.41)^2 + 3.14(0.84)(2.4)$$

$$\mathbf{A = 7.39 \text{ m}^2}$$

Correct answer is bolded

MATH 116 – Mathematics: Exam blueprint

Resources

1. *Pan Global Power Engineering Fourth Class, Part A, Volume 1, Chapters 2-8,*
2. Any text book that covers basic mathematics, basic algebra, right triangle trigonometry.
3. Academic supplement, Power Engineering, (Steam tables, Refrigeration Table, & Handbook of Formulae & Constants) 2005 edition.

TCOM 100 – Technical Communications 1

You will receive instruction and practice in basic job related interpersonal, oral and written communication skills. The course content includes writing for the workplace and the development of teamwork skills.

Credit unit(s): 2.0

Equivalent course(s): BCOM 120, TCOM 140

TCOM 100 – Technical Communications 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Apply job related interpersonal and oral communications.					
▪ Describe the communication process					
▪ Explain active listening					
▪ Discuss non-verbal aspects of communication					
▪ Discuss ways to overcome communication barriers					
▪ Discuss conflict and conflict styles					
▪ Explain techniques for dealing with difficult people					
2. Describe effective teamwork.					
▪ Describe the stages of team building and functioning					
▪ Discuss the role of teamwork in the workplace					
3. Create workplace documents.					
▪ Use standard business formats for internal messages					
▪ Write a memo and e-mail message					
▪ Write in a shift log					
▪ Prepare work orders					
▪ Fill out warranty service forms					
▪ Complete purchase order forms					
▪ Write technical instructions					
▪ Write a short report					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- **Employer validation** [checklist and validation letter](#)
- **Work example** - A sample work situation that would describe effective teamwork, using interpersonal skills, conducting a good workplace meeting, etc.:

You are a BST employee at XYZ Institute. You and your co-workers are concerned about a potentially unsafe area in your work environment. You suggest to your supervisor that you would like to have a short noon hour meeting to discuss the concerns and formulate recommendations. You agree to present the recommendations to the supervisor for implementation consideration. Your supervisor agrees that you should go ahead with the meeting, stating "I look forward to hearing the recommendations".

- Workplace documents that demonstrate your knowledge of information described in LO3.

TCOM 100 – Technical Communications 1: Exam blueprint

Resources

A PLAR candidate may find it beneficial to review the following material in preparation for the assessment. The resources may be referred to, but are not required to PLAR the course

1. SIAST Building Systems Technician course, *TCOM 100 Technical Communications 1*
2. Any general technical communications textbook

TCOM 101 – Technical Communications 2

You will receive instruction and practice in job search techniques. You will develop a targeted resume and learn the elements of the interview process. You will also study effective meeting management and develop your ability to make oral presentations in the workplace

Credit unit(s): 2.0

Equivalent course(s): BCOM 121, COMM 127, COMM 187, COMM 191, TCOM 123

Prerequisite(s): TCOM 100, minimum grade of 60

TCOM 101 – Technical Communications 2 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Apply job search skills.					
▪ Research the job market					
▪ Use the internet to find employment resources					
▪ Complete paper and online application forms					
▪ Create a personal resume					
▪ Write a letter of application					
▪ Explain how to adapt a resume for online application					
▪ Discuss the interview process					
▪ Discuss interview behaviour					
2. Use workplace-meeting procedures.					
▪ Prepare a meeting agenda					
▪ Discuss meeting management and procedures					
▪ Participate in informal meetings					
3. Deliver short presentations.					
▪ Review the parts of a business presentation					
▪ Explain effective presentation delivery					
▪ Deliver a basic presentation on a workplace topic					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Resume & cover letter
- Employer validation [checklist and validation letter](#)
- Work sample of a generic meeting agenda

2. Interview

With program assessor to describe elements of a good meeting (i.e. distribution of agenda in advance of meeting time, refer to website:
<http://aisweb.wustl.edu/hr/empld.nsf/pages/Protocol>

AND/OR

3. Assignment

Submit a video of a presentation **AND/OR**

- Written outline describing the elements of a good presentation

[TCOM 101 – Technical Communications 2: Exam blueprint](#)

Resources

A PLAR candidate may find it beneficial to review the following material in preparation for the assessment. The resources may be referred to, but are not required to PLAR the course.

1. SIAST TCOM 101 manual.
2. Any general technical communications textbook.

ThER 182 – Thermodynamics 1

You will receive an introduction to the field of thermodynamics. You will learn the quantities, units and principles involved in elementary thermodynamics.

Credit unit(s): 2.0

Equivalent course(s): PHYS 224

ThER 182 – Thermodynamics 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Explain the basic principles of thermodynamics.					
▪ Define temperature in terms of internal energy					
▪ Describe temperature scales					
▪ Explain the operating principles of temperature measuring instruments , for example, how a liquid in glass thermometer or a thermocouple works					
▪ Describe thermal expansion of materials					
▪ Discuss heat energy and heat units					
▪ Explain the specific heat of substances					
▪ Explain the formula for sensible heat					
▪ Explain the law of heat exchange					
▪ Describe the methods of heat transfer					
2. Explain the thermodynamics of steam.					
▪ Explain the difference between sensible heat and latent heat					
▪ Define latent heat of fusion and evaporation					
▪ Explain saturation temperature and superheated steam					
▪ Describe dry and wet saturated steam					
3. Solve thermodynamic problems.					
▪ Calculate thermal expansion ; for example, calculate the increase in length of a brass bar 8.0 m long if its temperature is increased from 10°C to 90°C					
▪ Solve heat transfer problems , for example, find the quantity of heat required raise the temperature of 6.5 kg of zinc from 25°C to 85°C					

THER 182 – Thermodynamics 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
<ul style="list-style-type: none"> ▪ Use steam tables to solve thermodynamic problems, for example, find the amount of heat required to convert 1 kg of water at 0°C to saturated steam at 500 kPa. 					
<ul style="list-style-type: none"> ▪ Solve problems involving ideal gases, for example, if a gas occupies 8.0 L at 60°C and a pressure of one atmosphere, determine the temperature of the same amount of gas occupying 2.4 L at 3.0 atmospheres of pressure 					
4. Discuss the basic concepts of matter.					
<ul style="list-style-type: none"> ▪ Describe the states of matter 					
<ul style="list-style-type: none"> ▪ Explain the difference between chemical and physical properties of matter 					
<ul style="list-style-type: none"> ▪ Explain the difference between chemical and physical changes in matter 					
<ul style="list-style-type: none"> ▪ Discuss the classification of matter 					
<ul style="list-style-type: none"> ▪ Explain the structure and purpose of the periodic table 					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Challenge exam

- Passing mark of 60%
- This test is 27 multiple choice questions. Percentage of questions per learning outcome: is LO1 - 37%, LO2 - 15%, LO3 - 41%, LO4 - 7%

Example:

The amount of energy required to convert 20 kg of water at 20°C to saturated steam at a pressure of 650 kPa is

- a) 2676 kJ
- b) 2760 kJ
- c) 53 527 kJ**
- d) 55 206 kJ

Correct answer is bolded

THER 182: Thermodynamics 1: Exam blueprint

Resources

1. *Pan Global Fourth Class, Part A, Volume 1, Chapters 18-20*, Southern Alberta Institute of Technology, Pearson Custom Publishing, Boston MA, 2003
2. www.powerengineering.ca
3. *Academic supplement, Power Engineering*, (Steam tables, Refrigeration Table, & Handbook of Formulae & Constants) 2005 edition.

THER 183 – Applied Mechanics 1

You will receive an introduction to the field of mechanics. You will learn the quantities, units and principles involved in statics and dynamics.

Credit unit(s): 2.0

Equivalent course(s): MECA 121

THER 183 – Applied Mechanics 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Describe the quantities, units, and principles of forces in equilibrium.					
▪ Describe force and acceleration and their units					
▪ State the relationship between mass and force					
▪ Explain the force of gravity					
▪ Describe moment of force					
▪ Explain the free body diagrams					
▪ State the conditions of equilibrium					
▪ Explain the calculation of reactions and other forces in equilibrium problems					
2. Perform calculations relating to the transmission of force and power by simple machines.					
▪ Define simple machines					
▪ Define actual mechanical advantage (AMA), velocity ratio (VR), and efficiency of a simple machine.					
▪ Express the velocity ratio of a lever, a wheel and axle, a pulley system, and an inclined plane					
▪ Solve problems involving the AMA, VR, and efficiency of simple machines					
▪ Discuss belt drives and belt slippage					
▪ Calculate rotational speed of pulleys and pulley trains					
▪ Discuss gear drives and intermediate gears					
▪ Determine the rotational speed of gear trains					
3. Perform calculations relating to force, pressure, work, power and energy.					
▪ Discuss pressure and its units					

THER 183 – Applied Mechanics 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
<ul style="list-style-type: none"> ▪ Calculate water pressure and steam pressure 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Explain the difference between gauge and absolute pressure 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Describe work, energy, power, and their units 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Identify different forms of energy 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Describe the mechanical equivalent of heat 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ State the law of conservation of energy 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Calculate kinetic energy and potential energy 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Solve basic problems involving friction on horizontal surfaces.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Define frictional force 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Discuss static friction and kinetic friction 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Calculate the coefficient of friction 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Calculate forces required to overcome static and kinetic friction 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Solve problems involving strength of materials.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Define stress, strain, and modulus of elasticity 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Explain tensile, compressive, and shear stresses 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Discuss Hooke's Law and elastic limit 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Solve problems involving ultimate strength, factor of safety, and allowable stress 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Solve problems involving scalar and vector qualities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Explain the difference between scalar and vector quantities 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Represent vector quantities, rectangular components of vectors, and the resultant of forces 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Calculate the rectangular components of vectors and the resultant forces 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Calculate reactions and other forces involved in equilibrium problems 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Solve problems involving one-dimensional motion.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ State the formulae governing one-dimensional motion with uniform acceleration 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

THER 183 – Applied Mechanics 1		Mastery	Competent	Functional	Learning	None
Level	Description					
Mastery:	I am able to demonstrate it well enough to teach it to someone else.					
Competent:	I can work independently to apply the outcome.					
Functional:	I need some assistance in using the outcome.					
Learning:	I am developing skills and knowledge for this area.					
None:	I have no experience with the outcome.					
	▪ Explain the features and uses of velocity-time graphs					
	▪ Solve problems involving distance and speed					
	▪ Solve problems involving displacement, velocity and acceleration					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Challenge exam

- Passing mark of 60%
- The test is 25 questions: 9 true/false questions and 16 calculation and graphing questions. Percentage of questions per learning outcome: LO1 - 15%, LO2 - 25%, LO3 - 24%, LO4 - 4%, LO5 - 10%, LO6 - 8%, LO7 - 14%

Example:

True or false? Velocity ratio of a simple machine is the force of the load (weight) moved by the machine compared to the force applied to move the load.

Correct answer: false

Example:

Using a lever, a force of 500 N is applied over 1 metre to move load of 2000 N a distance of 0.2 metre. Find the percent efficiency of the lever.

$$\text{Mechanical advantage} = \frac{\text{load}}{\text{effort}} = \frac{2000 \text{ N}}{500 \text{ N}} = 4$$

$$\text{Velocity ratio} = \frac{\text{effort distance}}{\text{load distance}} = \frac{1 \text{ m}}{0.2 \text{ m}} = 5$$

$$\text{Efficiency} = \frac{\text{M.A.}}{\text{V.R.}} = \frac{4}{5} = 0.8 = 80\%$$

Correct answer is 80%

THER 183 – Applied Mechanics 1: Exam blueprint

Resources

1. Pan Global Power Engineering Fourth Class, Part A, Volume 1, Chapters 9-17,
2. www.powerengineering.ca
3. *Academic supplement, Power Engineering*, (Steam tables, Refrigeration Table, & Handbook of Formulae & Constants) 2005 edition.

Program courses

BLDG 100 – Auxiliary Power Systems

You will learn how an uninterrupted power supply system works and how to manage emergency power systems (including a backup generator unit, emergency lighting systems and battery systems).

Credit unit(s): 1.0

Prerequisite(s): ELEC 188 minimum grade of 60 (concurrent) and SFTY 187 minimum grade of 60 (concurrent)

BLDG 100 – Auxiliary Power Systems	Mastery	Competent	Functional	Learning	None
Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.					
1. Describe means to provide emergency power in buildings.					
▪ Describe types of systems					
▪ Describe battery operated systems					
▪ Describe emergency generator operated systems					
2. Describe an uninterrupted power supply (UPS).					
▪ Explain what an uninterrupted power supply is					
▪ Explain the operating procedure for an interrupted power supply					
3. Operate an auxiliary generator.					
▪ Describe emergency generator systems					
▪ Operate a backup generator					
4. Service batteries					
▪ Describe the servicing of batteries					
▪ Service batteries					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be confirmed by program assessor
- Details of any workplace/industry training **AND/OR**

2. Interview **AND/OR**

3. Demonstration

- You will safely show the [procedure for properly charging a battery](#) and also be able to manually start a backup generator and control the voltage and cycles while the system has a constant load change.
- These procedures are covered in the coursepack BLDG 100 Auxiliary Power Systems

4. Challenge exam

- Passing mark of 60%
- Exam is 16 multiple choice questions

Example:

The emergency lighting systems that use batteries are to supply lighting for how long

- a) 10 minutes
- b) 20 minutes**
- c) 30 minutes
- d) 40 minutes
- e) 60 minutes

Correct answer is bolded

[BLDG 100 – Auxiliary Power Systems: Exam blueprint](#)

Resources

1. Saskatchewan Institute of Applied Science and Technology (SIAS.T.)
Building Systems Technician course pack, BLDG 100 Auxiliary Power Systems

BLDG 101 – Building Administration

You will examine the roles of various trades that work collaboratively within a building. You will be made aware of working liability and due diligence. You will complete an elevator visual and operational check and evacuation. You will also explain how to prepare a preventative maintenance checklist.

Credit unit(s): 2.0

Prerequisite(s): COMP 172 minimum grade of 60 (concurrent) and ELEC 135 minimum grade of 60 (concurrent)

BLDG 101 – Building Administration Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. List the various functions and trades involved with a building.					
▪ Describe the function of a building systems technician					
▪ Explain what trades are involved within a building					
2. Demonstrate awareness of working liability and due diligence.					
▪ Explain working liability					
▪ Explain due diligence					
3. Describe the procedure for completing a visual and operation check and procedures for an elevator evacuation.					
▪ Describe the procedure for doing a visual check on an elevator					
▪ Describe the procedure for an operational check on an elevator					
▪ Explain the procedures for evacuating an elevator					
4. Explain a preventative maintenance checklist.					
▪ Describe the use of a preventative maintenance checklist					
▪ Describe preventative maintenance checks for heating systems					
▪ Describe preventative maintenance checks for cooling systems					
▪ Describe preventative maintenance checks for air-handling systems					
▪ Describe preventative maintenance checks for the building interior					
▪ Describe preventative maintenance checks for the building exterior					
▪ Describe preventative maintenance of furniture and equipment					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be confirmed by program assessor
- Details of any workplace/industry training **AND/OR**

2. Interview **AND/OR**

3. Challenge exam

- Passing mark of 60%
- Exam is 21 multiple choice questions and 10 question & answer

Example:

To maintain equipment properly, staff must be:

- a) higher paid
- b) qualified**
- c) given more time to do work
- d) under more supervision

Correct answer is bolded

[BLDG 101 – Building Administration: Exam blueprint](#)

Resources

1. Saskatchewan Institute of Applied Arts and Sciences (S.I.A.S.T.) course pack
Building Administration BLDG 101

BLDG 103 – Building Envelope

You will examine the construction of different building types. You will learn sealing and insulating techniques and how to repair the interior and exterior (including windows, doors and roofs).

Credit unit(s): 2.0

Prerequisite(s): PLMB 101 minimum grade of 60 (concurrent)

BLDG 103 – Building Envelope Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Describe roof construction and maintenance.					
▪ Describe the different types of roofs and their construction.					
▪ Discuss how to maintain and check a flat roof.					
2. Describe various types of building construction.					
▪ Describe concrete, wood, and metal construction.					
▪ Discuss the differences between the different construction materials.					
3. Assess total energy conservation.					
▪ Describe the need for energy conservation					
▪ Identify ways to conserve energy					
▪ Develop an energy conservation checklist					
4. Describe sealing and insulating techniques.					
▪ Describe the various types of caulking					
▪ Describe the application of insulation types					
5. Describe repairs to doors, windows, walls, and exterior surfaces.					
▪ Describe procedures for hanging a door					
▪ Describe exterior doors and windows					
▪ Describe carpet repairs					
▪ Describe installing floor and ceiling tiles					
▪ Describe tread repairs					
▪ Describe repairing and painting walls					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Challenge exam

- Passing mark of 60%
- Exam is 21 multiple choice questions and 10 question & answer

Example:

The primary purpose of painting is:

- a) protection**
- b) looks
- c) to identify the pipe
- d) economy and looks
- e) economy

Correct answer is bolded

[BLDG 103 – Building Envelope: Exam blueprint](#)

Resources

1. Saskatchewan Institute of Science and Technology (SIAST)
Building Systems Technician course pack, BLDG 103 Building Envelope

BLDG 106 – Groundskeeping

You will study different types of groundskeeping (including above-ground and underground sprinkler systems, landscaping and associated small equipment).

Credit unit(s): 1.0

Prerequisite(s): SFTY 187 minimum grade of 60 (concurrent)

BLDG 106 – Groundskeeping Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Describe landscaping techniques appropriate to the prairies.					
▪ Describe turf quality					
▪ Describe proper mowing					
▪ Describe the importance of fertilizing					
▪ Describe chemical weed control					
▪ Describe the importance of pruning					
2. Describe installation and repairs to irrigation systems.					
▪ Identify components of an irrigation system					
▪ Describe sprinkler systems					
3. Describe servicing associated small equipment.					
▪ Identify various types of small equipment used					
▪ Describe maintenance procedures for servicing small engines					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))

- Any approved current certificates. These documents must be confirmed by program assessor
- Details of any workplace/industry training **AND/OR**

2. Demonstration

Complete [sharpening of blades](#) on shovels and sharpen a chain saw blade. Also design and make, balance, and sharpen a lawn mower blade.

AND/OR

3. Challenge exam

- Passing mark of 60%
- Written multiple choice questions

Example:

All garden tools should be kept from rusting by:

- a) keeping them looking nice
- b) by cleaning and oiling after use**
- c) scraping the mud off them
- d) by washing with the hose
- e) cleaning with wire wool

Correct answer is bolded

[BLDG 106 – Groundskeeping: Exam blueprint](#)

Resources

1. Saskatchewan Institute of Applied Science and Technology (SIAST) course pack
BLDG 106 Groundskeeping

BLDG 107 – Hydronic Heating

You will learn how to safely operate, maintain and service hydronic boilers, pumps, heating units and control systems.

Credit unit(s): 3.0

Prerequisite(s): PLMB 101 minimum grade of 60 (concurrent)

BLDG 107 – Hydronic Heating Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Describe hydronic boilers and associated equipment.					
▪ Describe hydronic firetube boilers					
▪ Describe hydronic watertube boilers					
▪ Describe cast sectional, coil and tube, and pulse boilers					
2. Describe the process for servicing hydronic system controls.					
▪ Describe zoning applications					
▪ Describe two-way valves					
▪ Describe three-way valve applications					
▪ Describe primary and secondary pumping as associated with zoning					
▪ Describe converters and heat exchangers					
3. Practice hydronic system safety.					
▪ Explain the code regulations for safe operation of hot water systems					
▪ Practice safety on hydronic heating systems					
4. Service a hydronic system and associated equipment.					
▪ Service expansion tanks, air eliminators and air vents					
▪ Service water makeup units, strainers, and check valves					
▪ Service chemical feeders					
▪ Service zone controls					
5. Demonstrate overhauling centrifugal pumps.					
▪ Describe the procedure for overhauling a centrifugal pump					

BLDG 107 – Hydronic Heating Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
<ul style="list-style-type: none"> Describe the procedure for adjusting the pump the overcome pressure increase 					
<ul style="list-style-type: none"> Overhaul and align a pump and motor 					
6. Calculate static and dynamic heads.					
<ul style="list-style-type: none"> Explain how to calculate static and dynamic heads 					
<ul style="list-style-type: none"> Complete calculations on static and dynamic heads 					
7. Operate lab/workplace boilers.					
<ul style="list-style-type: none"> Explain the operating procedures for operating a hydronic boiler 					
<ul style="list-style-type: none"> Operate a hydronic boiler 					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be confirmed by program assessor
- Details of any workplace/industry training **AND/OR**

2. Challenge exam

- Passing mark of 60%
- Multiple choice questions

Example:

The maximum pressure that a hot water heating boiler is permitted to operate according to the boiler code is:

- a) **1100 Kpa**
- b) 400 Kpa
- c) 200 Kpa
- d) 100 Kpa

Correct answer is bolded

BLDG 107 – Hydronic Systems: Exam blueprint

Resources

1. Saskatchewan Institute of Applied Science and Technology (SIASST) course pack
BLDG 107 - Hydronic Systems

BLDG 109 – Building Computer Operations

Your studies will focus on building control systems in medium to large sized buildings. You will learn how to manage central control systems. You will gain an understanding of and be able to operate the basic control systems in your particular building; including programmable controllers, direct digital control systems, and computer operated building equipment.

Credit unit(s): 2.0

Prerequisite(s): COMP 172 minimum grade of 60 (concurrent)

BLDG 109 – Building Computer Operations Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Describe programmable controller systems.					
▪ Describe different types of programmable controllers					
▪ Define seal-in circuits					
▪ Define input/output modules					
▪ Describe logic functions					
2. Manage computer operated building equipment.					
▪ Identify computer operated building systems equipment					
▪ Operate computer fan system					
▪ Operate computer pulse boiler					
▪ Operate computer rooftop unit					
▪ Operate computer B-1 steam boiler					
▪ Operate computer heat pump					
3. Describe direct digital control systems.					
▪ Define the background of direct digital controls					
▪ Identify components of a direct digital control system					
▪ Define types of controllers					
4. Use direct digital control systems.					
▪ Controller programming					
▪ Apply direct digital control systems					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Challenge exam

- Passing mark of 60%
- 23 questions in total; 13 multiple choice, 1 sketch & describe, 9 fill in the blanks

Example:

On the B.S.T. computer operated equipment, what does the term DDC stand for?

- a) Digital dial up computer
- b) Direct digital control**
- c) Digital domain command
- d) Digital discrete control

Correct answer is bolded

2. Demonstration

You will be expected to be able to use a computer to start, stop and monitor several different pieces of equipment in the Building Systems Technician area.

Resources

1. Saskatchewan Institute of Applied Science and Technology (SIAST) course pack
BLDG 109 – Building Computer Operations

BLDG 110 – Ventilation Systems

You will study the principles of air-handling systems in buildings. You will learn the auxiliary systems needed to operate an air-handling system (including pneumatic controls, fans, blowers and filters). You will also learn how to service air compressors, pneumatic controls, fans, blowers, filters and rooftop units.

Credit unit(s): 2.0

Prerequisite(s): RFRG 183 minimum grade of 60 (concurrent)

BLDG 110 – Ventilation Systems Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Balance air handling systems.					
▪ Describe air handling processes in buildings					
▪ Describe instrumentation used to monitor air flow					
▪ Operate an air handling system					
▪ Describe procedures for balancing air handling systems					
▪ Balance air handling systems					
2. Service fans and blowers.					
▪ Describe servicing fans and blowers					
▪ Describe servicing humidifiers and dehumidifiers					
3. Troubleshoot noise and vibration.					
▪ Describe air-handling processes in buildings					
▪ Describe procedures for measuring and recording vibration					
4. Service mixing boxes.					
▪ Describe mixing boxes					
▪ Service mixing boxes					
5. Perform start-up and shutdown functions for a rooftop unit.					
▪ Describe the rooftop unit					
▪ Identify all parts and components on the rooftop unit					
▪ Performed timing and sequence of operation					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be confirmed by program assessor
- Details of any workplace/industry training **AND/OR**

- [Show that you can use the](#) instruments and take the measurements to balance an air handling system. Also be able to properly read a manometer.

2. Clarification interview **AND/OR**

3. Challenge exam

- Multiple choice exam; 20 questions

Example:

What is the name of the piece of equipment that is used to measure velocity and static pressures in a duct system?

- a) a manometer**
- b) a velocimeter
- c) a u tube
- d) none of the above

Correct answer is bolded

[BLDG 110 – Ventilation Systems: Exam blueprint](#)

Resources

1. Saskatchewan Institute of Applied Science and Technology (SIAST)
Building Systems Technician course pack *BLDG 110 Ventilation Systems*

ELEC 135 – Electrical Systems

You will learn troubleshooting techniques and how to apply them in building systems equipment. You will learn how to calculate power factor correction as it applies to buildings. Your studies will also include variable frequency drives.

Credit unit(s): 2.0

Prerequisite(s): ELEC 188 minimum grade of 60 and SFTY 187 minimum grade of 60

ELEC 135 – Electrical Systems Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Describe electrical safety.					
▪ Describe the hazards of electricity					
▪ Describe electrical safety devices and safety procedures					
2. Apply electrical safety.					
▪ Electrical safety in lab and shop areas					
▪ Practice electrical safety					
3. Explain AC current flow and power factor correction.					
▪ Review terms and formulas used to calculate power in AC circuits					
▪ Calculate inductive reactance					
▪ Calculate capacitive reactance					
4. Perform power factor calculations.					
▪ Explain what power factor is					
▪ Perform power factor calculations					
5. Describe the principles of fire and security alarms.					
▪ Explain a fire alarm system					
▪ Describe security systems					
6. Troubleshoot various electrical devices.					
▪ Describe electrical procedures for changing switches					
▪ Describe electrical procedures for changing receptacles					
▪ Describe electrical procedures for testing heaters					

ELEC 135 – Electrical Systems Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
<ul style="list-style-type: none"> Describe electrical procedures for servicing electric switches motors 					
<ul style="list-style-type: none"> Describe electrical procedures for lamps and ballasts 					
<ul style="list-style-type: none"> Troubleshoot various electrical devices 					
7. Demonstrate variable frequency drives.					
<ul style="list-style-type: none"> Explain variable frequency drives 					
<ul style="list-style-type: none"> Manage a variable frequency drive operated motor 					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be confirmed by program assessor
- Details of any workplace/industry training **AND/OR**

2. Demonstration **AND/OR**

[Complete drawing using](#) straight edge and templates and find two faults installed by the instructor.

3. Challenge exam

- Passing mark of 60%
- Written multiple choice

Example:

In doing a gas test of a closed vessel, what would the tester be looking for?

- a) Oxygen content, toxic and flammable gases**
- b) Toxic and flammable gases
- c) How fresh air is in the closed vessel
- d) It is the law to check all closed vessels
- e) None of the above

Correct answer is bolded

ELEC 135 – Electrical Systems: Exam blueprint

Resources

1. Saskatchewan Institute of Applied Science and Technology (S.I.A.S.T) course pack *ELEC 135 Electrical Systems*
2. *Pan Global Power Engineering Fourth Class*, Part B, Volume 1 Chapter 82,
3. *Pan Global Power Engineering Fourth Class*, Part B, Volume 2 Chapters 113-115

ELEC 188 – Basic Electricity 1

You will be introduced to the basics of DC and AC circuits and machines. You will use electrical metering devices, perform electrical calculations and describe the operation of transformers and electrical distribution systems.

Credit unit(s): 3.0

Equivalent course(s): GRPH 181, ELEC 288, PHYS 224

ELEC 188 – Basic Electricity 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Describe the characteristics of series and parallel circuits.					
▪ Describe the atomic structure of matter and its relationship to electricity					
▪ Describe voltage					
▪ Describe current					
▪ Describe resistance					
▪ Describe circuit components					
▪ Describe connection of series circuit					
▪ Describe connection of parallel circuit					
▪ Describe characteristics of series circuit in terms of electrical quantities					
▪ Describe characteristics of parallel circuit in terms of electrical quantities					
2. Perform simple calculations using voltage, current, resistance and power.					
▪ State Ohm's Law					
▪ State Power Law					
▪ Describe relationship between electrical quantities					
▪ Calculate electrical quantities of series circuits					
▪ Calculate electrical quantities of parallel circuits					
3. Describe basic principles of magnetism.					
▪ Describe relationship between current and magnetic field					
▪ Describe right hand rule					

ELEC 188 – Basic Electricity 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
4. Describe operating principles of various types of A.C. and D.C. motors and generators.					
▪ Describe components of a DC machine					
▪ Describe the operating principle of a DC generator					
▪ Describe the operating principle of a DC motor					
▪ Describe the various types of applications of DC machines					
▪ Describe components of an AC machine					
▪ Describe the operating principle of an AC alternator					
▪ Describe the various types and application of AC machines					
▪ Describe power factor					
5. Use electrical metering devices.					
▪ Describes process of measuring resistance					
▪ Describes process of measuring voltage					
▪ Describe process of measuring current					
▪ Describe process of measuring power					
▪ Describe process of measuring a circuit					
6. Describe operating principles of transformers.					
▪ Describe the construction and function of components within a transformer					
▪ Describe the principle of operation					
▪ Describe the relationship between primary and secondary voltage, current and power					
7. Describe an electrical distribution system.					
▪ Describe standard types of electrical voltage systems					
▪ Describe the types of electrical voltage systems					
▪ Describe the major components of an electrical system					
▪ Describe alternate power supply system equipment					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be confirmed by program assessor
- Details of any workplace/industry training

AND/OR

2. Challenge exam

- Passing mark of 60%
- Multiple choice

Example:

Increasing the rotational speed of an alternator will:

- a) decrease the field strength
- b) reduce the output voltage
- c) reduce the alternating current in the loop
- d) increase the frequency
- e) decrease the frequency

[ELEC 188 – Basic Electricity 1: Exam blueprint](#)

Resources

1. *Pan Global Power Engineering Fourth Class, Part B, Volume 1 Chapters 70-84*

ENGP 100 – Heating Systems 1

You will receive an introduction to heating boiler terminology, design, operation and government regulations. You will also learn about the controls for steam and hot water heating boilers.

Credit unit(s): 2.0

ENGP 100 – Heating Systems 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Describe cast iron and sectional types of boilers used in heating systems.					
<ul style="list-style-type: none"> ▪ Explain the construction of water-tube, tubular, cast iron sectional, modular and fire-tube heating boilers 					
<ul style="list-style-type: none"> ▪ List advantages and disadvantages of each type 					
2. Explain the operation of hot water and steam heating boilers.					
<ul style="list-style-type: none"> ▪ Describe types of burners used in heating boilers. 					
<ul style="list-style-type: none"> ▪ Explain oil atomizing 					
<ul style="list-style-type: none"> ▪ Describe auxiliary equipment needed for an oil combustion system 					
<ul style="list-style-type: none"> ▪ Explain the design and operation of an oil system 					
<ul style="list-style-type: none"> ▪ Explain the operation of gas burners 					
<ul style="list-style-type: none"> ▪ Describe the construction and operation of automatic valves 					
3. Describe operating principles of various boiler fittings, valves and gauges.					
<ul style="list-style-type: none"> ▪ Discuss the code requirements for pressure gauges, safety valves, water level gauges, feed water and blow off connections for steam and hot water heating boilers 					
<ul style="list-style-type: none"> ▪ Describe the purpose, operation and code requirements for hot water system expansion tanks 					
<ul style="list-style-type: none"> ▪ Discuss the types of non-required fittings used for hot water heating systems 					
4. Describe heating boiler controls for boiler operation and combustion.					
<ul style="list-style-type: none"> ▪ Describe the general operation and start-up/shut-down procedures 					
<ul style="list-style-type: none"> ▪ Describe the types of non-required fittings used for hot water heating systems 					

ENGP 100 – Heating Systems 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
5. Describe controls used for pneumatic, electric and electronic heating systems.					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be confirmed by program assessor
- Details of any workplace/industry training **AND/OR**

2. Interview **AND/OR**

3. Challenge exam

- Passing mark of 60%
- 60 questions; 50 multiple choice and 10 true/false

Example:

How many pressure relief valves shall at hot water heating boiler have?

- a) none
- b) at least one**
- c) at least two
- d) at least three
- e) at least four

Correct answer is bolded

ENGP 100 – Heating Systems 1: Exam blueprint

Resources

1. *Pan Global Power Engineering Course fourth class, "B" Volume 1 chapters 92 to 100 (inclusive)*
2. *Pan Global Power Engineering Course fourth class, "B" Volume 2 chapters 109 to 114 (inclusive)*

ENGP 101 – Heating Systems 2

Building on the knowledge gained in ENGP 100 (Heating Systems 1), you will study the various types of heating systems. You will learn the importance of building ventilation. You will also study auxiliary building systems.

Credit unit(s): 1.0

Prerequisite(s): ENGP 100 minimum grade of 60

ENGP 101 – Heating Systems 2 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Describe various steam heating systems.					
▪ Discuss heat exchange devices used to transfer heat from steam to a heated space					
▪ Describe auxiliary equipment					
▪ Describe piping and equipment for steam heating systems					
▪ Explain operation and maintenance of steam heating equipment					
▪ Explain how to troubleshoot a heating system					
2. Describe various hot water heating systems.					
▪ Outline piping and circulation layouts of hot water systems					
▪ Explain the difference between hot water and steam heating systems					
▪ Describe radiant panel and snow melting systems					
▪ Explain the purpose of hot water heating accessories					
▪ Explain the cleaning, filling, starting, routine operation and troubleshooting of hot water heating systems					
3. Describe warm air heating systems.					
▪ Explain the difference between forced air and gravity warm air heating systems					
▪ Describe the common sources of warm air heat					
▪ Describe the operation of directly fired space heaters					
▪ Explain the operation of furnace components					
▪ Discuss types of air distribution systems					
▪ Discuss recommended maintenance procedures					

ENGP 101 – Heating Systems 2 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
4. Describe building ventilation systems.					
<ul style="list-style-type: none"> ▪ Explain the difference between natural and mechanical ventilation 					
<ul style="list-style-type: none"> ▪ Discuss types of contaminants and air cleaning devices used in buildings 					
5. Describe alternate heating systems.					
<ul style="list-style-type: none"> ▪ Describe the concept and application of infrared heating 					
<ul style="list-style-type: none"> ▪ Explain the construction and operation of gas-fired and electric infrared heaters 					
<ul style="list-style-type: none"> ▪ Explain the difference between electric and other heating systems 					
<ul style="list-style-type: none"> ▪ Discuss the different methods of electric heating 					
6. Describe auxiliary building systems.					
<ul style="list-style-type: none"> ▪ Explain various lighting systems and design considerations for lighting a space 					
<ul style="list-style-type: none"> ▪ Describe common types of lighting equipment controls, emergency lighting and systems 					
<ul style="list-style-type: none"> ▪ Discuss the interrelationship between lighting, air conditioning and energy conservation in buildings 					
<ul style="list-style-type: none"> ▪ Describe hot and cold water supply systems in a building 					
<ul style="list-style-type: none"> ▪ Explain construction and operation of hot water heaters and system protective devices 					
<ul style="list-style-type: none"> ▪ Explain different methods of preventing backflow 					
<ul style="list-style-type: none"> ▪ Describe the layout of building drainage systems 					
<ul style="list-style-type: none"> ▪ Describe storm water drainage systems for buildings 					
<ul style="list-style-type: none"> ▪ Explain routine maintenance for drainage system devices 					
<ul style="list-style-type: none"> ▪ Explain how to troubleshoot drainage systems 					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be confirmed by program assessor
- Details of any workplace/industry training **AND/OR**

2. Interview **AND/OR**

3. Challenge exam

- Passing mark of 60%
- 30 multiple choice questions

Example:

Sewer gases are prevented from entering the building from fixtures by the use of:

- a) flushometer
- b) traps**
- c) air venting
- d) air gap back flow preventer
- e) double check valves

Correct answer is bolded

[ENGP 101 – Heating Systems 2: Exam blueprint](#)

Resources

A PLAR candidate may find it beneficial to review the following material in preparation for the assessment. The resources may be referred to, but are not required to PLAR the course.

1. *Pan Global Fourth Class Power Engineering*, Part “B” Volume 1 Chapters 101 to 108 (inclusive)
2. *Pan Global Fourth Class Power Engineering*, Part “B” Volume 2 Chapters 115,116,117

ENGP 103 – Legislation and Codes

You will review the various provincial, Canadian and ASME legislation and codes related to the construction and operation of boilers, pressure vessels and refrigeration plants.

Credit unit(s): 1.0

ENGP 103 – Legislation and Codes Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. State the purpose and function of the ASME Boiler and Pressure Vessel Committee and Code.					
<ul style="list-style-type: none"> ▪ Review the purposes for having a committee to formulate and adopt standardized codes 					
<ul style="list-style-type: none"> ▪ Identify the various ASME codes 					
2. Use the provincial Boiler and Pressure Vessel Act and Regulations.					
<ul style="list-style-type: none"> ▪ Review the “Sask. Boiler and Pressure Vessel ACT” 					
<ul style="list-style-type: none"> ▪ Review “Regulations for the design, Construction and Installation of Boilers and Pressure Vessels” 					
<ul style="list-style-type: none"> ▪ Review “Regulations for Power Engineers” in Saskatchewan 					
<ul style="list-style-type: none"> ▪ Review the “Examination Regulations” 					
<ul style="list-style-type: none"> ▪ Review the “Pressure Welders Regulations” 					
3. Use the Canadian Standards Association (CSA) B51 code for the construction and inspection of boilers and pressure vessels.					
<ul style="list-style-type: none"> ▪ Review the sections of the CSA B51 code book 					
<ul style="list-style-type: none"> ▪ Apply the CSA B51 code 					
4. Use the Canadian Standards Association (CSA) B52 Mechanical Refrigeration Code.					
<ul style="list-style-type: none"> ▪ Review the sections of the CSA B52 code book 					
<ul style="list-style-type: none"> ▪ Apply the CSA B51 code 					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

An interview may be required to clarify evidence.

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be validated by program assessor
- Details of any workplace/industry training (i.e. size of boilers)

2. Challenge exam

- Passing mark of 60%
- 24 multiple choice questions and 6 true/false questions

Example:

The objective of rules of safety governing the design, fabrication, and inspection during construction of boilers and pressure vessels is to:

- a) legislate safety
- b) protect life and property**
- c) prevent the boilers from exploding
- d) ensure safe operation of all boilers
- e) make certain that boilers coming from the USA are safe

Correct answer is bolded

ENGP 103 – Legislation and Codes: Exam blueprint

Resources

1. *Pan Global Power Engineering Fourth Class, Part A, Volume 1, Chapter 1,*
2. *Pan Global Power Engineering Fourth Class, Part A, Volume 1, Chapter 25,*

ENGP 104 – Advanced Power Lab

Building on the skills you developed in ENGP 180 (Power Lab 1), you will operate boilers, pumps and take water tests in a functioning lab. The lab will allow you to bring all of your previously learned theory and skills together in order to validate your knowledge and operating skills.

Prerequisite(s): ENGP 180 minimum grade of 60

ENGP 104 – Advanced Power Lab Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Place a boiler on hot standby.					
▪ Describe the reasons for placing a boiler on hot standby					
▪ Explain the procedure for placing a boiler on hot standby					
▪ Place the boiler on hot standby in the proper order					
2. Regulate boiler pressure.					
▪ Operate boiler firing controls to maintain pressure regardless of changing load conditions					
▪ Operate steam users to help maintain boiler pressure					
3. Switch electric controls from manual to automatic and vice versa.					
▪ Describe the procedure for switching electric controls from manual to automatic and vice versa					
▪ Place the boiler controls onto automatic control and vice versa					
▪ Operate boiler controls from auto to manual when facing adverse operating conditions					
▪ Identify origin of operating control signal in automatic and manual mode					
4. Explain soot blowers.					
▪ Pressurize the steam lines up to the soot blowing equipment					
▪ Manipulate the firing controls to the required conditions for soot blowing operation					
▪ Operate the soot blowers					
▪ Shut down the system					
▪ Return the firing controls to normal operation					

ENGP 104 – Advanced Power Lab Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
5. Operate a high pressure boiler using computer controls.					
<ul style="list-style-type: none"> ▪ Explain the difference between electric controls and computer controls for boiler operation 					
<ul style="list-style-type: none"> ▪ Operate boiler using computer controls changing from automatic to manual and vice versa 					
6. Describe operation of steam turbines and steam pumps. *					
<ul style="list-style-type: none"> ▪ Explain the operation of a high pressure steam engine and steam pump 					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

* To successfully challenge this course, a candidate must demonstrate application of learning outcome #6. The knowledge of the learning outcomes 1-5 are incorporated into the application of Learning outcome #6. *

1. Evidence file

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be validated by program assessor
- Details of any workplace/industry training (i.e. size of boilers) **AND/OR**

2. Demonstration

Service a boiler and accessories that operates on either fuel oil or natural gas.

- To successfully challenge this demonstration a candidate must demonstrate knowledge of all learning outcomes as outlined in the self-audit of this course.
- The program assessor will ask clarification questions while candidate is demonstrating how to service a boiler and accessories using either fuel oil or natural gas.

ENGP 104 – Advanced Power Lab: Exam blueprint

Resources

1. *Pan Global Power Engineering Fourth Class, Part B, Volume 1, Unit 16, Chapter 69,*
2. Saskatchewan Institute of Applied Science and Technology, (SIAST)
Building Systems Technician course pack ENGP 104 Advanced Power Lab

ENGP 180 – Power Lab 1

You will learn the major components of a steam plant and participate in the start-up of the equipment which is similar to that used in industry. You will also perform water testing and chemical treatment.

Credit unit(s): 4.0

Equivalent course(s): PROP 182

ENGP 180 – Power Lab 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Identify power lab components and safety regulations.					
▪ Identify the major components of the power lab					
▪ Identify the importance of safety regulations in the power lab					
2. Install manhole and handhole covers.					
▪ Identify types of gaskets and their purpose					
▪ Select appropriate gaskets					
▪ Install gaskets					
▪ Install manhole and handhole covers					
3. Operate a plant air distribution system.					
▪ Identify instrument air sources					
▪ Identify lab air compressor system components					
▪ Start up air compression system					
▪ Monitor lubrication and air pressure					
▪ Shut down air compression system					
4. Operate raw and treated water systems.					
▪ Identify source of raw water					
▪ Trace raw water lines to the water softener					
▪ Identify water treatment components					
▪ Trace treated water lines to various vessels					
▪ Identify treated water users					
▪ Put water system into operation					

ENGP 180 – Power Lab 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
5. Operate boiler feedwater pump.					
▪ Check source water level					
▪ Identify fittings and components on suction, discharge and recirculation lines					
▪ Trace feed water lines to high pressure boiler					
▪ Open all suction, recirculation and discharge valves to boiler					
▪ Start pump					
▪ Monitor and adjusts pressure and water levels					
▪ Perform shut down procedure					
6. Operate basic controllers.					
▪ Identify controller components					
▪ Identify purpose of controllers					
▪ Perform manual increase and decrease functions					
▪ Place feed water controller on automatic control					
7. Operate low pressure boiler and auxiliaries.					
▪ Identify boiler fittings and equipment					
▪ Perform pre-start checks					
▪ Start up boiler					
▪ Put feed water pump and system into operation					
▪ Perform intermittent blow down					
▪ Operate ON/OFF controls to maintain pressure					
▪ Perform shut down procedures					
8. Operate high pressure boiler.					
▪ Identify boiler fittings and equipment					
▪ Perform pre-start checks					
▪ Start up boiler					
▪ Check programmer operation					

ENGP 180 – Power Lab 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
▪ Perform intermittent blow-down					
▪ Perform manual purge					
▪ Operate manual controls to maintain pressure					
▪ Maintain drum water level					
▪ Perform shut down procedures					
9. Tests boiler interlocks.					
▪ Identifies location and purpose of all interlocks					
▪ Identify interaction with boiler programmer					
▪ Check interlock function					
10. Perform water tests and chemical additions.					
▪ Locate water samples points					
▪ Obtain water samples					
▪ Perform water tests					
▪ Interpret test results					
▪ Adds chemical to adjust water chemistry					
11. Operate low and high pressure steam systems.					
▪ Identify fittings and equipment on high pressure systems					
▪ Identify fittings and equipment on low pressure system					
▪ Pressurize high pressure system					
▪ Pressurize low pressure system					
▪ Pressurize dearator					
▪ Put condensate system into service					
▪ Put heat exchanger into service					
▪ Adjust boiler controls for specific pressures and steam flows					
▪ Monitor system operation					
▪ Perform shut down procedures					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

An interview may be required to clarify evidence

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be validated by program assessor
- Details of any workplace/industry training (i.e. size of boilers) **AND/OR**

2. Challenge exam

- Written exam with multiple choice and definition questions

Multiple choice example:

The objective of rules of safety governing the design, fabrication, and inspection during construction of boilers and pressure vessels is to:

- a) to act as a sediment collector
- b) to reduce agitation of water level
- c) to house a low water cut off
- d) all of the above

Definition example:

Define the purpose of a siphon

Candidate must attain an overall 60% average on assessment methods

ENGP 180 – Power Lab 1: Exam blueprint

Resources

1. *Pan Global Power Engineering Fourth Class, Part B, Volume 1, Unit 16, Chapter 69,*
2. Saskatchewan Institute of Applied Science and Technology, (SIAST)
Building Systems Technician course pack ENGP 104 Advanced Power Lab

ENGP 181 – Plant Maintenance 1

You will learn about and practice the various types of maintenance required to keep plant equipment functioning in a safe workplace.

Credit unit(s): 4.0

ENGP 181 – Plant Maintenance 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Describe the safe use of common hand tools in the powerhouse.					
<ul style="list-style-type: none"> ▪ List the general safe working practices identified by the Worker's Compensation Board 					
<ul style="list-style-type: none"> ▪ Describe the types and proper use of hacksaws, files, chisels, hammers, screwdrivers and wrenches 					
<ul style="list-style-type: none"> ▪ Explain the types and proper use of hand threading tools 					
<ul style="list-style-type: none"> ▪ Discuss the types and proper use of measuring tools 					
<ul style="list-style-type: none"> ▪ Describe the proper layout of work and the use of layout tools 					
<ul style="list-style-type: none"> ▪ List the types and proper use of portable and fixed grinders, hand drills, drill presses and the care of drill bits 					
2. Explain the mechanical properties of engineering materials.					
<ul style="list-style-type: none"> ▪ Discuss the requirements of setting up work platforms, ladders and scaffolding 					
<ul style="list-style-type: none"> ▪ Describe the general safety precautions calculations used when rigging equipment 					
<ul style="list-style-type: none"> ▪ Explain the general safety precautions used when hoisting equipment 					
<ul style="list-style-type: none"> ▪ Discuss the mechanical properties of materials 					
<ul style="list-style-type: none"> ▪ List the various types of ferrous materials with respect to their mechanical properties 					
<ul style="list-style-type: none"> ▪ Describe the various types of non-ferrous materials with respect to their mechanical properties 					
3. Use basic welding techniques.					
<ul style="list-style-type: none"> ▪ Define the common terms used in welding 					
<ul style="list-style-type: none"> ▪ Describe forge welding 					
<ul style="list-style-type: none"> ▪ Discuss oxyacetylene welding and cutting 					

ENGP 181 – Plant Maintenance 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
<ul style="list-style-type: none"> ▪ Describe metal arc welding 					
<ul style="list-style-type: none"> ▪ Describe braze welding 					
<ul style="list-style-type: none"> ▪ Discuss the commonly used methods of weld inspection and testing 					
<ul style="list-style-type: none"> ▪ Use basic welding techniques 					
4. Discuss power piping.					
<ul style="list-style-type: none"> ▪ State the applications for the most common materials used in piping 					
<ul style="list-style-type: none"> ▪ Describe the common methods used to identify the size of commercial pipe 					
<ul style="list-style-type: none"> ▪ Describe methods of connection of screwed, flanged and welded pipe 					
<ul style="list-style-type: none"> ▪ Identify fittings and their markings 					
<ul style="list-style-type: none"> ▪ Define methods and devices used to allow for pipe expansion and support 					
<ul style="list-style-type: none"> ▪ Explain the need for good drainage in steam piping 					
<ul style="list-style-type: none"> ▪ Discuss the methods, materials and need for piping insulation 					
5. Discuss the design, application and maintenance of the most common types of valves used in power piping systems.					
<ul style="list-style-type: none"> ▪ Describe the standard valve designs 					
<ul style="list-style-type: none"> ▪ Describe the design and operation of specialized boiler valves 					
<ul style="list-style-type: none"> ▪ Describe piping arrangements and the design and operations of steam system pressure-reducing valves 					
<ul style="list-style-type: none"> ▪ State the common construction materials for valves 					
<ul style="list-style-type: none"> ▪ Describe valve identification markings 					
<ul style="list-style-type: none"> ▪ Discuss typical valve maintenance 					
6. Perform maintenance tasks in powerhouse environment.					
<ul style="list-style-type: none"> ▪ Use precision measuring tools 					
<ul style="list-style-type: none"> ▪ Repack a pump and valve 					

ENGP 181 – Plant Maintenance 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
▪ Manufacture a tool from raw metal stock					
▪ Sharpen drill bits					
▪ Change gauge glass					
▪ Construct gaskets					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

An interview may be required to clarify evidence

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be validated by program assessor
- Details of any workplace/industry training (i.e. size of boilers) **AND/OR**

2. Challenge exam

- Passing mark of 60%
- Written multiple choice

Example:

In the metal arc welding process what shields the atmosphere from the weld?

- a) flux
- b) rod coating
- c) welding shield
- d) all of the above

[ENGP 181 – Plant Maintenance 1: Exam blueprint](#)

3. Demonstration: Thread pipe

Candidate will be evaluated on the following criteria:

- Work done safely and properly
- Cut square and to the correct length
- Reaming is smooth and clean
- Method of die use and cut
- Finish product is clean and smooth

If needed, complete [Proctor forms – Appendix C](#) (upon approval from program head)
See [Step 4 – Action Plan](#)

Resources

1. *Pan Global Power Engineering Fourth Class, Part B, Volume 2; Chapters 142-144,*
2. *Pan Global Power Engineering Fourth Class, A2; Chapters 46-48,*
3. Saskatchewan Institute of Applied Science and Technology, (SIAST),
Building Systems Technician Plant Maintenance 1 Project Book

ENGP 188 – Plant Maintenance 2

The course is a continuation of ENGP 181 (Plant Maintenance 1). You will receive hands-on training on plant maintenance tasks (including the construction of piping systems, shaft alignment and boiler cleaning, maintenance and repair).

Credit unit(s): 4.0

Prerequisite(s): ENGP 181 minimum grade of 60

ENGP 188 – Plant Maintenance 2 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Construct piping systems.					
▪ Builds a soft copper air assembly					
▪ Fabricate a hard copper piping system					
▪ Cuts threads					
▪ Make a steel pipe trap and bypass rack					
2. Perform shaft alignment and rigging procedures.					
▪ Identify common shaft alignment problems					
▪ Identify methods to correct alignment					
▪ Aligns shafts					
3. Issue work permits for plant maintenance jobs.					
4. Describe the maintenance required for boilers and service a boiler					
▪ List the tools needed to service a boiler					
▪ Identify common boiler problems					
▪ Discuss routine boiler service and maintenance procedures					
▪ Describe lay-up methods					
▪ Describe boiler repair procedures required after an inspection					
▪ Perform boiler service and maintenance tasks					
5. Describe boiler cleaning and boiler inspection preparation procedures.					
▪ Discuss the inspection methods used for the fireside and waterside of a boiler					

ENGP 188 – Plant Maintenance 2 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
▪ Describe the operational procedures used to prepare a boiler for cleaning					
▪ Discuss the mechanical and chemical cleaning procedures used					
▪ List the tools and chemicals used in boiler cleaning					
▪ Perform boiler cleaning					
6. Describe plant shutdown and maintenance procedures.					
▪ Disassemble plant equipment					
▪ Identify any plant equipment problems					
▪ Discuss ASME code and provincial Boiler Branch repair procedures and qualification requirements					
▪ Fix minor equipment problems					
7. Perform plant shutdown and maintenance procedures.					
▪ Disassemble plant equipment					
▪ Identify any plant equipment problems					
▪ Report findings					
▪ Fix minor equipment problems.					
▪ Perform cable, rope and fastener attachments used in maintenance procedures					
▪ Identify any plant equipment problems					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

An interview may be required to clarify evidence

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))

- Any approved current certificates. These documents must be validated by program assessor
- Details of any workplace/industry training (i.e. size of boilers) **AND/OR**

2. Challenge exam

- Passing mark of 60%
- Written multiple choice

Example:

To what pressure must the boiler be raised to in order to do a hydrostatic test correctly on a boiler normally operating at 600 lbs. psi?

- a) 600 psi
- b) 650 psi
- c) 700 psi
- d) 800 psi
- e) 900 psi

ENGP 188 – Plant Maintenance 2: Exam blueprint

3. Demonstration

Your plant is doing a boiler layup. Provide a written explanation in point form the steps you must take to do a boiler layup. (Please refer to learning outcomes #3 & #4)

4. Clarification interview

The BST program evaluation may need to ask some clarification questions concerning your evidence submission and demonstration.

If needed, complete [Proctor forms – Appendix C](#) (upon approval from program head)
See [Step 4 – Action Plan](#)

Resources

1. *Pan Global Power Engineering Fourth Class, Part A, Volume 2, Chapters 49,50,*
2. *Pan Global Power Engineering Fourth Class, Part B, Volume 2, Chapters 145,146,*
3. *Pan Global Power Engineering Fourth Class, B1; Chapter 75*
4. Saskatchewan Institute of Applied Science and Technology, (SIAST)
Plant Maintenance 2 Project Book

PLMB 101 – Plumbing Systems

You will study plumbing systems in larger buildings. You will learn water supply and waste-water handling. You will also learn how to test and service plumbing fixtures.

Credit unit(s): 2.0

Prerequisite(s): ENGP 181 minimum grade of 60 (concurrent)

PLMB 101 – Plumbing Systems Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Describe various plumbing systems.					
▪ Describe plumbing fixtures used in buildings					
▪ Describe maintaining of plumbing fixtures					
▪ Explain motion sensors on plumbing systems					
2. Describe storm and wastewater handling systems for large buildings.					
▪ Describe storm drainage systems around the building and the problems associated with them					
▪ Describe a sanitary drainage system and the problems associated with it					
3. Describe water supply systems for large buildings.					
▪ Describe a water distribution system					
▪ Describe the problems associated with the distribution system					
4. Describe servicing plumbing fixtures.					
▪ Identify the types of water closets					
▪ Describe the procedure for clearing a blocked water closet					
▪ Describe the procedure for replacing a water closet					
▪ Identify the parts of a water closet tank and describe the action					
▪ Describe the procedure for replacing a fixture and faucets					
5. Service plumbing fixtures.					
▪ Clear a blocked water closet					
▪ Replace a water closet					
▪ Service fixtures and faucets					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

An interview may be required to clarify evidence

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be confirmed by program assessor
- Details of any workplace/industry training **AND/OR**

2. Clarification interview **AND/OR**

3. Challenge exam

- Passing mark of 60%
- Written multiple choice of 30 questions

Example:

The purpose of a trap is:

- a) seal out sewer gases**
- b) trap objects
- c) prevent flow back
- d) provide a flexible connection to the stack

Correct answer is bolded

[PLMB 101 – Plumbing Systems: Exam blueprint](#)

Resources

1. Saskatchewan Institute of Applied Science and Technology (SIAST)
Building Systems Technician, course pack, *Plumbing 101*

RFRG 103 – Refrigeration Systems 2

You will develop skills used to troubleshoot and repair different types of refrigeration systems used in buildings (such as ice machines, water coolers, refrigerators, walk-in coolers and/or freezers).

Credit unit(s): 2.0

Prerequisite(s): ELEC 188 minimum grade of 60 (concurrent) and SFTY 187 minimum grade of 60 (concurrent)

RFRG 103 – Refrigeration Systems 2 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Describe refrigeration safety.					
▪ Explain refrigeration safety					
▪ Explain safety specific to ammonia systems					
2. Implement refrigeration safety.					
▪ Practice refrigeration safely					
▪ Install service gauges in a refrigeration system					
3. Describe servicing refrigeration systems					
▪ List methods of leak detection					
▪ Describe methods of drying the system					
▪ Explain charging a system					
▪ Describe charging, drying and leak detection in a system					
4. Service refrigeration systems.					
▪ Explain the procedures for servicing a refrigeration system					
▪ Service a refrigeration system					
5. Apply troubleshooting techniques on refrigeration systems.					
▪ Discuss troubleshooting techniques for a refrigeration system					
▪ Troubleshoot a refrigeration system					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be confirmed by program assessor
- Details of any workplace/industry training **AND/OR**

2. Interview **AND/OR**

3. Demonstration

[You will safely show the procedure](#) for putting gauges on a refrigeration system. You will also be able to understand and explain what the corresponding pressures and temperature mean. You will be able to safely change a part, including the evacuation and proper charging of the system.

These procedures are covered in:

- Learning outcome 4. Service refrigeration systems
- Learning outcome 5. Apply troubleshooting techniques on refrigeration systems

4. Challenge exam

- Passing mark of 60%
- Written 30 question exam; 18 multiple choice and 12 true/false

Example:

When connecting manifold gauges to a system the high side gauge is connected to the:

- a) suction service valve
- b) discharge service valve**
- c) king valve
- d) expansion valve

Correct answer is bolded

[RFRG 103 – Refrigeration Systems 2: Exam blueprint](#)

Resources

1. *Modern Refrigeration and Air Conditioning 18th Edition*; Chapter 3, units 3.1 – 3.9
2. Saskatchewan Institute of Applied Science and Technology, (SIAST) Building Systems Technician course pack, *RFRG 103*

RFRG 183 – Air Conditioning

You will receive the information needed to operate and maintain a building's air conditioning system.

Credit unit(s): 3.0

Equivalent course(s): AIR 288

RFRG 183 – Air Conditioning Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Describe the psychrometric properties of air.					
▪ Explain the composition of air					
▪ Define the terminology of air					
▪ Explain the specific volume and enthalpy of air					
▪ Interpret the psychrometric properties of air on a psychrometric chart					
2. Solve air quality problems using a psychrometric chart.					
▪ Explain the psychrometric chart regarding combined heating/cooling and humidification problems					
▪ Interpret the psychrometric chart to find values of specific properties of air					
▪ Apply the psychrometric chart to the heating and cooling of air					
▪ Describe what is meant by “comfort conditions” with respect to the psychrometric chart					
3. Describe air flow behaviour and its movement through distribution systems.					
▪ Discuss the theory of air flow and pressure conversions					
▪ Describe major types of air handling fans, their construction and operation					
▪ Interpret fan performance charts					
▪ Describe fan motors, drives and belt guards					
4. Explain duct design and components used in air conditioning systems.					
▪ Explain how air duct systems are classified					
▪ Describe air duct materials, system layout, fabrication and installation					

RFRG 183 – Air Conditioning Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
<ul style="list-style-type: none"> ▪ Describe air duct leakage 					
<ul style="list-style-type: none"> ▪ List the types of liners and dampers used in air duct systems 					
<ul style="list-style-type: none"> ▪ Describe terminal air distribution devices and the principles of diffusion, induction, entrainment and aspiration. 					
5. Describe various types of coils used for air conditioning.					
<ul style="list-style-type: none"> ▪ Describe general construction of finned heat exchanger coils 					
<ul style="list-style-type: none"> ▪ Explain the construction, sizing and operation of water coils and steam coils 					
<ul style="list-style-type: none"> ▪ Explain the operational and equipment sizing issues associated with glycol coils 					
<ul style="list-style-type: none"> ▪ Describe the installation recommendations for coils, piping, steam traps, control valves, air vents and vacuum relief devices 					
6. Describe the equipment and principles of humidification.					
<ul style="list-style-type: none"> ▪ Describe the general purpose and principles of humidification 					
<ul style="list-style-type: none"> ▪ List residential and commercial types of humidifiers. 					
<ul style="list-style-type: none"> ▪ Describe industrial humidifiers. 					
7. Discuss the operation of various air conditioning systems.					
<ul style="list-style-type: none"> ▪ List the functional components and categories of air conditioning systems 					
<ul style="list-style-type: none"> ▪ Describe the operation of air handling units 					
<ul style="list-style-type: none"> ▪ Explain the general layout and operation of unitary air conditioning systems 					
<ul style="list-style-type: none"> ▪ Describe the general layout and operation of central air conditioning systems 					
8. Explain the design of combined air conditioning systems and alternative system arrangements.					
<ul style="list-style-type: none"> ▪ Describe the general layout and operation of combined air conditioning systems 					
<ul style="list-style-type: none"> ▪ Describe alternative arrangement of equipment for air conditioning systems 					
<ul style="list-style-type: none"> ▪ Explain the selection criteria for air conditioning systems 					

RFRG 183 – Air Conditioning Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
9. Describe air conditioning heat recovery systems.					
▪ Describe the general principles of air conditioning heat recovery					
▪ Describe the operation of the “runaround” system					
▪ Explain the thermal wheel air conditioning heat recovery system					
▪ Describe the heat pipe air conditioning heat recovery system					
▪ Describe the heat pump system					
10. Describe the control systems used in air conditioning.					
▪ Explain various damper control strategies for air conditioning systems					
▪ List preheat coil control strategies for air conditioning systems.					
▪ Discuss heating coil control strategies for air conditioning systems					
▪ Describe humidification control strategies for air conditioning systems					
▪ Explain dehumidification and cooling control strategies for air conditioning systems					
▪ Describe volume control with static pressure regulation for air conditioning systems					
▪ Discuss complete air conditioning control systems					
11. Explain the various ways a building gains and loses heat.					
▪ Define heat transmission terminology					
▪ Identify calculation units					
▪ Describe the heat gains that occur in a building					
▪ Describe the heat losses that occur in a building					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

The PLAR candidate will submit evidence accompanied by an [Employer letter of validation](#) (see Appendix A) to support meeting of all course learning outcomes. (A list of the required evidence will be given to the PLAR candidate at the PLAR audit meeting in step 3 of the candidate process for prior learning.)

Note: An interview may be required to support the Evidence file.

2. Challenge exam

- Passing mark of 60%
- Written 50 question exam; 44 multiple choice and 11 true/false

Example:

Effective temperature is:

- a) a temperature ratio between sensible heat and air flow
- b) a temperature ratio between humidity and sensible heat
- c) rate of which air is dehumidified
- d) rate of which air is humidified
- e) **a measurement in comfort**

Correct answer is bolded

[RFRG 183 – Air Conditioning: Exam blueprint](#)

Resources

1. *Pan Global Power Engineering Fourth*, Part B, Volume two. Unit 27 Chapters 130-136 & Unit 28 Chapters 137-141

RFRG 195 – Refrigeration Systems

The course provides an introduction to the principles of refrigeration used in power plants.

Credit unit(s): 4.0

Prerequisite: THER 182 minimum grade of 60

RFRG 195 – Refrigeration Systems Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Describe the terms and principles associated with the thermodynamics of refrigeration.					
<ul style="list-style-type: none"> ▪ Explain the fundamentals of refrigeration 					
<ul style="list-style-type: none"> ▪ Describe the cycle of operation in a vapour compression refrigeration system 					
<ul style="list-style-type: none"> ▪ Explain how operating temperatures and pressures relate in a vapour compression refrigeration system 					
<ul style="list-style-type: none"> ▪ State how the capacity of a refrigeration system is described 					
<ul style="list-style-type: none"> ▪ Explain how refrigeration tables are used to calculate system performance 					
2. Discuss the different refrigerants used in an industrial application.					
<ul style="list-style-type: none"> ▪ Explain how refrigerants are classified 					
<ul style="list-style-type: none"> ▪ Describe the thermodynamic properties of refrigerants 					
<ul style="list-style-type: none"> ▪ Describe the properties of a refrigerant 					
3. Describe the operating principles of a compression refrigeration system.					
<ul style="list-style-type: none"> ▪ Discuss the basic layout of compression refrigeration system 					
<ul style="list-style-type: none"> ▪ Recognize the difference between direct and indirect refrigeration systems 					
<ul style="list-style-type: none"> ▪ Explain how compression refrigeration system temperature and pressures are related 					
<ul style="list-style-type: none"> ▪ Describe the layout of packaged refrigeration systems 					
<ul style="list-style-type: none"> ▪ Discuss the role of a refrigeration economizer 					
4. Explain refrigeration compressors.					
<ul style="list-style-type: none"> ▪ Discuss the construction and operation of the common types of refrigeration compressors 					

RFRG 195 – Refrigeration Systems Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
<ul style="list-style-type: none"> Describe the construction and operation of seals for refrigeration compressors 					
5. Perform simple compressor calculations.					
<ul style="list-style-type: none"> Calculate the capacity of a refrigeration compressor 					
<ul style="list-style-type: none"> Calculate the efficiency of a refrigeration compressor 					
<ul style="list-style-type: none"> Calculate the compression ratio of a refrigeration compressor 					
6. Describe the different types of heat exchangers used in refrigeration systems.					
<ul style="list-style-type: none"> Describe the designs and construction of refrigeration system evaporators and condensers 					
<ul style="list-style-type: none"> Describe refrigeration condenser operation and maintenance 					
7. Describe the purpose of operational and safety controls on a refrigeration system.					
<ul style="list-style-type: none"> Describe the operation of temperature, pressure and humidity controls for refrigeration systems 					
<ul style="list-style-type: none"> Describe system actuators used in a refrigeration control systems 					
<ul style="list-style-type: none"> Discuss the typical refrigeration system safety shutdown devices 					
8. Explain the operating principles of refrigeration capacity controls.					
<ul style="list-style-type: none"> Discuss refrigeration cycle expansion valves 					
<ul style="list-style-type: none"> Describe evaporator and compressor capacity controls 					
9. Discuss refrigeration system accessories.					
<ul style="list-style-type: none"> Explain accessories used in refrigeration plants to gain proper efficiencies of operation 					
<ul style="list-style-type: none"> Describe the operation of gauges, separators, strainers and indicators 					
10. Describe prestart-up procedures used on compression refrigeration systems.					
<ul style="list-style-type: none"> Describe how to perform refrigeration system leak tests 					
<ul style="list-style-type: none"> Discuss how a refrigeration system is dried and charged prior to start-up 					

RFRG 195 – Refrigeration Systems Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
<ul style="list-style-type: none"> Describe how a system is purged of noncondensable gases prior to start-up 					
<ul style="list-style-type: none"> List the steps for adding oil to a refrigeration compressor when it is in service 					
11. Explain operation and maintenance procedures used on compression refrigeration systems.					
<ul style="list-style-type: none"> Describe the steps in the start-up and shut-down of a compression refrigeration system 					
<ul style="list-style-type: none"> List the safety shutdown devices that are specific to a centrifugal compressor 					
<ul style="list-style-type: none"> Describe the routine operation and associated log sheets for compression refrigeration systems 					
<ul style="list-style-type: none"> Describe the standard preventative maintenance procedures for compression refrigeration systems 					
<ul style="list-style-type: none"> Describe how to troubleshoot a compression refrigeration system 					
12. Describe the operating principles of the ammonia and lithium bromide absorption refrigeration systems.					
<ul style="list-style-type: none"> Describe the theory and operation of an ammonia absorption refrigeration system 					
<ul style="list-style-type: none"> Describe the theory and operation of the lithium bromide absorption refrigeration system 					
<ul style="list-style-type: none"> Identify the advantages and disadvantages of absorption and compression refrigeration systems 					
13. Discuss the operation and maintenance procedures used on absorption refrigeration systems.					
<ul style="list-style-type: none"> Explain the operation of absorption refrigeration systems with respect to crystallization equilibrium concentration and dilution 					
<ul style="list-style-type: none"> Describe an absorption system heat exchanger bypass, pump motor lubrication and cooling 					
<ul style="list-style-type: none"> Describe the purging system for an absorption refrigeration system 					
<ul style="list-style-type: none"> List the steps in the start-up procedure of an absorption refrigeration system 					
<ul style="list-style-type: none"> Describe the routine operation of an absorption refrigeration system 					

RFRG 195 – Refrigeration Systems Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
<ul style="list-style-type: none"> Describe the preventative maintenance performed on an absorption refrigeration system 					
<ul style="list-style-type: none"> Describe how to troubleshoot an absorption refrigeration system 					
14. Describe a refrigeration system.					
<ul style="list-style-type: none"> Perform a start-up sequence for an ammonia compression refrigeration system 					
<ul style="list-style-type: none"> Operate an ammonia compression refrigeration system 					
<ul style="list-style-type: none"> Perform shutdown sequence for an ammonia compression refrigeration system 					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Detailed resume
- Any approved current certificates. These documents must be validated by program assessor
- Details of any workplace/industry training (i.e. size of refrigeration system)

AND/OR

2. Interview

An interview may be required to clarify evidence **AND/OR**

3. Challenge exam

- Passing mark of 60%
- 30 multiple choice questions

Example:

Superheat is designed to eliminate:

- a) evaporator from freezing
- b) metering valve from freezing up
- c) liquid refrigerant from entering the compressor**
- d) cooling of refrigerant entering the condenser
- e) none of the above

Correct answer is bolded

RFRG 195 – Refrigeration Systems: Exam blueprint

Resources

1. *Pan Global Power Engineering Fourth Class* , Part B, Volume 2, Chapters 118- 129

SEM 101 – Technology Seminars

You will receive an orientation to your program and learn where and how the technician/technologist fits into the workplace and society. You will become familiar with the role of technicians/technologists in society, study and time management skills, increasing diversity in the workplace, principles of sustainability, the impact of technology on society and workplace safety requirements.

Credit unit(s): 1.0

Equivalent course(s): ENGM 181, ETHC 183, ORTN 120

SEM 101 – Technology Seminars Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Develop study and time management skills.					
▪ Identify keys of success					
▪ Set priorities and goals					
▪ Apply time management skills					
▪ Identify methods of dealing with stress					
▪ Use note taking skills and study techniques					
2. Recognize diversity in the workplace.					
▪ Explain the concepts and benefits of diversity					
▪ Identify the factors driving the need for diversity in the workplace					
▪ Identify barriers facing non-traditional workers					
▪ Recognize the requirements of equity programs					
▪ Recognize harassment and discrimination in the workplace					
3. Recognize principles of sustainability to work.					
▪ Identify significant environmental problems of local and global concern					
▪ Recognize environmental consequences of an individual's actions					
4. Describe professional ethics, responsibility and accountability.					
▪ Discuss the role of professional organizations					
▪ Discuss the roles and responsibilities of the technician, technologist and engineer					

SEM 101 – Technology Seminars Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
<ul style="list-style-type: none"> ▪ Discuss personal qualities needed to become a technologist 					
<ul style="list-style-type: none"> ▪ Discuss present and future prospects of technology 					
<ul style="list-style-type: none"> ▪ Discuss professionalism and ethics 					
5. Describe the impact of technology on society.					
<ul style="list-style-type: none"> ▪ Recognize the linkages between technology, sociology and economics in national and international development 					
<ul style="list-style-type: none"> ▪ Recognize the importance of public relations in dealing with technology impacts on society 					
<ul style="list-style-type: none"> ▪ Recognize the capabilities, limitation and expectations of technology in solving global problems 					
<ul style="list-style-type: none"> ▪ Recognize the linkages between technology, sociology and economics in national and international development 					
<ul style="list-style-type: none"> ▪ Recognize the importance of public relations in dealing with technology impacts on society 					
6. Describe workplace safety procedures.					
<ul style="list-style-type: none"> ▪ Discuss the importance of workplace safety 					
<ul style="list-style-type: none"> ▪ Discuss special occupational and safety requirements for the occupational area 					
<ul style="list-style-type: none"> ▪ Identify sources of safety related legislation, codes and standards 					
<ul style="list-style-type: none"> ▪ Describe requirements for WHMIS certification and a WHMIS information center 					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be confirmed by program assessor
- Details of any workplace/industry training **AND/OR**

2. Clarification interview **AND/OR**

3. Assignment

Develop a code of ethics for a building systems technician. Please refer to this website for a sample of a code of ethics <http://www.sastt.ca/ethics.html>

Resources

1. Saskatchewan Institute of Applied Science and Technology (SIAST)
Building Systems Technician, course pack, *SEM 101*

SFTY 172 – Safety

You will receive general safety information related to power engineering. You will study the basic principles dealing with personal safety equipment, fire safety and WHMIS. You will learn about environmental pollutants and their methods of control. An overview of the Transportation of Dangerous goods legislation will be discussed. Communication as it pertains to health and safety will be studied. A review of some of the occupational health hazards in industry and methods of prevention of incidents will be undertaken.

Credit unit(s): 3.0

SFTY 172 – Safety Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Discuss the implications and practices of workplace safety.					
<ul style="list-style-type: none"> ▪ Identify the costs and effects of workplace injuries on the individual worker and business 					
<ul style="list-style-type: none"> ▪ Identify the use, selection and care of personal protective equipment 					
2. Describe practices to ensure general workplace safety.					
<ul style="list-style-type: none"> ▪ Identify the general procedures involved in the isolation of plant equipment 					
<ul style="list-style-type: none"> ▪ Identify the procedures needed to enter into and work safely within confined spaces 					
<ul style="list-style-type: none"> ▪ Identify the safe procedures for the storage and handling of cylinders containing compressed gasses 					
<ul style="list-style-type: none"> ▪ Describe the safe procedures for loading, storage, unloading and transportation of hydrocarbon fluids 					
<ul style="list-style-type: none"> ▪ Describe hydrogen sulphide (H₂S) in terms of its working principles 					
3. Describe environmental pollutants and their methods of control.					
<ul style="list-style-type: none"> ▪ Identify the interaction and interdependency of environmental elements 					
<ul style="list-style-type: none"> ▪ Identify the environmental impact and control of gaseous pollutants related to power plants 					
<ul style="list-style-type: none"> ▪ Identify the environmental impact and control of noise pollutants related to power plants 					
<ul style="list-style-type: none"> ▪ Identify methods of handling and controlling solid pollutants related to power plants 					
<ul style="list-style-type: none"> ▪ Identify the environmental impact and control of liquid waste 					

SFTY 172 – Safety	Mastery	Competent	Functional	Learning	None
Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.					
▪ Identify environmental impacts of industrial operating					
4. Describe environmental pollutants and their methods of control.					
▪ Identify the interaction and interdependency of environmental elements					
▪ Identify the environmental impact and control of gaseous					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be confirmed by program assessor
- Details of any workplace/industry training **AND/OR**

2. Interview **AND/OR**

3. Challenge exam

- Passing mark of 60%
- Written multiple choice

Example:

Supplied air breathing apparatus:

- a) covers only the mouth and nose
- b) is used only when the partial pressure of oxygen is higher than 19 kilopascals
- c) does not require an effective facial seal
- d) is fitted with an alarm warning**
- e) is not considered to PPE

Correct answer is bolded

SFTY 172 – Safety: Exam blueprint

Resources

1. *Pan Global Power Engineering Fourth Class* , Part A, Volume 1 Chapters 26-35 and 37-39,
2. *Pan Global Power Engineering Fourth Class* , Part A, Volume 2 Chapters 40-45,

WORK 108 – Work Experience

You will have an opportunity to observe and participate in the operation of a boiler in the workplace. This experience will help you relate the theory you learned to an operational plant. It will also help you develop contacts for possible future employment.

Credit unit(s): 0.0

Prerequisite(s): SEM 101 minimum grade of 60 (concurrent)

WORK 108 – Work Experience Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Work safely as part of a team.					
<ul style="list-style-type: none"> ▪ Identify company safety policies pertinent to the power plant 					
<ul style="list-style-type: none"> ▪ Identify where first aid stations are located 					
<ul style="list-style-type: none"> ▪ Identify where MSDS's are kept 					
<ul style="list-style-type: none"> ▪ Identify all work safety procedures 					
2. Operate and/or observe the operation of boilers.					
<ul style="list-style-type: none"> ▪ Interpret location of all boilers and related equipment 					
<ul style="list-style-type: none"> ▪ Identify which equipment you will be allowed to operate 					
<ul style="list-style-type: none"> ▪ Determine what your responsibilities will be during your placement 					
3. Communicate effectively in the workplace.					
<ul style="list-style-type: none"> ▪ Identify that you are a guest in the plant and are there to learn as much as you can 					
<ul style="list-style-type: none"> ▪ Practice asking questions and giving answers about the work experience/workplace 					
4. Conduct water tests.					
<ul style="list-style-type: none"> ▪ Practice water tests 					
5. Participate in maintenance procedures.					
<ul style="list-style-type: none"> ▪ Determine which activities you will be allowed to do 					
6. Write a work placement report.					
<ul style="list-style-type: none"> ▪ Identify location of all plant equipment 					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Detailed resume
- Any approved current certificates. These documents must be confirmed by program assessor
- Details of any workplace/industry training **AND/OR**

2. Clarification interview

Resources

1. Saskatchewan Institute of Applied Science and Technology (SIAST)
Building Systems Technician, course pack, *Work 108*

WTER 100 – Water Treatment 1

The course will introduce you to some of the basic methods utilized in power plants to prepare and maintain the water used in steam generation.

Credit unit(s): 1.0

WTER 100 – Water Treatment Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Discuss the need for water treatment.					
<ul style="list-style-type: none"> ▪ Identify water impurities and their effects on the boiler and systems 					
<ul style="list-style-type: none"> ▪ Identify the various types of water treatment 					
2. Explain operation of common external water treatment equipment used in a high pressure power plant.					
<ul style="list-style-type: none"> ▪ Describe filtration methods and equipment operation 					
<ul style="list-style-type: none"> ▪ Describe the equipment, operation and function of various types of water softeners 					
<ul style="list-style-type: none"> ▪ Explain ion exchange and the regeneration of a sodium zeolite softener 					
<ul style="list-style-type: none"> ▪ Discuss the theory and equipment used in external deaeration 					
3. Discuss the principles and equipment used in the internal treatment of water in a boiler.					
<ul style="list-style-type: none"> ▪ Describe reasons for internal chemical treatment 					
<ul style="list-style-type: none"> ▪ Describe the problems associated with chemical treatment 					
<ul style="list-style-type: none"> ▪ Discuss chemicals used for internal treatment 					
<ul style="list-style-type: none"> ▪ Discuss PH control 					
<ul style="list-style-type: none"> ▪ Describe chemical feed systems 					
<ul style="list-style-type: none"> ▪ Describe standard boiler water tests and their purpose 					

PLAR assessment methods

If you qualify for PLAR, you may be asked to demonstrate your learning in one or more of the following ways. Be prepared to discuss the expectations during a consultation meeting.

1. Evidence file

- Detailed resume
- PLAR [Employer validation checklist](#) – skills and knowledge checked & verified by an employer (Appendix A)
- Letter of validation from an employer(s) ([Appendix A](#))
- Any approved current certificates. These documents must be confirmed by program assessor
- Details of any workplace/industry training **AND/OR**

2. Interview **AND/OR**

3. Challenge exam

- Passing mark of 60%
- Written multiple choice

Example:

Water with a PH of 7.6 would probably be:

- a) boiler waste
- b) condensate
- c) raw water**
- d) softened water

Correct answer is bolded

[WTER 100 – Water Treatment 1: Exam blueprint](#)

Resources

1. *Pan Global Power Engineering Fourth Class Part A, Volume 1 Chapters 26-35 and 37-39,*
2. *Pan Global Power Engineering Fourth Class Part A, Volume 2 Chapters 40-45,*

Building Systems Technician Certificate Program



Appendices

Building Systems Technician



Appendix A

Employer Validation Letters and Checklists

Building Systems Technician program

Name: _____

BLDG 100

Student ID: _____

Auxiliary Power Systems

Date: _____

Completion Date: _____

Employee/PLAR candidates for the challenge of BLDG 100 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing BLDG 100. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

BLDG 100 – Auxiliary Power Systems		Mastery	Competent	Functional	Learning	None
Mastery:	I am able to demonstrate it well enough to teach it to someone else.					
Competent:	I can work independently to apply the outcome.					
Functional:	I need some assistance in using the outcome.					
Learning:	I am developing skills and knowledge for this area.					
None:	I have no experience with the outcome.					
1. Provides emergency power in buildings.						
2. Operates an uninterrupted power supply and emergency backup generator.						
3. Services batteries.						

The employer/ supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.

Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

ELEC 135

Student ID: _____

Electrical Systems

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of ELEC 135 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing ELEC 135. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

ELEC 135 – Electrical Systems Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Applies electrical safety.					
2. Uses correct safety procedures.					
3. Safely uses electrical devices.					
4. Applies safe lockout procedures when working around electrical equipment in shop areas.					
5. Applies theory of alternating current flow and reactance.					
6. Works with induction and inductive reactance.					
7. Works with capacitance and capacitive reactance.					
8. Calculates cost of power in A.C. circuits.					
9. Applies the principles of fire and security alarms.					
10. Operates a security system.					
11. Programs a security system.					
12. Troubleshoot various electrical devices:					

ELEC 135 – Electrical Systems Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
▪ changing switches					
▪ changing receptacles					
▪ changing electrical heaters					
▪ procedures for servicing electrical switches and motors					
▪ procedures for lamps					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.

Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

ELEC 188

Student ID: _____

Basic Electricity 1

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of ELEC 188 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the Employer Validation Checklist accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing ELEC 188. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

ELEC 188 – Basic Electricity 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Operates electrical metering devices.					
▪ measures voltage					
▪ measures current					
▪ measures resistance					
▪ measures power					
2. Identifies the four necessary components of circuits.					
3. Connects series circuits.					
4. Connects parallel circuits.					
5. Performs simple calculations using voltage, current, resistance and power.					
6. Applies Ohm's Law to solve circuits.					
7. Applies the Power Law to calculate energy.					
8. Applies the right hand rule.					

ELEC 188 – Basic Electricity 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
9. Operates various types of A.C. and D.C. motors and generators.					
10. Calculates the relationship between primary and secondary voltage, current and power.					
11. Operates electrical voltage systems.					
12. Operates single and 3 phase types of electrical voltage systems.					
13. Operates alternate power supply system equipment.					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.

Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

ENGP 100

Student ID: _____

Heating Systems 1

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of ENGP 100 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing ENGP 100. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

ENGP 100 – Heating Systems 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Operates heating system boilers such as the following:					
▪ water tube					
▪ tubular					
▪ cast iron sectional					
▪ modular					
▪ fire tube					
2. Applies knowledge of burner operation.					
3. Follows code requirements for the operation of boiler fittings.					
4. Operates various boiler fittings such as burners, valves and gauges.					
5. Operates hot water and steam heating boilers including HVAC electronic control systems.					
6. Operates heating system boilers such as the following:					
▪ water tube					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.

Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

ENGP 101

Student ID: _____

Heating Systems 2

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of ENGP 101 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing ENGP 101. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

ENGP 101 – Heating Systems 2 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Maintains warm air heating systems.					
2. Troubleshoots problems with operation of hot water steam systems.					
3. Operates gas fired, infrared and electrical heating systems.					
4. Operates auxiliary building systems such as:					
▪ lighting systems					
▪ energy conservation					
▪ system protective devices					
▪ backflow protection					
▪ building drainage systems					
▪ storm water drainage systems and devices					
▪ drainage systems					
▪ lighting systems					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.

Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

ENGP 103

Student ID: _____

Legislation and Codes

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of ENGP 103 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the Employer Validation Checklist accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing ENGP 103. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

ENGP 103 – Legislation and Codes Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Applies the regulations for ASME boiler codes.					
2. Applies Pressure Vessel act and regulations.					
3. Applies Sask. Boiler and Pressure Vessel Act.					
4. Applies the Canadian Standards Association (CSA) B51 code for the Construction and Inspection of Boilers and Pressure Vessels.					
5. Applies the Canadian Standards Association (CSA) B52 Mechanical Refrigeration Code.					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.

Building Systems Technician program

Name: _____

ENGP 104

Student ID: _____

Advanced Power Lab

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of ENGP 104 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing ENGP 104. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

ENGP 104 – Advanced Power Lab Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Places the boiler on hot standby in the proper order.					
2. Operates boiler firing controls to maintain pressure regardless of changing load conditions.					
3. Operates steam users to help maintain boiler pressure.					
4. Operates boiler controls from auto to manual when facing adverse operating conditions.					
5. Manipulates the firing controls to the required conditions for soot blowing.					
6. Operates boiler using computer controls changing from automatic to manual and vice versa.					
7. Operate a high pressure boiler using fuel oil.					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.

Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

BST Technician program

Name: _____

ENGP 180

Student ID: _____

Power Lab 1

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of ENGP 180 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing ENGP 180. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

ENGP 180 – Power Lab 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Installs manhole and handhole covers.					
2. Operates a plant air distribution system.					
3. Identify instrument air sources.					
4. Identify lab air compressor system components.					
5. Start up air compression system.					
6. Monitor lubrication and air pressure.					
7. Shut down air compression system.					
8. Operates raw and treated water systems.					
9. Identifies fittings and components on suction, discharge and recirculation lines.					
10. Opens all suction, recirculation and discharge valves to boiler.					
11. Operates controller components.					

ENGP 180 – Power Lab 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
12. Perform pre-start checks.					
13. Operates high pressure boiler.					
14. Perform shut down procedures.					
15. Tests boiler interlocks.					
16. Check interlock function.					
17. Performs and interprets water tests and chemical additions.					
18. Operate low and high pressure steam systems.					

**The employer/supervisor may be contacted by the SIAST
 assessor to confirm/clarify information provided.**

Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

ENGP 181

Student ID: _____

Plant Maintenance 1

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of ENGP 181 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing ENGP 181. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

ENGP 181 – Plant Maintenance Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Safely operates common hand tools in the powerhouse:					
▪ hacksaws					
▪ files					
▪ chisels					
▪ hammers					
▪ screwdrivers					
▪ wrenches					
2. Safely operates hand threading tools (tap and die set).					
3. Correctly uses measuring tools.					
4. Applies the correct layout of work.					
5. Correctly operates portable and fixed grinders , hand drill, etc.					
6. Applies safety precautions when operating:					
▪ hoisting equipment					

ENGP 181 – Plant Maintenance Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
▪ work platforms					
▪ scaffolds					
▪ ladders					
▪ rigging equipment					
7. Operates basic welding techniques.					
▪ forge welding					
▪ oxyacetylene welding and cutting					
▪ metal arc welding					
▪ braze welding					
8. Applies piping techniques.					
9. Applies and maintains common types of valves used in power engineering systems:					
▪ standard valve designs					
▪ specialized boiler valves					
▪ pressure-reducing valves					
▪ perform maintenance tasks in powerhouse environment					
▪ sharpen drill bits					
▪ change gauge glass					
▪ construct gaskets					
10. Perform maintenance tasks in powerhouse environment:					
▪ construct gaskets					
▪ sharpen drill bits					
▪ change gauge glass					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.

Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

ENGP 188

Student ID: _____

Plant Maintenance 2

Date: _____

Completion date: _____

Employee/PLAR Candidates for the challenge of ENGP 188 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing ENGP 188. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

ENGP 181 – Plant Maintenance 2 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Fabricates a copper piping system.					
2. Cuts threads.					
3. Makes a steel pipe trap piping system.					
4. Performs shaft alignments.					
5. Performs boiler service and maintenance tasks.					
6. Performs a boiler inspection and cleaning.					
7. Disassemble plan equipment and report findings.					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.

Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

PLMB 101

Student ID: _____

Plumbing Systems

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of PLMB 101 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing PLMB 101. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

PLMB 101 – Plumbing Systems Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Maintains sensors for building plumbing systems.					
2. Installs sensors for building plumbing systems.					
3. Services plumbing fixtures including water closets, fixtures and faucets.					
4. Installs plumbing fixtures including water closets, fixtures and faucets.					
5. Troubleshoots problems associated with storm and water waste systems.					
6. Services storm and wastewater handling systems for large buildings.					
7. Maintains water supply and distribution systems for large buildings					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.

Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

RFRG 103

Student ID: _____

Refrigeration Systems 2

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of RFRG 103 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing RFRG 103. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

RFRG 103 – Refrigeration Systems 2 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Solves air quality problems using a psychometric chart.					
2. Measures the following characteristics of airflow:					
▪ static					
▪ velocity					
▪ total air pressure					
3. Operates various air conditioning systems.					
4. Sets humidifier controls at appropriate humidity levels.					
5. Incorporates knowledge of humidification when operating air conditioned building.					
6. Operates various air conditioning systems.					
7. Operates control systems used in air conditioning.					
8. Compensates for heat gains and losses in a building.					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.

Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

TCOM 100

Student ID: _____

Technical Communications 1

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of TCOM 100 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing TCOM 100. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

TCOM 100 – Technical Communications 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Uses job related interpersonal and oral communications.					
2. Listens actively.					
3. Uses appropriate workplace body language.					
4. Deals well with difficult people.					
5. Works effectively as team member.					
6. Works well with diverse populations.					
7. Creates workplace documents such as:					
▪ Uses standard business formats for internal messages					
▪ Write a memo and email message					
▪ Write in a shift log					
▪ Prepare work orders					
▪ Fill out warranty service forms					

TCOM 100 – Technical Communications 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
<ul style="list-style-type: none"> ▪ Complete purchase order forms 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Write technical instructions 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Write a short report 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.

Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

TCOM 101

Student ID: _____

Technical Communications 2

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of TCOM 101 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing TCOM 101. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

TCOM 101 – Technical Communications 2 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Participates in workplace meetings.					
2. Delivers short informal presentations.					
3. Participates in workplace meetings.					
4. Delivers short informal presentations.					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.

Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

DRFT 103

Student ID: _____

Basic Mechanical Drafting

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of DRFT 103 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing DRFT 103. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

DRFT 103 – Basic Mechanical Drafting Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Can give reference numbers (zone numbers) for components on a diagram.					
2. Calculates the dimensions of given area on a blueprint					
3. Identify the following symbols:					
Draw the symbols for: <ul style="list-style-type: none"> ▪ a quick opening valve ▪ a lockshield valve 					
4. Identify the door swing of a door in a given area of blueprint					
5. Locate detail of a certain area of a blueprint					
6. Calculate the width and length of a given room on a blueprint					
7. Locate detail of a certain area of blueprint					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.

Building Systems Technician program

Name: _____

SFTY 172

Student ID: _____

Safety

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of SFTY 172 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing SFTY 172. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

SFTY 172 – Safety Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Uses safe practices of workplace safety.					
2. Uses personal protective equipment.					
3. Cares for protective equipment.					
4. Uses safe general procedures for isolation of plant equipment.					
5. Applies safe procedures to enter and work within confined spaces.					
6. Applies safe procedures to the storage of compressed gases.					
7. Uses compressed gases in a safe manner.					
8. Performs safe practices when loading & unloading hydrocarbon fluids.					
9. Uses safe practices when store hydrocarbon fluids.					
10. Uses safe practices when transporting hydrocarbon fluids.					
11. Applies safe practices when transporting hydrocarbon fluids.					

SFTY 172 – Safety Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
12. Applies safe working principles with hydrogen sulphide (H ₂ S).					
13. Uses environmental pollutants in a safe manner:					
▪ noise pollutants					
▪ chemical pollutants					
▪ solid pollutants					
▪ liquid waste					
14. Applies WHIMIS information to the workplace.					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.



Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

BLDG 101

Student ID: _____

Building Administration

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of BLDG 101 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing BLDG 101. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

BLDG 101 – Building Administration Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Develops a resource list for trades involved with building systems maintenance.					
2. Demonstrates awareness of working liability and due diligence.					
3. Applies appropriate procedures for elevator evacuation.					
4. Uses safe general procedures for isolation of plant equipment.					
5. Completes a preventative maintenance checklist on a regular basis.					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.



Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

BLDG 109

Student ID: _____

Building Computer Systems

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of BLDG 109 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the Employer Validation Checklist accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing BLDG 109. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

BLDG 109 – Building Computer Systems Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Manages computer operated equipment such as:					
▪ fan					
▪ ventilation systems					
▪ rooftop units					
▪ boiler systems					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.



Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

BLDG 103

Student ID: _____

Building Envelope

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of BLDG 103 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing BLDG 103. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

BLDG 103 – Building Envelope		Mastery	Competent	Functional	Learning	None
Mastery:	I am able to demonstrate it well enough to teach it to someone else.					
Competent:	I can work independently to apply the outcome.					
Functional:	I need some assistance in using the outcome.					
Learning:	I am developing skills and knowledge for this area.					
None:	I have no experience with the outcome.					
1. Assesses total energy conservation.						
2. Completes a checklist for total energy conservation.						
3. Employs sealing, caulking and insulating techniques.						
4. Repairs doors, windows, walls, and interior and exterior surfaces.						

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.



Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

BLDG 107

Student ID: _____

Hydronic Systems

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of BLDG 107 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing BLDG 107. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

BLDG 107 – Hydronic Systems Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Operates different types of hydronic boilers and associated equipment.					
2. Services different types of hydronic boilers and associated equipment.					
3. Aligns centrifugal pumps.					
4. Calculates static and dynamic heads.					
5. Operates different types of hydronic boilers and associated equipment.					
6. Services different types of hydronic boilers and associated equipment.					
7. Aligns centrifugal pumps.					
8. Calculates static and dynamic heads.					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.



Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Building Systems Technician program

Name: _____

BLDG 110

Student ID: _____

Ventilation Systems

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of BLDG 110 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the **Employer validation checklist** accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing BLDG 110. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

BLDG 110 – Ventilation Systems		Mastery	Competent	Functional	Learning	None
Mastery:	I am able to demonstrate it well enough to teach it to someone else.					
Competent:	I can work independently to apply the outcome.					
Functional:	I need some assistance in using the outcome.					
Learning:	I am developing skills and knowledge for this area.					
None:	I have no experience with the outcome.					
1. Services air compressor and auxiliaries.						
2. Balances air handling systems including humidification equipment.						
3. Balances air handling systems including humidification equipment.						
4. Troubleshoots problems with ventilation systems.						

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.



Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

BST Technician program

Name: _____

WTER 100

Student ID: _____

Water Treatment 1

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of WTER 100 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the Employer Validation Checklist accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing WTER 100. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

WTER 100 – Water Treatment 1 Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Completes water treatment tests.					
2. Applies test results to treatment of water.					
3. Operates common external water treatment.					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.



Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

BST Technician program

Name: _____

SEM 101

Student ID: _____

Technology Seminars

Date: _____

Completion date: _____

Employee/PLAR candidates for the challenge of SEM 101 must have this form completed by their direct supervisor/employer. The supervisor/employer is responsible for ensuring the Employer Validation Checklist accurately reflects your abilities in each area identified.

Directions: On the following page(s) there is a list of skill and knowledge factors that the employee is required to achieve in completing SEM 101. Please validate the employee/candidate's performance by placing a ✓ in the appropriate column. Add any clarifications/observations in the "Optional Comments" section. Sign and date below.

SEM 101 – Technology Seminars Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
1. Applies time management skills.					
2. Identifies the factors driving the need for diversity in the workplace.					
3. Recognizes harassment and discrimination in the workplace.					
4. Recognizes environmental consequences of an individual's actions.					
5. Recognizes the roles and responsibilities of the technician, technologist and engineer.					
6. Applies professionalism and ethics.					
7. Recognizes the impact of technology on society and its limitations and benefits.					
8. Applies workplace safety procedures.					

The employer/supervisor may be contacted by the SIAST assessor to confirm/clarify information provided.



Optional comments:

Employee Information *(please print)*

Dates of employment: _____ to _____
(dd/mm/yy) (dd/mm/yy)

Employment description: Full-time Hours per week: _____
Part-time Hours per week: _____

Position(s) held _____

Candidate Information *(please print)*

Name _____ Student number _____

I affirm that I am the person who has performed those items checked on this checklist. I acknowledge that the performance checklists used are solely for the purpose of skills assessment for the SIAST BST Technician program requirements, and are not intended to replace or modify company operating or safety procedures, and may not be appropriate for use in all circumstances.

PLAR candidate's signature _____ Date _____

Employer/ Supervisor's Information *(please print)*

Name _____ Phone _____

Organization/employer _____

Address _____

I affirm that I am the person who has administered this checklist, and that I have conducted this candidate's skills assessment with integrity. I also affirm that the above named candidate is the person whose performance I evaluated, and that the above named person performed the checked tasks at the indicated level without assistance from me or any other person.

Employer/supervisor's signature _____ Date _____

Appendix B: Exam blueprints

Exam blueprints: Building Systems Technician Certificate program			
Individual course exam blueprints			
Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
RFRG 103 - Refrigeration 2	<ol style="list-style-type: none"> Describe refrigeration safety Implement refrigeration safety Describe servicing refrigeration systems Service refrigeration systems Apply troubleshooting techniques on refrigeration systems 	LO 1 = 12 LO 2 = 6 LO 3 = 2 LO 4 = 5 LO 5 = 5	Practical demonstration on safely installing gauges, changing parts and troubleshooting.
ELEC 135 - Electrical Systems	<ol style="list-style-type: none"> Describe electrical safety Apply electrical safety Explain AC current flow and power factor correction Perform power factor calculations Describe the principles of fire and security alarms Troubleshoot various electrical devices 	LO 1 = 4 LO 2 = 3 LO 6 = 4	Complete drawing using straight edge and templates and find two faults installed by the instructor.
THER 182 – Thermodynamics 1	<ol style="list-style-type: none"> Explain the basic principles of thermodynamics Explain the thermodynamics of steam Perform basic thermodynamic problems Discuss the basic concepts of matter 	LO1 37% - 10 questions LO2 15% - 4 questions LO3 41% - 11 questions LO4 7% - 2 questions	

Exam blueprints: Building Systems Technician Certificate program

Individual course exam blueprints

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
THER 183 - Applied Mechanics 1	<ol style="list-style-type: none"> Describe the quantities, units, and principles of forces in equilibrium. Perform Calculations relating to the transmission of force and power by simple machines. Perform calculations relating to force, pressure, work, power, and energy. Solve basic problems involving friction on horizontal surfaces. Solve problems involving strength of materials. Solve problems involving scalar and vector quantities. Solve problems involving one-dimensional motion. 	<p>LO1 15% - 3 questions - 7 marks</p> <p>LO2 25% - 5 questions – 13 marks</p> <p>LO3 24% - 6 questions – 12 marks</p> <p>LO4 4% - 1 questions – 2 marks</p> <p>LO5 10% - 4 questions – 5 marks</p> <p>LO6 8% - 2 questions – 4 marks</p> <p>LO7 14% - 4 questions – 7 marks</p>	
CHEM 100 - Chemistry	<ol style="list-style-type: none"> Describe basic chemistry concepts Discuss the principles of chemical bonding Identify names and formulae of chemical compounds Balance simple chemical equations Describe acids, bases, and salts Perform basic chemical calculations 	<p>LO1 20% - 5 questions</p> <p>LO2 12% - 3 questions</p> <p>LO3 20% - 5 questions</p> <p>LO4 16% - 4 questions</p> <p>LO5 16% - 4 questions</p> <p>LO6 16% - 4 questions</p>	

Exam blueprints: Building Systems Technician Certificate program

Individual course exam blueprints

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
MATH 116 - Mathematics	<ol style="list-style-type: none"> Use basic mathematics. Use algebra. Use measurement systems. Calculate perimeter, area and volume. Use basic trigonometry. 	LO1 27% - 8 questions LO2 30% - 9 questions LO3 10% - 3 questions LO4 30% - 9 questions LO5 3% - 1 questions	
DRFT 103 - Basic Mechanical Drafting	<ol style="list-style-type: none"> Apply drafting fundamentals. Read drawings. Sketch system diagrams. 	LO 1 = 35% LO 2 = 50% LO 3 = 15%	
SEM 101 - Technology Seminars	<ol style="list-style-type: none"> Develop study and time management skills. Recognize diversity in the workplace. Recognize principles of sustainability to work. Describe professional ethics, responsibility and accountability. Describe the impact of technology on society. Describe workplace procedures. 	No written exam for this course	
WORK 108 - Work Experience	<ol style="list-style-type: none"> Work safely as part of a team. Operate and/or observe the operation of boilers. Communicate effectively in the workplace. Conduct water tests. Participate in maintenance procedures. Write a work placement report. 	No written exam for this course	

Exam blueprints: Building Systems Technician Certificate program

Individual course exam blueprints

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
ELEC 188 - Basic Electricity 1	<ol style="list-style-type: none"> Describe the characteristics of series and parallel circuits. Perform simple calculations using voltage, current, resistance and power. Describe basic principles of magnetism. Describe operating principles of various types of A.C. and D.C. motors and generators. Use electrical metering devices. Describe operating principles of transformers. Describe the electrical distribution system. 	LO 1 = 5 LO 2 = 5 LO3 = 5 LO 4 = 5 LO 5 = 5 LO 6 = 5 LO 7 = 5	
RFRG 195 - Refrigeration Systems	<ol style="list-style-type: none"> Describe the terms and principles associated with the thermodynamics of refrigeration. Discuss the different refrigerants used in an industrial application. Describe the operating principles of a compression refrigeration system. Explain refrigeration compressors. Perform simple compressor calculations. Describe the different types of heat exchangers used in refrigeration systems. Describe the purpose of operational and safety control on a refrigeration system. Explain the operating principles of refrigeration capacity controls. Describe refrigeration system accessories. Describe ore start-up procedures used on compression refrigeration systems. 	LO 1 = 10 LO 2 = 11 LO 3 = 9 LO 4 = 5 LO 5 = 3 LO 6 = 5 LO 7 = 4 LO 8 = 10 LO 9 = 11 LO 10 = 5	

Exam blueprints: Building Systems Technician Certificate program

Individual course exam blueprints

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
	11. Explain operation and maintenance procedures used on compression refrigeration systems. 12. Describe the operating principles of the ammonia and lithium bromide absorption refrigeration systems. 13. Discuss the operation and maintenance procedures used on absorption refrigeration systems. 14. Describe a refrigeration system.	LO 11= 10 LO 12 = 10 LO 13 = 6	
ENGP 180 - Power Lab 1	1. Identify power lab components and safety regulations. 2. Install manhole and handhole covers. 3. Operates a plant air distribution system. 4. Operate raw and treated water systems. 5. Operate boiler feed water pump. 6. Operate basic controllers. 7. Operate low pressure boiler and auxiliaries. 8. Operate high pressure boiler. 9. Tests boiler interlocks. 10. Perform water tests and chemical additions. 11. Operate low and high pressure steam systems.	LO 7 – 50% LO 8 – 50%	No demonstration

Exam blueprints: Building Systems Technician Certificate program

Individual course exam blueprints

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
ENGP 104 - Advanced Power Lab	<ol style="list-style-type: none"> Place a boiler on hot standby. Regulate boiler pressure. Switch electric controls from manual to automatic and vice versa. Operate soot blowers. Operate a high pressure boiler using Computer controls. Describe operation of a steam turbine/steam pumps. Operate a high pressure boiler using fuel oil. 	No written test	Demonstration – please refer to page 63 for explanation.
ENGP 181 - Plant Maintenance 1	<ol style="list-style-type: none"> Describe the safe use of common hand tools in the powerhouse. Explain the mechanical properties of engineering materials. Uses basic welding techniques. Discuss power piping. Discuss the design, application and maintenance of the most common types of valves used in power piping systems. Perform maintenance tasks in powerhouse environment. 	LO 3 – 10 LO 4 - 19	Demonstration – Pipe threading
ENGP 188 - Plant Maintenance 2	<ol style="list-style-type: none"> Construct piping systems. Perform shaft alignment and rigging procedures. Issue work permits for plant maintenance jobs. Describe the maintenance required for boilers and service a boiler. Describe boiler cleaning and boiler inspection preparation procedures. Describe plant shutdown and maintenance procedures. Perform plant shutdown and maintenance procedures. 	LO 3 = 9 LO 4 = 11 LO 5 = 1	Written explanation of a boiler lay-up (refer to page 73 for criteria)

Exam blueprints: Building Systems Technician Certificate program

Individual course exam blueprints

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
SFTY 172 - Safety	<ol style="list-style-type: none"> 1. Discuss the implications and practices of workplace safety. 2. Describe practices to ensure general workplace safety. 3. Describe environmental pollutants and their methods of control. 4. Describe WHMIS regulations. 5. Describe fire safety in the workplace. 6. Describe the interaction and interdependency between the various elements of the environment. 7. Describe the nature, environmental impacts and control methods for gaseous and noise pollutants in a power plant. 8. Discuss the nature, environmental impacts and control methods for solid and liquid pollutants in a power plant. 9. Explain the impact of liquid waste on the environment. 10. Explain the impact of gases and vapours on the environment. 11. Discuss the impacts that operating facilities may have on the environment and some methods of dealing with those impacts. 	LO 1 = 5 LO 2 = 5 LO 3 = 5 LO 4 = 5 LO 4 = 5	
TCOM 100 - Technical Communications 1	<ol style="list-style-type: none"> 1. Apply job related interpersonal and oral communications 2. Describe effective teamwork 3. Create workplace documents 	No written exam	
TCOM 101 - Technical Communications 2	<ol style="list-style-type: none"> 1. Apply job search skills 2. Use workplace-meeting procedures 3. Deliver short presentations 	No written exam	

Exam blueprints: Building Systems Technician Certificate program

Individual course exam blueprints

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
ENGP 103 - Legislation and Codes	<ol style="list-style-type: none"> 1. State the purpose and function of the ASME Boiler and Pressure Vessel Committee and Code. 2. Use the provincial Boiler and Pressure Vessel Act and Regulations. 3. Use the Canadian Standards Association (CSA) B51 code for the Construction and Inspection of Boilers and Pressure Vessels. 4. Use the Canadian Standards Association (CSA) B52 Mechanical Refrigeration Code. 	LO 1 = 3 LO 2 = 7 LO 3 = 9 LO 4 = 1	
BLDG 101 - Building Administration	<ol style="list-style-type: none"> 1. List the various functions and trades involved with a building. 2. Demonstrate awareness of working liability and due diligence. 3. Describe the procedure for completing a visual and operational check and procedures for an elevator evacuation. 4. Explain a preventative maintenance checklist. 	No written exam	Develop a due diligence and working liability checklist Develop an preventative maintenance checklist
RFRG 183 – Air Conditioning	<ol style="list-style-type: none"> 1. Describe the psychrometric properties of air. 2. Solve air quality problems using a psychrometric chart 3. Describe air flow behaviour and its movement through distribution systems 4. Explain duct design and components used in air conditioning systems 5. Describe the equipment and principles of humidification. 	LO 1 = 12 LO 2 = 6 LO 3 = 2 LO 4 = 5 LO 5 = 5	Practical demonstration of safely installing gauges, and calculating and properly charging an air conditioning system and a practical demonstration on calculating and reading psychrometric charts

Exam blueprints: Building Systems Technician Certificate program

Individual course exam blueprints

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
	<ol style="list-style-type: none"> 6. Discuss the operation of various air conditioning systems. 7. Explain the design of combined air-conditioning systems and alternative system arrangements. 8. Describe air conditioning heat recovery systems. 9. Describe the control systems used in air conditioning. 10. Explain the various ways a building gains and loses heat. 		
ENGP 100 – Heating Systems 1	<ol style="list-style-type: none"> 1. Describe cast iron and sectional types of boilers used in heating systems. 2. Explain the operation of hot water and heating boilers. 3. Describe types of burners used in heating boilers. 4. Describe operating principles of various boiler fittings, valves and gauges. 5. Describe heating boiler controls for boiler operation and combustion. 6. Describe heating boiler controls for boiler operation and combustion. 7. Describe controls used for pneumatic, electric and electronic heating systems. 	LO 1 = 4 LO 2 = 3 LO 6 = 4	
ENGP 101 – Heating Systems 2	<ol style="list-style-type: none"> 1. Describe various steam heating systems. 2. Describe various hot water heating systems. 3. Describe warm air heating systems. 4. Describe building ventilation systems. 5. Describe alternate heating systems. 6. Describe auxiliary building systems. 	LO 1 = 37% LO 2 = 15% LO 3 = 41% LO 4 = 7%	

Exam blueprints: Building Systems Technician Certificate program

Individual course exam blueprints

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
BLDG 100 - Auxiliary Power Systems	<ol style="list-style-type: none"> Describe means to provide emergency power in buildings. Describe an uninterrupted Power Supply (UPS). Operate an auxiliary generator. Service batteries. 	LO 1 = 15% LO 2 = 25% LO 3 = 24% LO 4 = 4%	Practical demonstration on operating an emergency generator
BLDG 103 - Building Envelope	<ol style="list-style-type: none"> Describe roof construction and maintenance. Describe various types of building construction. Assess total energy conservation. Describe sealing and insulating techniques. Describe repairs to doors, windows, walls and exterior surfaces. 		
BLDG 106 – Groundskeeping	<ol style="list-style-type: none"> Describe landscaping techniques appropriate to the prairies Describe installation and repairs to irrigation equipment Describe servicing associated small equipment 	LO 1 = 4 LO 2 = 3 LO 3 = 4	Do a practical exercise on sharpening chainsaw blades, shovels, and lawnmower blades
BLDG 107 Hydronic Systems	<ol style="list-style-type: none"> Describe hydronic boilers and associated equipment Practice the process for servicing hydronic system controls Practice hydronic system safety Service a hydronic system and associated equipment Demonstrate overhauling centrifugal pumps Calculate static and dynamic heads Operate lab/workplace boilers 	LO 1 = 24 LO 4 = 1 LO 6 = 1	Practical demonstration on operating a hydronic boiler and safety involved in operation

Exam blueprints: Building Systems Technician Certificate program

Individual course exam blueprints

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
PLMB 101 – Plumbing Systems	<ol style="list-style-type: none"> Describe various plumbing systems. Describe storm and wastewater handling systems for large buildings. Describe water supply systems for large buildings. Describe servicing plumbing systems. Service plumbing fixtures. 	LO 1 = 1 LO 2 = 1 LO 3 = 9 LO 4 = 11 LO 5 = 4	Complete a demonstration on installing sinks, taps, water closets and cleaning water closets
BLDG 110 – Ventilation Systems	<ol style="list-style-type: none"> Balance air handling systems. Service fans and blowers. Troubleshoot noise and vibration. Service mixing boxes. Perform start-up and shutdown functions for a rooftop unit. 		Practical demonstration on Balancing an air handling system and procedures for servicing mixing boxes
WTER 100 – Water Treatment 1	<ol style="list-style-type: none"> Discuss the need for water treatment. Explain operation of common external water treatment equipment used in a high pressure plant. Describe the principles and equipment used in a boiler. 	7 4 3	Demonstration and practical test on water treatment which includes tests on sulphate, T.D.S. and softness of water

Appendix C: Proctor form

If you wish to write a theory exam off campus, please return this completed form to your SIAST program. Request this wish at [Step 4 – Action plan](#). The exam and a return envelope will be mailed to the exam invigilator. You can write the exam under secure conditions when it is convenient to both of you.

Your exam proctor will mail the exam to the relevant SIAST campus (your point of contact for your PLAR challenge).

Program Head
 BST program
 SIAST Wascana Campus
 PO Box 556
 Regina, SK, S4P 3A3

Program Head
 Power Engineering program
 SIAST Kelsey Campus
 PO Box 1520
 Saskatoon, SK, S7K 3R5

Exam proctor form



SIAST

SASKATCHEWAN INSTITUTE OF
 APPLIED SCIENCE AND TECHNOLOGY

The exam supervisor should be a professional (teacher, RCMP, RN, secretary, clergy, etc.) and must be a non-relative.

Exam Supervisor

Name: _____

Address: _____

Postal code _____

Occupation: _____

Place of employment: _____

Business phone: _____ Home phone: _____

Student's name: (please print) _____

Course(s) _____

Signature of exam supervisor

Appendix D: Total Program Challenge

Building Systems Technician program: Total Program Challenge – Requirements

1. Program entrance requirements

Grade 12; with Math 30A or GED plus required math Accuplacer score or one year post-secondary education or Journey person certificate.

2. Cost

Please refer to PLAR database at:

https://webprod.siastr.sk.ca:8000/ceroneprod/szpkplar.P_PLARInformation

3. Eligibility

Minimum certificates to challenge total program:

- Refrigeration Engineers certificate
- 5th Class certificate

Must have two years post certificate experience of 2 years within the last 5 years in a facility that has a boiler (minimum size 300 k. w.) and a chiller of 50 tonnes as chief or 20 tonnes as shift engineer.

4. Assessment methods

The following methods are used to assess your prior knowledge and skills:

a) Evidence file must include:

- Detailed resume.
- Cover letter – a letter of application for a job within the building systems technology area. You must include the job advertisement for which you are applying. This job advertisement can be any job advertisement within the building systems area you find in a newspaper or online.
- Work facility description with type of boiler and chiller.
- Validated copies of required certificates.
- Description of any industry/workplace training.
- Evidence of any further training beyond required certificates.
- [Employer validation checklist](#) and [validation form](#) – this form must be returned to the BST Program head directly from the supervisor/employer.
- Letter of reference from supervisor.
- Completed permission form for possible [site visit](#) (form is included in this guide).
- Description and/or detailed industry related safety training which has been validated by supervisor.
- Problem solve the following work example to demonstrate knowledge of the following: Technical Communications 1 and 2 learning outcomes.

You are a BST employee at XYZ Institute. You and your co-workers are concerned about a potentially unsafe area in your work environment. You suggest to your supervisor that you would like to have a short noon hour meeting to discuss the concerns and formulate recommendations. You agree to present the recommendations to the supervisor for implementation consideration. Your supervisor agrees that you should go ahead with the meeting, stating “I look forward to hearing the recommendations”.

b) You will be required to write one comprehensive theory exam

- This test is multiple choice format. The exam blueprint is included in this document. This blueprint will identify the number of questions per critical learning outcome. You must earn 60% to successfully pass it. You may write this exam in your home location. Please use the [Exam Proctor Form found in Appendix C](#) of this guide to notify the program of your exam proctor.

Sample question:

Electric boilers:

- a) require tall stacks for pollution dispersment
- b) tend not to be very compact
- c) require soot blowers
- d) have energy conversion efficiencies close to 100%**
- e) are very inefficient

The correct answer is bolded.

c) Two demonstrations – one for electrical and one for refrigeration

Note: If the evidence you submit, demonstrates that you have previous appropriate level of training or learning in electrical or refrigeration, you will not be required to do these demonstrations.

Electrical demonstration could involve properly replacing a switch or receptacle or doing some electrical troubleshooting on given equipment.

Refrigeration demonstration could include installing gauges and possible charging a system and/ or troubleshooting a system.

d) Employer validation checklist and validation form

This form is included in this [Appendix D](#). Please have your employer complete and return it to the BST program at the address indicated on the form.

- Letter of reference from employer.
- Possible workplace visit which would include tour of facility and possible interview with supervisor and co-workers. Please have the attached permission form completed by your supervisor for a workplace visit and return to the BST program.

Building Systems Technician program: Total program challenge – Self-audit

The following outcomes are the critical outcomes that have been taken from each course of the Building Systems Technician program. For candidates who are planning on challenging the **Total Program Challenge**, they may use this self-audit to assess their knowledge and skills.

Total Program Challenge	Mastery	Competent	Functional	Learning	None
Mastery: I am able to demonstrate it well enough to teach it to someone else.					
Competent: I can work independently to apply the outcome.					
Functional: I need some assistance in using the outcome.					
Learning: I am developing skills and knowledge for this area.					
None: I have no experience with the outcome.					
Communications in the workplace					
Create workplace documents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Works well with diverse cultural and gender groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Describes professional ethics, responsibility and accountability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Create a personal resume	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Write a letter of application	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Math 116					
Use powers and roots	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use the order of operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use signed numbers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Apply the laws of exponents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Solve linear equations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Solve equations involving exponents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transform formulas and literal equations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Convert between metric and Imperial units	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use the Pythagorean theorem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Calculate area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Calculate volume	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drafting					
Read drawings (blueprints)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sketch system diagrams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chemistry					
Recognize safe practices, relating to chemistry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Total Program Challenge Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
Discuss the chemical and physical properties of elements and their compounds, for example, properties of water, properties of iron					
Uses the periodic table to determine the characteristics of elements					
Describe nomenclature use in naming organic compounds, for example, write the formula for magnesium chloride					
Electrical					
Describe the hazards of electricity					
Describe electrical safety devices and safety procedures					
Electrical safety in lab and shop areas					
Apply electrical safety in lab and shop areas					
Perform power factor calculations					
Perform simple calculations using voltage, current, resistance and power					
Describe operating principles of various types of A.C. and D.C. motors and generators					
Use electrical metering devices					
Describe operating principles of primary and secondary transformers					
Safety in the workplace					
Describe environmental pollutants and their methods of control					
Describe practices to ensure general workplace safety					
Identify the procedures needed to enter into and work safely within confined spaces					
Identify the safe procedures for the storage and handling of cylinders containing compressed gasses					
Refrigeration:					
▪ Explain refrigeration safety					
▪ Explain the procedures for servicing a refrigeration system					
▪ Apply troubleshooting techniques on refrigeration systems					
▪ Describe the terms and principles associated with the thermodynamics of refrigeration					

Total Program Challenge Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
<ul style="list-style-type: none"> Describe the operating principles of a compression refrigeration system 					
<ul style="list-style-type: none"> Describe the standard preventative maintenance procedures for compression refrigeration systems 					
<ul style="list-style-type: none"> Operate a compression refrigeration system 					
Describe the psychrometric properties of air					
Solve air quality problems using a psychrometric chart					
Describe fan motors, drives and belt guards					
Describe industrial humidifiers					
Describe the general layout and operation of central air conditioning systems					
Explain the design of combined air conditioning systems and alternative system arrangements					
Describe air conditioning heat recovery systems					
<ul style="list-style-type: none"> Explain the various ways a building gains and loses heat 					
Thermodynamics					
Describe the methods of heat transfer					
Explain the operating principles of temperature measuring instruments					
Explain saturation temperature and superheated steam					
Describe dry and wet saturated steam					
Use steam tables to solve thermodynamic problems					
Describe moment of force					
Explain the difference between gauge and absolute pressure					
Calculate forces required to overcome static and kinetic friction					
Calculate the rectangular components of vectors and the resultant forces					
Calculate reactions and other forces involved in equilibrium problems					
Solve problems involving displacement, velocity and acceleration					
Engineering					

Total Program Challenge Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
Operate boiler using computer controls changing from automatic to manual and vice versa					
Explain the operation of a high pressure steam engine and steam pump					
State the purpose and function of the ASME Boiler and Pressure Vessel committee and code					
Identify the various ASME codes					
Review the "Examination Regulations"					
Use the Canadian Standards Association (CSA) B51 code for the Construction and Inspection of Boilers and Pressure Vessels					
Use the Canadian Standards Association (CSA) B52 Mechanical Refrigeration Code					
Identify the major components of the power lab					
Install manhole and hand hole covers					
Operates a plant air distribution system					
Identify lab air compressor system components					
Identify source of raw water					
Identify water treatment components					
Put water system into operation					
Identify fittings and components on suction, discharge and recirculation lines					
Open all suction, recirculation and discharge valves to boiler					
Identify controller components					
Perform manual increase and decrease functions					
Perform pre-start checks					
Perform shut down procedures					
Operate high pressure boiler					
Perform shut down procedures					
Tests boiler interlocks					
Perform water tests and chemical additions					

Total Program Challenge Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
Interpret test results					
Operate low and high pressure steam systems					
Identify fittings and equipment on high pressure systems					
Identify fittings and equipment on low pressure system					
Describe the safe use of common hand tools in the powerhouse					
List the general safe working practices identified by the Worker's Compensation Board					
Discuss the safe and proper setup of equipment for hoisting and working above ground					
Uses basic welding types:					
State the applications for the most common materials used in piping					
Discuss the design, application and maintenance of the most common types of valves used in power piping systems					
Perform maintenance tasks in powerhouse environment					
Use precision measuring tools					
Construct gaskets					
Construct piping systems					
Perform shaft alignments					
Services a boiler					
Explain working liability					
Explain due diligence					
Explain the calculation of reactions and other forces in equilibrium problems					
Explain operation and maintenance of steam heating systems					
Describe auxiliary building systems					
<ul style="list-style-type: none"> ▪ Different methods of preventing backflow 					
<ul style="list-style-type: none"> ▪ Explain the construction of watertube, tubular, cast-iron sectional, modular and firetube heating boilers 					
Identify components and regulations of combustion safety and equipment					

Total Program Challenge Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
Demonstrate start-up and shut down of chemical injection system					
Perform start-up and shutdown functions for a low-pressure boiler and auxiliaries					
Water Treatment					
Discuss the need for water treatment					
Explain operation of common external water treatment equipment used in a high pressure power plant					
Discuss the principles and equipment used in the internal treatment of water in a boiler					
Perform water tests					
Describe how a sodium zeolite water softener works					
Plumbing					
Describe a water distribution system					
Describe a sanitary drainage system and the problems associated with it					
Describe maintaining of plumbing fixtures					
<ul style="list-style-type: none"> ▪ Describe means to provide emergency power in buildings 					
<ul style="list-style-type: none"> ▪ Operate an auxiliary generator 					
Building Computer Operations					
Describe programmable controller systems					
Describe logic functions					
Identify computer operated building systems equipment					
Perform preventative maintenance					
Hydronic Heating					
Describe converters and heat exchangers					
Practice safety on hydronic heating systems					
Service a hydronic system and associated equipment					
Overhaul and align centrifugal pumps and motors					
Describe various types of building construction:					

Total Program Challenge Mastery: I am able to demonstrate it well enough to teach it to someone else. Competent: I can work independently to apply the outcome. Functional: I need some assistance in using the outcome. Learning: I am developing skills and knowledge for this area. None: I have no experience with the outcome.	Mastery	Competent	Functional	Learning	None
Identify ways to conserve energy					
Develop an energy conservation checklist					
Describe repairs to doors, windows, walls, and exterior surfaces					
Groundskeeping					
Describe landscaping techniques appropriate to the prairies					
Describe sprinkler systems					
Describe servicing associated small equipment					

Total Program Challenge: Exam Blueprint

Exam blueprints: Building Systems Technician Certificate program			
Total Program Exam Blueprint			
Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
RFRG 103 - Refrigeration 2	<ol style="list-style-type: none"> Describe refrigeration safety. Apply troubleshooting techniques on refrigeration systems. 	1	Practical demonstration on safely installing gauges, changing parts and troubleshooting.
ELEC 135 - Electrical Systems	<ol style="list-style-type: none"> Describe electrical safety. Explain AC current flow and power factor correction. Troubleshoot various electrical devices. 	1 1	Complete drawing using straight edge and templates and find two faults installed by the instructor.
THER 182 – Thermodynamics 1	<ol style="list-style-type: none"> Explain the thermodynamics of steam. Perform basic thermodynamic problems. 	1 1	
THER 183 - Applied Mechanics 1	<ol style="list-style-type: none"> Describe the quantities, units, and principles of forces in equilibrium. Perform calculations relating to force, pressure, work, power, and energy. Solve problems involving scalar and vector quantities. 	1 1 1	
CHEM 100 - Chemistry	<ol style="list-style-type: none"> Identify names and formulae of chemical compounds. Describe acids, bases, and salts. 	1 1	
DRFT 103 - Basic Mechanical Drafting	<ol style="list-style-type: none"> Read drawings. Sketch system diagrams. 	1	1
SEM 101 - Technical Seminars	<ol style="list-style-type: none"> Develop study and time management skills. 	Practical exercise	

Exam blueprints: Building Systems Technician Certificate program
Total Program Exam Blueprint

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
ELEC 188 - Basic Electricity 1	<ol style="list-style-type: none"> 1. Perform simple calculations using voltage, current, resistance and power. 2. Describe basic principles of magnetism. 3. Describe operating principles of various types of A.C. and D.C. motors and generators. 4. Use electrical metering devices 	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	
RFRG 195 - Refrigeration Systems	<ol style="list-style-type: none"> 1. Describe the terms and principles associated with the thermodynamics of refrigeration. 2. Describe the operating principles of a compression refrigeration system. 3. Explain operation and maintenance procedures used on compression refrigeration systems. 4. Describe the operating principles of the ammonia and lithium bromide absorption refrigeration systems. 5. Discuss a refrigeration system. 	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	Operate a refrigeration unit
ENGP 180 - Power Lab 1	<ol style="list-style-type: none"> 1. Identify power lab components and safety regulations. 2. Install manhole and handhole covers. 3. Operates a plant air distribution system. 4. Operate raw and treated water systems. 5. Operate boiler feed water pump. 6. Operate basic controllers. 7. Operate low pressure boiler and auxiliaries. 8. Operate high pressure boiler. 9. Tests boiler interlocks. 10. Perform water tests and chemical additions. 11. Operate low and high pressure steam systems. 	<p>1</p>	Practical demonstration required

Exam blueprints: Building Systems Technician Certificate program
Total Program Exam Blueprint

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
ENGP 104 - Advanced Power Lab	<ol style="list-style-type: none"> Place a boiler on hot standby. Regulate boiler pressure. Switch electric controls from manual to automatic and vice versa. Operate soot blowers. Operate a high pressure boiler using Computer controls. Describe operation of a steam turbine/steam pumps. Operate a high pressure boiler using fuel oil. 	No written test	Demonstration – please refer to page 64 for explanation.
ENGP 181 - Plant Maintenance 1	<ol style="list-style-type: none"> Describe the safe use of common hand tools in the powerhouse. Discuss the safe and proper setup of equipment for hoisting and working above ground. Discuss the design, application and maintenance of the most common types of valves used in power piping systems. Perform maintenance tasks in powerhouse environment. 	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	Demonstration – Pipe threading
ENGP 188 - Plant Maintenance 2	<ol style="list-style-type: none"> Describe the maintenance required for boilers and service a boiler. Describe boiler cleaning and boiler inspection preparation procedures. Describe plant shutdown and maintenance procedures. Perform plant shutdown and maintenance procedures. 	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	Written explanation of a boiler lay-up (refer to page 73 for criteria)

Exam blueprints: Building Systems Technician Certificate program
Total Program Exam Blueprint

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
SFTY 187 - Safety	<ol style="list-style-type: none"> 1. Discuss the implications and practices of workplace safety. 2. Describe practices to ensure general workplace safety. 3. Describe environmental pollutants and their methods of control. 4. Describe WHMIS regulations. 5. Describe fire safety in the workplace. 	1 1 1 1 1	
TCOM 100 - Technical Communications 1	<ol style="list-style-type: none"> 1. Apply job related interpersonal and oral communications. 2. Describe effective teamwork. 3. Create workplace documents. 	No written exam	
TCOM 101 - Technical Communications 2	<ol style="list-style-type: none"> 1. Apply job search skills. 2. Use workplace-meeting procedures. 3. Deliver short presentations. 	No written exam	
ENGP 103 - Legislation and Codes	<ol style="list-style-type: none"> 1. State the purpose and function of the ASME Boiler and Pressure Vessel Committee and Code. 2. Use the provincial Boiler and Pressure Vessel Act and Regulations. 3. Use the Canadian Standards Association (CSA) B51 code for the Construction and Inspection of Boilers and Pressure Vessels. 4. Use the Canadian Standards Association (CSA) B52 Mechanical Refrigeration Code. 	1 1 1 1	
BLDG 101 - Building Administration	<ol style="list-style-type: none"> 1. Demonstrate awareness of working liability and due diligence. 2. Describe the procedure for completing a visual and operational check and procedures for an elevator evacuation. 	1 1	Develop a due diligence and working liability checklist Develop an preventative maintenance checklist

Exam blueprints: Building Systems Technician Certificate program
Total Program Exam Blueprint

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
RFRG 183 – Air Conditioning	<ol style="list-style-type: none"> Describe the psychrometric properties of air. Solve air quality problems using a psychrometric chart. Describe air flow behaviour and its movement through distribution systems Explain the design of combined air-conditioning systems and alternative system arrangements. Describe air conditioning heat recovery systems. 	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Practical demonstration of safely installing gauges, and calculating and properly charging an air conditioning system and a practical demonstration on calculating and reading psychrometric charts</p>
ENGP 100 – Heating Systems 1	<ol style="list-style-type: none"> Describe types of boilers used in heating systems. Describe operating principles of various boiler fittings, valves and gauges. Explain the operation of hot water and steam heating boilers. Describe heating boiler controls for boiler operation and combustion. Describe controls used for pneumatic, electric and electronic heating systems. 	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	
ENGP 101 – Heating Systems 2	<ol style="list-style-type: none"> Describe various steam heating systems. Describe various hot water heating systems. Describe warm air heating systems. Describe building ventilation systems. Describe alternate heating systems. 	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	
BLDG 100 - Auxiliary Power Systems	<ol style="list-style-type: none"> Describe means to provide emergency power in buildings. Describe an uninterrupted Power Supply (UPS). Operate an auxiliary generator. 	<p>1</p> <p>1</p>	<p>Practical demonstration on operating an emergency generator</p>

Exam blueprints: Building Systems Technician Certificate program
Total Program Exam Blueprint

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
BLDG 103 - Building Envelope	1. Describe roof construction and maintenance.	1	
	2. Describe various types of building construction.	1	
	3. Describe repairs to doors, windows, walls and exterior surfaces.	1	
BLDG 106 – Groundskeeping	1. Describe installation and repairs to irrigation equipment	1	Do a practical exercise on sharpening chainsaw blades, shovels, and lawnmower blades
	2. Describe servicing associated small equipment	1	
BLDG 107 Hydronic Systems	1. Describe hydronic boilers and associated equipment.	1	Practical demonstration on operating a hydronic boiler and safety involved in operation
	2. Service a hydronic system and associated equipment.	1	
	3. Calculate static and dynamic heads.	1	
PLMB 101 – Plumbing Systems	1. Describe various plumbing systems.	1	Complete a demonstration on installing sinks, taps, water closets and cleaning water closets
	2. Describe storm and wastewater handling systems for large buildings.	1	
	3. Describe water supply systems for large buildings.	1	
	4. Describe servicing plumbing systems.	1	
	5. Service plumbing fixtures.	1	
BLDG 110 – Ventilation Systems	1. Balance air handling systems.	1	Practical demonstration on Balancing an air handling system and procedures for servicing mixing boxes
	2. Service fans and blowers.	1	
	3. Troubleshoot noise and vibration.		
	4. Service mixing boxes.		

Exam blueprints: Building Systems Technician Certificate program
Total Program Exam Blueprint

Title of course	Learning outcomes	Number or percentage of questions per outcome	
		Written test	Demonstration
WTER 100 – Water Treatment 1	<ol style="list-style-type: none"> 1. Explain operation of common external water treatment equipment used in a high pressure plant. 2. Describe the principles and equipment used in the internal treatment of water in a boiler. 	<p>1</p> <p>1</p>	Demonstration and practical test on water treatment which includes tests on sulphate, T.D.S. and softness of water

Building Systems Technician program: Total Program Challenge

Employer validation checklist

Directions: Please check "Satisfactory", "Unsatisfactory", or "Not Applicable" for each knowledge and skill factor. Please add any clarifications in the "Optional comments" column.

Skills and knowledge	Satisfactory	Unsatisfactory	Not Applicable	Optional comments
Uses job related interpersonal and oral communications				
Participates in workplace meetings				
Reads drawings (blueprints)				
Sketches system diagrams when needed				
Applies safety to the use of workplace chemicals				
Applies electrical safety				
Safely uses electrical devices				
Operates safe lockout procedures when working around electrical equipment in shop areas				
Applies the principles of fire and security alarms				
Troubleshoots various electrical devices				
Identifies the different types of switches				
Services "electric motors"				
Uses single and 3 phase types of electrical voltage systems				
Applies principles of electrical voltage systems				
Uses single and 3 phase types of electrical voltage systems				
Applies operating principles of primary and secondary transformers				
Uses electrical metering devices				

Skills and knowledge	Satisfactory	Unsatisfactory	Not Applicable	Optional comments
Applies troubleshooting techniques on refrigeration systems				
Operates a compression refrigeration system				
Installs coils, piping, steam traps, control valves, air vents and vacuum relief devices				
Applies the general principles of air conditioning heat recovery:				
Applies information on the control systems used in air conditioning				
Applies the principles of various ways a building gains and loses heat				
Solves heat transfer problems				
Uses steam tables to solve thermodynamic problems				
Solve problems involving ultimate strength, factor of safety, and allowable stress				
Places the boiler on hot standby in the proper order				
Operates boiler using computer controls changing from automatic to manual and vice versa				
Applies principles found in the ASME Boiler and pressure vessel committee and code				
Applies the Canadian Standards Association (CSA) B51 code for the Construction and Inspection of Boilers and Pressure Vessels				
Applies the Canadian Standards Association (CSA) B52 Mechanical Refrigeration Code				
Operates a plant air distribution system				
Tests boiler interlocks				
Performs water tests and interprets test results				
Operates low and high pressure steam systems				

Skills and knowledge	Satisfactory	Unsatisfactory	Not Applicable	Optional comments
Uses safe and proper setup of equipment for hoisting and working above ground				
Uses basic welding types				
Performs maintenance tasks in powerhouse environment				
Uses precision measuring tools				
Construct gaskets				
Construct piping systems				
Performs shaft alignments				
Applies working knowledge of various steam heating systems				
Identifies components and regulations of combustion safety and equipment				
Identifies the need for water treatment				
Identifies a sanitary drainage system and the problems associated with it				
Applies maintenance principles of plumbing fixtures				

Note to employer/customer verifying the critical learning outcomes for Business Systems Technician Total Program Challenge.

Please complete the PLAR validation checklist for Total BST Program Challenge. Verify whether the PLAR candidate has performed each of the factors, then sign below and include with the [Letter of validation](#)

Comments: _____

Signature: _____

Building Systems Technician program: Total Program Challenge

Employer consent form for a work site visit



Work site information

Workers in the building system field have the opportunity to have their knowledge and skills recognized through the Prior Learning Assessment and Recognition (PLAR) Process at SIAST towards credit for the Building Systems Technician (BST) certificate. The purpose of this work site visit is to provide the student currently enrolled in the Building Systems Program (BST) with the opportunity to demonstrate knowledge of program learning outcomes. Completion of a work site visit by a program assessor is one of the requirements of Prior Learning Assessment and Recognition for BST total program challenge.

Participation in this work site visit is entirely voluntary. Confidentiality will be maintained regarding the information that is provided. Only the student and the SIAST faculty will have access to the information.

Work site consent form

As the employer/supervisor of _____ I have received information regarding BST total program challenge and have read the information. I understand the purpose of a work site visit by the SIAST program assessor.

I hereby forever release and discharge Saskatchewan Institute of Applied Science and Technology (SIAST), its officers, servants, agents and employees from any claim or action arising from my participation in this work site visit.

I understand that I may contact the program head, Building Systems Technician program of the Technology Division, SIAST if I have any comments or concerns regarding my participation in this work site study.

I understand and agree of my own free will to participate in this work site visit.

Print name _____

Signature _____

Date _____

Phone _____

Industry work site _____

Sample Employer Validation Letter

(On employer's business letterhead)

_____ has performed the knowledge and skill factors that have
(Candidate's name)
been checked "satisfactory" at a competent level for course(s) _____
(course / learning outcome)

(course / learning outcome)

Name of validator: _____

Employer: _____

Job title: _____

Telephone: _____

Fax: _____

email: _____

General comments regarding the candidate's performance (optional):

Signature: _____

Date: _____

Note to PLAR candidate:

The information within this letter must be completed and signed by your employer/supervisor or designate and printed on official letterhead indicating the place of employment and who is verifying your validation checklist. The supervisor or designate is responsible for ensuring your validation checklist accurately reflects your abilities in each area identified. A copy of the signed and dated [validation checklist\(s\)](#) for Building Systems Technician course(s) must be included with the letter of validation and returned to your PLAR assessor at SIAST.