



A POLYTECHNIC INSTITUTION

School of Manufacturing, Electronics & Industrial Processes

Program: Technology Teacher Education

Option: Diploma

**TTED 3003  
Structures Foundations**

<b>Start Date:</b>	Oct. 09/06	<b>End Date:</b>	Dec. 15/06
<b>Total Hours:</b>	40	<b>Total Weeks:</b>	10
<b>Hours/Week:</b>	4	<b>Lecture:</b>	2
		<b>Lab:</b>	2
		<b>Shop:</b>	
		<b>Course Credits:</b>	2.5
		<b>Seminar:</b>	
		<b>Other:</b>	

**Prerequisites**

Course No.	Course Name
TTED 3009	Basic Safety Foundations
TTED 3002	Precision Meas. Foundations
TTED 3020	Hand Tool Basics Metal/Mech
TTED 3030	Hand Tool Basics Wood/Plastics
TTED 3040	Materials Science Foundations

**TTED 3003 is a Prerequisite for:**

Course No.	Course Name
TTED 4000	Design, Drawing & CAD 1 for TTED
TTED 4025	Product Manufacturing for TTED
TTED 4040	Materials Science for TTED
TTED 4001	Design, Drawing & CAD 2 for TTED
TTED 4080	Tech. Ed. Projects
TTED 6099	Safety Across Tech. Ed. Curric.
TTED 5080	Directed Technical Project 1

**Course Description**

This course introduces the basic design of structures, strength of materials and stress analysis at an appropriate level for pre-service Technology Education teachers. Principles of math, science, technology and engineering are learned in an integrated way. Besides receiving formal instruction, students will solve statics problems as well as design, build and test scale structures.

**Detailed Course Description**

The goal of the course is to enable Technology Education Teacher to explain and utilise engineering principles for designing structures. This will be accomplished through an understanding of the principles of the strength of materials and stress analysis.

**Evaluation**

Course work will include lectures, work sheets, lab activities (including reports), and written tests. For each activity or lab assigned, information will be distributed describing its purpose, parameters, evaluation criteria and due dates. The approximate weighting of these tasks is as follows:

First Design Problem	10%	Comments: % values are approximate and subject to change.
Torsion Testing Lab	15%	
Statics Problem Sheets	10%	All assignments and work must be done individually, unless otherwise noted.
Statics Quiz	15%	
Truss Lab	15%	All assignments and work must be submitted on time unless previous arrangements have been made with the instructor.
Final Exam	35%	
<b>TOTAL</b>	<u>100%</u>	

Students must attain a minimum of 50% to earn a pass in this course.



A POLYTECHNIC INSTITUTION  
School of Manufacturing, Electronics & Industrial Processes  
Program: Technology Teacher Education  
Option: Diploma

**TTED 3003**  
**Structures Foundations**

<b>Start Date:</b>	Oct. 09/06	<b>End Date:</b>	Dec. 15/06
<b>Total Hours:</b>	40	<b>Total Weeks:</b>	10
<b>Hours/Week:</b>	4	<b>Lecture:</b>	2
		<b>Lab:</b>	2
		<b>Term/Level:</b>	1
		<b>Course Credits:</b>	2.5
		<b>Shop:</b>	
		<b>Seminar:</b>	
		<b>Other:</b>	

**Prerequisites**

Course No.	Course Name
TTED 3009	Basic Safety Foundations
TTED 3002	Precision Meas. Foundations
TTED 3020	Hand Tool Basics Metal/Mech
TTED 3030	Hand Tool Basics Wood/Plastics
TTED 3040	Materials Science Foundations

**TTED 3003 is a Prerequisite for:**

Course No.	Course Name
TTED 4000	Design, Drawing & CAD 1 for TTED
TTED 4025	Product Manufacturing for TTED
TTED 4040	Materials Science for TTED
TTED 4001	Design, Drawing & CAD 2 for TTED
TTED 4080	Tech. Ed. Projects
TTED 6099	Safety Across Tech. Ed. Curric.
TTED 5080	Directed Technical Project 1

**Course Description**

This course introduces the basic design of structures, strength of materials and stress analysis at an appropriate level for pre-service Technology Education teachers. Principles of math, science, technology and engineering are learned in an integrated way. Besides receiving formal instruction, students will solve statics problems as well as design, build and test scale structures.

**Detailed Course Description**

The goal of the course is to enable Technology Education Teacher to explain and utilise engineering principles for designing structures. This will be accomplished through an understanding of the principles of the strength of materials and stress analysis.

**Evaluation**

Course work will include lectures, work sheets, lab activities (including reports), and written tests. For each activity or lab assigned, information will be distributed describing its purpose, parameters, evaluation criteria and due dates. The approximate weighting of these tasks is as follows:

First Design Problem	10%	Comments: % values are approximate and subject to change.
Torsion Testing Lab	15%	
Statics Problem Sheets	10%	All assignments and work must be done individually, unless otherwise noted.
Statics Quiz	15%	
Truss Lab	15%	All assignments and work must be submitted on time unless previous arrangements have been made with the instructor.
Final Exam	35%	
<b>TOTAL</b>	<u>100%</u>	

Students must attain a minimum of 50% to earn a pass in this course.

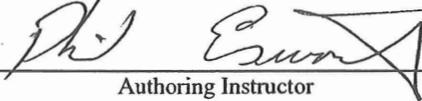
**Course Learning Outcomes/Competencies**

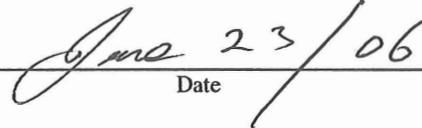
Upon successful completion, the student will be able to:

1. explain the concepts of strengths of materials.
2. explain the effect of buckling and slender columns.
3. define the term: structure.
4. explain the purpose of structures.
5. explain the terms used in the design and analysis of structures (e.g. equilibrium, resultant, reactions, etc.).
6. explain the three broad categories of structures.
7. explain the different types of loads.
8. explain the properties of forces.
9. explain the types of support and the internal forces in plane frames.
10. create free body diagrams.
11. calculate trigonometrical solutions for forces.
12. calculate moments & couples.
13. perform a variety of stress analysis calculations.
14. design structures for specific applications.
15. determine the size of material necessary for a given design application.
16. develop structure activities and problems suitable for inclusion in a High School.

**Verification**

I verify that the content of this course outline is current.

  
\_\_\_\_\_  
Authoring Instructor

  
\_\_\_\_\_  
Date

I verify that this course outline has been reviewed.

  
\_\_\_\_\_  
Program Head/Chief Instructor

  
\_\_\_\_\_  
Date

I verify that this course outline complies with BCIT policy.

  
\_\_\_\_\_  
Dean/Associate Dean

  
\_\_\_\_\_  
Date

Note: Should changes be required to the content of this course outline, students will be given reasonable notice.

**Instructor(s)**

Phil Esworthy

Office Location: SW9-205E

Office Phone: 604-432-8332

Office Hrs.: By Appointment

E-mail Address: Phil\_Esworthy@bcit.ca

**Learning Resources**

*Required:*

me

### Information for Students

**Assignments:** All assignments and work must be submitted on time unless previous arrangements have been made with the instructor. Assignments, lab reports or projects must be done on an individual basis unless otherwise specified by the instructor.

**Makeup Tests, Exams or Quizzes:** There will be no makeup tests, exams or quizzes. If you miss a test, exam or quiz, you will receive zero marks. Exceptions may be made for documented medical reasons or extenuating circumstances. In such a case, it is the responsibility of the student to inform the instructor immediately.

**Ethics:** BCIT assumes that all students attending the Institute will follow a high standard of ethics. Incidents of cheating or plagiarism may, therefore, result in a grade of zero for the assignment, quiz, test, exam, or project for all parties involved and/or expulsion from the course.

**Attendance:** The attendance policy as outlined in the current BCIT Calendar will be enforced. Attendance will be taken at the beginning of each session. Students not present at that time will be recorded as absent.

**Illness:** A doctor's note is required for any illness causing you to miss assignments, quizzes, tests, projects, or exam. At the discretion of the instructor, you may complete the work missed or have the work prorated.

**Attempts:** Students must successfully complete a course within a maximum of three attempts at the course. Students with two attempts in a single course will be allowed to repeat the course only upon special written permission from the Associate Dean. Students who have not successfully completed a course within three attempts will not be eligible to graduate from the appropriate program.

**Course Outline Changes:** The material or schedule specified in this course outline may be changed by the instructor. If changes are required, they will be announced in class.

**Advancement:** Students who fail three or more courses in a term cannot advance to the next term and may be asked to discontinue from the program.

### TTED Program Policy Information

All assigned work must be submitted on or before the specified date. Due dates will be provided by instructors in writing and late work will not be accepted without prior permission from the instructor. Exceptions to this policy will be made for students having documented personal reasons (e.g., medical).

Assignments which fail to meet the standards of the program will be returned marked **UNSATISFACTORY**, with instructor comments and will be recorded as a zero. Standards relate to:

1. The format used (see below).
2. The quality of the English language used.
3. The overall quality of the submission's content.

Unless otherwise indicated, all assignments are to be submitted in a standard format:

1. Begin with a title page showing the following information:
  - Course Name & Number:
  - Assignment Identification:
  - Submitted by:
  - Submitted to:
  - Date:
2. Use standard 8 1/2" x 11" white unlined paper, unless another size is specified for the assignment.
3. Text word-processed and printed in an easily read font.
4. Diagrams hand-drawn or computer-generated to the standard taught in the program (specific instructions may be associated with certain assignments).
5. Your name and date in a footer on every page.

Plagiarism will result in an automatic zero for an assignment for all students involved in the deed. To avoid a charge of plagiarism in research work, always include references which properly credit the original author or designer. This referencing is particularly important when working with partners or teams. Some assignments will be assigned as individual work and even though you may consult with others, the final submission must be your own work and not copied or adapted from the work of others.

### Schedule

Week	Topics/Material Covered	Reference/ Reading	Assignment	Due Date
1	Introduction to structures	Handouts	Design & build a newspaper bridge	Oct. 18
2	Strength of materials	Handouts	Torsion testing lab & report	Nov. 6
3	Statics <ul style="list-style-type: none"> <li>• Components</li> <li>• Resultants</li> <li>• Moments</li> </ul>	Handouts	Components, Resultants & moments problems	Nov. 2
4	Statics <ul style="list-style-type: none"> <li>• Truss problems by similar triangles</li> </ul>	Handouts	Statics problems	Nov. 9
5	Review truss problems		Truss design & build lab	
6	<b>Quiz</b>		Truss design & build lab	
7	Review quiz		Test trusses & write up	Nov. 29
8	FEPC & internet sites	Handout	Internet assignment: Bridge designs & truss analysis	Dec. 6
9	Review for final exam			
10	<b>Final Exam</b>			Week of Dec. 11