Nemeth Code/Abacus
TLL 2547
Term: Fall 2023
University of Pittsburgh

Instructor:
Joanne Devine, Teacher of the Visually Impaired
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When contacting instructor via email, please follow appropriate professional correspondence by including a greeting, separate email body, and sign off. It's helpful if the subject of your email is specific. I try to respond to email messages within 24 hours.

Office:

This is an online course and I do not work on campus. I can be contacted through the Department of Teaching, Learning, and Leading 412-648-7312, however the quickest contact is through email. I encourage you to reach out with any questions to help you progress with weekly assignments.

Required Zoom Meeting Dates: Tuesdays at 7:30 p.m. to 8:30 p.m.
8/29, 9/5, 9/12, 9/19, 9/26, 10/3, 10/10, 10/17, 10/24, 10/31(subject to change), 11/7, 11/14, 11/28

Course Description:
This course is designed to provide instruction in the mathematical braille code (Nemeth code) as well as the Cranmer abacus. Students will be instructed in arithmetic computation and mathematical problem solving using both systems. Students will also learn instructional strategies to assist students who are blind or visually impaired to obtain mathematical literacy.

Objectives:
1. Students will demonstrate an ability to read and write Nemeth for mathematics problems in all four basic operations (addition, subtraction, multiplication and division) in horizontal and vertical arrangements using whole numbers and fractions.
2. Students will demonstrate an ability to read and write set and expanded notation and simple equations in Nemeth.
3. Students will demonstrate an ability to find errors in written Nemeth code.
4. Students will demonstrate the ability to use Nemeth code within UEB contexts.
5. Students will demonstrate an ability to use the Nemeth text as a resource to correctly write advanced signs and symbols in Nemeth Code.
6. Students will demonstrate an ability to adapt a diagram into an accessible tactual format.
7. Students will demonstrate the ability to use the abacus for calculation using the counting method.
8. Students will demonstrate knowledge of the abacus secrets for addition and subtraction.
9. Students will demonstrate an ability to perform all four basic math operations on the abacus.
10. Students will demonstrate knowledge of teaching strategies, math tools, and adaptations to facilitate mathematical learning in students who are blind and visually impaired.

Required Texts and Equipment:

The following texts and materials are required for the course.

1. ABACUS

Millaway, S.M. (2001). *Abacus basic competency: A counting method.* Louisville, KY: American Printing House for the Blind, Inc.

Abacus video and PowerPoint training materials using the counting method are available as a free download from Iowa Education Services for the Blind and Visually <https://www.iesbvi.org/educator-resources/math-2/>

Additional links to the TSBVI Distance Education Abacus training videos are provided in Canvas.

2. NEMETH CODE

Herzberg, T., Osterhaus, S., Larkin, S, & Rosenblum, P. (2022) *Learning and Teaching the Nemeth Code within UEB Contexts: A Step-by-Step Guide.* Licensed under CC BY-NC 4.0 This license requires that users give credit to the creator. It allows users to distribute, remix, adapt and build upon the material in any medium or format, for noncommercial purposes only. (Available online as a free download; posted in Text Books Folder in Canvas for a PDF copy of individual lessons.)

3. REQUIRED READING

Braille Authority of North America, Nemeth Code Technical Committee. (2018) *Guidance for the transcription Using the Nemeth Code within UEB Contexts.* <https://www.brailleauthority.org/nemeth-code> (Available online as a free download; posted Course Documents folder in Canvas)

Kapperman, G., Heinze, T., & Sticken, J. (1997). *Strategies for developing mathematics skills in students who use braille.* Sycamore, IL: Research and Development Institute, Inc. (available online as a free download; see Course Documents folder in Canvas for a PDF copy.)

Additional required reading materials are posted in Canvas in the Course Documents folder.

You will also need the following equipment for the course:
1. Perkins Brailler and eraser
2. APH Cranmer Abacus (available through www.aph.org)
3. Braille Paper: You can order your braille paper from APH by following these steps:
   Shop APH www.aph.org
   Look for braille paper; you can choose between 2 styles of paper, 3-hole punched or unpunched.
• Item Number: 1-04540-00 – 11.5" x 11" unpunched
• Item Number: 1-04680-00 – 11.5" x 11" 3-hole punch

The Perkins Brailler should be borrowed from a local Intermediate Unit or PaTTAN as you did for the literary braille course. You can also borrow the abacus from the same location or purchase one through APH or other vendor.

Optional Download if for some reason you are not able to use the Perkins brailler:
You will be submitting all assignments completed on your Perkins Brailler and submitted electronically.
In order to write in braille on your computer and read simulated braille within the course, you will need to download Perky Duck and the Braille True Type font. Follow the instructions below to download this free program onto your computer.
1. Go to www.duxburysystems.com
2. Select All Products
3. Scroll down to Select Perky Duck Download
4. Click Download of Perky Duck for Windows
5. When the box pops select save.
6. Save the setup to your desktop where you can find it.
7. Go to your desktop and click on setup.
8. Follow the installation instructions.

Perky Duck allows you to use 6-key entry (like on the Perkins) on your keyboard to write and save a braille file that can then be sent to the instructor. Keys "S", "D", and "F" correspond to dots 1, 2, and 3 of the braille cell. Keys "J", "K", and "L" correspond to dots 4, 5, and 6 respectively.

** Please note that Perky Duck allows only 6 key direct-entry of braille characters. It does not function as a braille translation program.

Use of a braille translation program such as Scientific Notebook, Duxbury Braille Translator, or Braille Blaster, etc. is prohibited for this course because the intent is to develop your own skills. The use of braille translation software in this course will be considered a violation of the University of Pittsburgh's Academic Integrity guidelines.

Download: Braille True Type font: http://www.braillebrain.com/p/download-braille-font_6.html
(Also available in Canvas as a free download.)
To test if your keyboard will work with Perky Duck:
1. Open up a blank word document
2. Simultaneously press down the letters: S, D, F, J, K, L
3. Count how many letters are on the screen. Order is unimportant, but all 6 letters should show up. If so, your computer keyboard should work. If you get less than 6 letters, you will need a keyboard that supports n-key rollover.

Video Course material:
Mr. Wassermann has recorded Abacus Video lectures using the traditional method. Other video lessons using the counting method are located in Canvas in a folder in the Course Unit Material Folder. You will view these video lectures as part of your abacus instruction.

Zoom:
In addition there will be weekly conferences through Zoom. At a minimum students need to have speakers and a microphone, however, a headset with a microphone will ensure that they will be able to hear and participate in the conferences.
This program allows voice, video and computer desktop sharing. We will only use the audio for group responses and I will display video of the abacus computations throughout.
I will send you the Zoom meeting link via email to your Pitt email address.

Course Sequence:
Each weekly unit is approximately a week in length and divided into two sections:
Nemeth Code and Abacus. Within each section the objectives and readings for that section will be listed followed by instructor's notes, practice suggestions, and assignment listings. Skills will build upon each other as you move through the course. It is important to PRACTICE, PRACTICE, and PRACTICE!
As with learning UEB, acquiring the skills to read and write Nemeth Code and to use the abacus takes practice and repetition. Assignments that you turn in should not be the only practice you do to learn the skills. The objectives in each section are the skills you should be able to do independently by the end of the unit. Use the objectives as a guide to gauge the depth of your learning.

Assignments:
All the readings and assignments for each unit are summarized together in the assignments and reading chart which can be found in the Course Schedule section of the Syllabus link. There is also a place to keep track of your points on this chart.
In addition to Abacus Competency, there are four types of assignments and two exams you will be doing in this course:

1. Weekly Nemeth Assignments: Each unit will have a Nemeth assignment to be completed on your brailler. The required format for completing the assignment in is stated in the unit.
   - Brailler assignments should be submitted electronically. You will take a picture of each page the hard copy braille and save the document as a .pdf file. Then you will submit the assignment in Canvas.
   - Here are the steps to save multiple images in Preview into a single multi-page PDF.
     - Select all of the images you want to include in your PDF,
     - right-click and choose select Print
     - Then from the "File" menu choose "Print Selected Images" (or "Print..." in recent OS X versions) and then "PDF > Save as PDF"
     - The file should be saved with the following file name: NemethWeek#_Last Name
     - Open the file before submitting to make sure that all the work and braille dots are visible so that I will be able to view and grade your work accurately.

2. Abacus Quizzes: Every few weeks, you will be asked to take an abacus quiz to test your understanding. These quizzes will be taken on-line. It is important that you practice abacus as designated in each unit. You will be expected to take the quizzes over until you achieve 100% competency in order to receive the points designated for the quiz. NOTE: Quizzes are set for multiple attempts. After the instructor reviews your quiz, you will be able to view your results with feedback. You can reset the quiz if you need to take it again.

3. <u>Two Long Term Projects</u>: There are two long term projects you will develop:
- Math Tools Exploration: This assignment is meant to get you researching the types of math tools and materials available to support mathematics instruction of students who are blind and visually impaired. You will be asked to discover information about the tools and then apply your knowledge of tools and math teaching strategies to a student scenario. The assignment is introduced in detail in Week 2.
- Math worksheet Transcription and Tactile Graphic: You will be asked to select two math worksheets (one required, and one selected from four options). You will transcribe and create a tactile graphic to support the concept of each worksheet. This assignment is introduced in detail in Week 10.

4. <u>Classwork Assignments</u>: To assist with the acquisition of new Nemeth Code skills, each week students will model at least 2 Nemeth Code problems presented in the Zoom lecture. Students will and post the classwork for evaluation and feedback before beginning the Weekly Nemeth assignment.

5. <u>Abacus Competency</u>
Weekly audio conferences using a teleconference app are built into the schedule. In addition, students will submit an abacus competency performance video for grading. Abacus Competency Performance will be assessed by student submission of an abacus competency performance video for grading. A Rubric will be provided in Canvas for this assignment. If a student prefers, a Zoom meeting can be scheduled for the Abacus Competency Performance
- Students will demonstrate a knowledge of the Cranmer abacus parts, terminology and hand positions for performing math operations.
- Students will demonstrate the ability to set addition, subtraction and multiplication problems on the abacus utilizing the correct terminology and hand positions.

Zoom meetings will also give students the opportunity to ask questions, refine techniques and practice abacus new abacus skills.

6. <u>Class Discussion</u>: The only graded discussion is the "Project 1 Discussion sharing post" for sharing information from the materials researched in Project 1. Questions about learning and teaching Nemeth Code and abacus can be shared in the "General Course Questions" discussion board.

7. <u>Exams</u>: The last weeks of class are designated for exams. You will take an Abacus Final Exam in a Nemeth Code Final Exam in Week 15. Both exams will contain some questions regarding teaching strategies. Project 1 Discussion sharing post in Week 12 will be a posting to share information for the group from your Math Tools Investigation.

Grading Details for Assignments

1. <u>Nemeth Assignments:</u>
Each assignment is worth 10 points and is graded based on the following criteria:
- You are responsible for proofreading your work. It may be necessary to redo and assignment more than one time before submitting it for grading.
- Points are lost for errors in rule execution, symbols, spacing, etc.
- Any erasure that can be felt interferes with the quality of the work and will be counted as an error.
- Please keep in mind that literary errors and repeated errors will count toward total number of errors for grading purposes.
- Points are based on the following scale:
  0-1 Errors = 10 points
  2-3 Errors = 9 points
  4-5 Errors = 8 points
  6-7 Errors = 7 points
  8-9 Errors = 6 points (required re-do of assignment)
  10-11 Errors = 5 points (required re-do of assignment)
  12-13 Errors = 4 points (required re-do of assignment)
  14-15 Errors = 3 points (required re-do of assignment)
  16-17 Errors = 2 points (required re-do of assignment)
  18-19 Errors = 1 point (required re-do of assignment)
  20 + Errors = 0 points (required re-do of assignment)
  Repeated errors, past six, are not deducted
- Assignments receiving a grade of 6 or lower must be redone. For required re-submissions, 8 points will be the highest score possible and you will be provided with a new assignment to do that is similar in length and content to the original assignment. This redo assignment will be graded on the following criteria:
  0-4 Errors= 8 points
  5-7 Errors= 7 points
  8+ must be redone
- Required re-dos not submitted by week 14 (first week of finals) will receive an additional 2-point deduction off the original score received.
- Late assignments incur an automatic 2 point deduction. Contact me in advance if you have a conflict.

2. <u>Abacus Quizzes:</u>
    Each quiz is worth 5 points. You receive these points when you achieve 100%competency on the quiz. Multiple attempts are allowed, but correct answers will not be displayed at each attempt. You are encouraged to post questions if you have difficulty achieving competency. This is the way for all of us to gauge learning throughout the course.
    Please note: The instructor rather than the computer will grade quizzes, so that the instructor can review your responses before determining if you need to take a quiz again.

3. Weekly Audio Conferences: 13 total; each conference is worth 2 points

4. Classwork Assignment: 13 total; worth 3 points each.

5. Abacus Competency Performance: 10 points
You will be assigned 3 problems. You will video yourself performing the operations on the Cranmer abacus and verbalizing each step as you solve the problems. Video results will be submitted in Canvas for grading. A rubric will be provided for this video assignment.
If you prefer, a Zoom meeting can be scheduled for the Abacus Competency Performance. Students will be expected to:
- demonstrate the ability to solve abacus addition problems from memory utilizing the abacus language and movements
- demonstrate the ability to solve abacus subtraction problems from memory utilizing the abacus language and movements
- demonstrate the ability to set multiplication problems on the abacus utilizing the correct positions.

6. Long Term Projects:
Long term project 1 is further explained in Week 2 and due on or before the end of Week 12. Long Term Project 2 is introduced in Week 10 and due by electronic submission on or before the end of Week 14.

The projects will be graded based on the following criteria:

• Long Term Project 1: Math Tools Exploration (30 points):
- The two math tools were adequately researched (5 points).
- Uses and limitations of each tool were adequately discussed and relevant and logical for the chosen Math Standards (15 points).
- A thoughtful lesson plan with logical progression was developed (10 points).

• Long Term Project 2: Math Worksheets and Tactile Graphics (30 points):
- Math worksheets (one required, one chosen from options) were transcribed accurately (5 points - one point lost per 2 errors).
- Tactile graphics were accurate, readable, supported learning and followed principles of good graphic making (20 points - 10 for each graphic).
- Short write-up about the choices made in making the graphics was adequate and showed deliberate attention to principles of good graphic making (5 points)

7. Discussion Board:
A Question and Answer forum will be posted for questions, comments and suggestions.
In addition a graded discussion worth 5 points will be posted to share information from the Project 1 tool investigation.

8. Course Participation
The expectation for course participation is as follows:
- Maintain a high level of interaction with your peers and instructor in Zoom meetings.
- Demonstrate that you are actively learning the material in each weekly unit.
- Complete the weekly classwork assignment.
- Monitor your grades, assessments and feedback. The assignments in this course are meant to help you gauge your acquisition of the skills - but additional practice prior to

doing the assignments is essential.

9. <u>Exams</u>:
- The abacus final exam is worth 20 points.
- The Nemeth final exam is worth 30 points.

Total Points for the Course:

13 Nemeth Assignments:	130 points
13 Classwork Assignments	39 points
13 Nemeth/Abacus Conferences	26 points
Abacus Quizzes	20 points
Abacus Competency Performance	10 points
Math Tools Exploration-Project 1:	30 points
Project 1 Discussion sharing post	5 points
Worksheet/Tactile Graphic-Project 2:	30 points
Abacus Final Exam:	20 points
<u>Nemeth Final Exam:</u>	<u>30 points</u>
Total	**340 points**

Grading Scale:
B- is the lowest passing grade for this graduate course.
100 - 97% A+
96 - 94% A
93 - 90% A-
89 - 87% B+
86 - 83% B
82 - 80% B-
79 - 77% C+
76 - 73% C

Other Resources (not required):

1. Complete reference book for Nemeth including advanced mathematics (available as pdf download from BANA and a copy is in Canvas in the Course Documents). *Nemeth code for mathematics and science notation (1972).* Louisville, KY: American Printing House for the Blind. (Note: The text is based on the work of Dr. Abraham Nemeth; it is written in EBAE braille which predates the use of UEB.)

   American Printing House for the Blind. *Nemeth Tutorial.* (free online training program) <https://nemeth.aphtech.org/>

2. Nemeth reference meant for transcribers:
   NFB Mathematics Braille Transcribing Course Manual: <https://nfb.org/programs-services/braille-certification/mathematics-braille-transcribing> (available online as a free download; see Course Documents folder in Canvas for a PDF copy of individual lessons.)

3. *Nemeth Symbol Library*. Pearson Accessibility Assessment Division (PAA). <https://accessibility.pearson.com/resources/nemeth-curriculum/nemeth-symbol-library/index.php#SimilarTo>.

4. Iowa Braille School. Math Resources: *Abacus Resources*. <https://www.iesbvi.org/educator-resources/math-2/>.

5. Nemeth Reference Sheets:
   Dumont, T. and Malone, J.L. (2003). *Nemeth reference sheets*. Boston, MA: National Braille Press. <https://shop.nbp.org/products/nemeth-reference-sheets>
   (This reference guide is available in Braille and Print or Large Print for users with vision. It is also available in Braille for users without vision. The Braille version includes raised images of the mathematical symbols as they appear in print.)

Academic Integrity

Students in this course will be expected to comply with the [University of Pittsburgh's Policy on Academic Integrity]. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.

To learn more about Academic Integrity, visit the [Academic Integrity Guide] for an overview of the topic. For hands-on practice, complete the [Understanding and Avoiding Plagiarism tutorial] .

Disability Services

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and [Disability Resources and Services](#) (DRS), 140 William Pitt Union, (412) 648-7890, [drsrecep@pitt.edu,](#) (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Because this course is primarily online and I may not get to meet with you in person. Clear communication and student support are important to me so please feel free to contact me via email if you are having difficulties. We can arrange for a Zoom or on-campus meeting.

Equity, Diversity, and Inclusion

The University of Pittsburgh does not tolerate any form of discrimination, harassment, or retaliation based on disability, race, color, religion, national origin, ancestry, genetic information, marital status, familial status, sex, age, sexual orientation, veteran status or gender identity or other factors as stated in the University's Title IX policy. The University is committed to taking prompt action to end a hostile environment that interferes with the University's mission. For more information about policies, procedures, and practices, visit the [Civil Rights & Title IX Compliance web page](#).

I ask that everyone in the class strive to help ensure that other members of this class can learn in a supportive and respectful environment. If there are instances of the aforementioned issues, please contact the Title IX Coordinator, by calling 412-648-7860, or e-mailing [titleixcoordinator@pitt.edu](#). Reports can also be [filed online](#). You may also choose to report this to a faculty/staff member; they are required to communicate this to the University's Office of Diversity and Inclusion. If you wish to maintain complete confidentiality, you may also contact the University Counseling Center (412-648-7930).

Accessibility

The Canvas LMS platform was built using the most modern HTML and CSS technologies, and is committed to W3C's Web Accessibility Initiative and [Section 508](#) guidelines. Specific details regarding individual [feature compliance](#) are documented and updated regularly.

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To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.