MATH 1410 - Number Concepts for Teachers (formerly Number Concepts for Elementary Education)
3 Credit Hours

Course Description:

This course develops the mathematical thinking students will need as beginning elementary mathematics teachers. The foundations for learning mathematics will be examined along with fundamental concepts, the four basic operations of arithmetic, number theory and proportional reasoning. Students will use the ten standards formulated by the National Council of Teachers of Mathematics throughout the course. Innovative manipulative activities will be integrated throughout the learning process for each topic.

Course Outcomes:

Through the study of MATH 1410, the student will acquire the ability to:

1. Explain, illustrate, and use Polya's 4-step problem solving process: understand the problem, devise a plan, carry out the plan, look back;
2. Explain, illustrate, and apply the following strategies: make a drawing, guess and check, make a table, use a model, work backward, use a variable, make an organized list, and eliminate possibilities;
3. Apply concepts of patterns to problem solving: Fibonacci numbers, Pascal's triangle, arithmetic sequence, geometric sequence, triangular numbers, and finite differences;
4. Use algorithms for solving equations and inequalities in problem solving;
5. Use concepts of set theory in problem solving: disjoint sets, subsets, equal sets, one-to-one correspondence, finite sets, infinite sets, intersection of sets, union of sets, complement of a set, and Venn diagrams;
6. Use concepts of functions and graphs in problem solving;
7. Apply concepts of deductive reasoning to problem solving;
8. Represent numeric values using symbolisms of a variety of numeration systems: Egyptian, Roman, Mayan, and Hindu-Arabic;
9. Illustrate and apply models for numeration and place value in bases two through twelve;
10. Apply models for addition and subtraction algorithms;
11. Apply techniques for mental calculations: compatible numbers, substitutions, equal differences, and add-up method;

12. Apply techniques for estimation of sums and differences: rounding, compatible numbers, and front- end estimation;
13. Apply models for multiplication algorithms;
14. Apply techniques of mental multiplication: compatible numbers, substitutions, and equal products;
15. Apply techniques for estimation of products: rounding, compatible numbers, and front-end estimation;
16. Apply models for division algorithms;
17. Apply the technique of equal quotients for mental division;
18. Apply techniques for estimation of quotients: rounding, compatible numbers, and front-end estimation;
19. Apply concepts of exponents;
20. Apply concepts of number theory to problem solving: factors, multiples, divisibility, prime and composite numbers;
21. Apply concepts of greatest common divisor (factor) and least common multiple in problem solving;
22. Apply models for operations with integers;
23. Apply models for concepts of fractions: part-to-whole, division, and ratio;
24. Apply concepts of fraction relationships: equality, common denominators, inequality, density; mixed numbers, and improper fractions;
25. Apply algorithms for operations with fractions: addition, subtraction, multiplication, and division;
26. Apply concepts for mental calculations with fractions: compatible numbers, substitutions, equal differences, add-up, and equal quotients;
27. Apply concepts for estimation with fractions: rounding and compatible numbers;
28. Use concepts of fractions in problem solving;
29. Apply models for decimal concepts: decimal squares and number line;
30. Apply concepts of decimal relationships: equality and inequality;
31. Apply concepts of rational numbers: decimal form, density, and estimation;
32. Apply algorithms for operations with decimals: addition, subtraction, multiplication, and division;
33. Convert repeating decimals to rational numbers;
34. Apply concepts for mental computation with decimals: substitutions and add-up, equal quotients, and compatible numbers;
35. Apply concepts for estimation with decimals: rounding, front-end estimation, and compatible numbers;
36. And use concepts of ratio, proportion, and percent in problem solving.

Prerequisites and Corequisites:

Documented eligibility for collegiate mathematics; one high school credit each in Algebra I, Algebra II, and geometry.

Course Topics:

Module 1 - Foundations

Module 2 - Fundamentals

Module 3 - Operations

Module 4 - Number Theory

Module 5 - Number systems

Module 6 - Proportion

Specific Course Requirements:

Basic familiarity with Microsoft Office components such as Word, PowerPoint, and FrontPage. Several word processing documents will be submitted. They should be submitted in Microsoft Word format. Many programs such as Microsoft Works and the word processor available for Macintosh computers can save documents in Word format. Although there is no requirement to purchase Microsoft Word, students must discover a way to save documents in Word format. Word Perfect may not be used for assignment submissions.

Required Textbooks:

Please visit the Virtual Bookstore to obtain textbook information for this course. Move your cursor over the "Books" link in the navigation bar and select "Textbooks & Course Materials." Select your Program, Term, Department, and Course; then select "Submit."

Supplementary Materials:

Students will find the use of a graphing calculator such as the TI-83 Plus helpful. A student's solution manual for the textbook is optional.

Hardware and Software Requirements:

Minimum hardware requirements can be found here.

Minimum software requirements can be found here.

Common applications you might need:
To read a PDF file download the latest version of Adobe Reader here
Don't have Microsoft Word? Explore an alternative OpenOffice here
Accessing a PowerPoint file? Download the PowerPoint Viewer here

Web Resources:

Purdue OWL Online Writing Lab (for APA, MLA, or Chicago style)

The Writing Center Online Writer's Handbook

Student Resources:

- Technical support information can be found on the TN eCampus Help Desk page.
- Smarthinking virtual tutoring is available **FREE** of charge. to access Smarthinking, visit the course homepage and select Smarthinking under Course Resources. You also view sample sessions to see what Smarthinking offers and how it works.
- Information on other student issues or concerns can be located on the TN eCampus Student Resources page.

Instructor Information:

Please see "Instructor Information" in the Getting Started Module for instructor contact information, virtual office hours, and other communication information. You can expect to receive a response from the instructor within 24-48 hours unless notified of extenuating circumstances.

Testing Procedures:

All testing will be done online. Students are honor-bound to produce work which is completely their own.

Grading Procedures:

Each of the 6 modules will include discussions, web assignments, and a quiz. Assignments will count 10 points each, quizzes will count 50 points each, homework will count 100 points, total participation will count 100 points, and the individual project will count 100 points. The final exam will count 200 points.

Quizzes and Final Exam

Module 1 Quiz – 50 points
Module 2 Quiz – 50 points
Module 3 Quiz – 50 points
Module 4 Quiz – 50 points
Module 5 Quiz – 50 points
Module 6 Quiz – 50 points
Total Possible Points – 300
Final Exam – 200 points

Grading Scale:

Total Possible Points 1000

A	900-1000 points	90-100%
B	800-899 points	80-89%
C	700-799 points	70-79%
D	600-699 points	60-69%
F	Below 600 points	0-59%

Assignments and Projects:

A sequenced list of assignments are arranged by module. Each assignment is worth 10 points.

Module 1:
Assignment 1 - NCTM
Assignment 2 - Venn Diagram

Module 2:
Assignment 3 - Sets
Assignment 4 - Base 10
Assignment 5 - Base 7

Module 3:
Assignment 6 - Add
Assignment 7 - Subtract
Assignment 8 - Multiply
Assignment 9 - Divide

Assignment 10 - Input
Assignment 11 - Plot

Module 4:
Assignment 12 - Factor
Assignment 13 - Month
Assignment 14 - GCF_LCM

Module 5:
Assignment 15 - Integer
Assignment 16 - Frac_Add
Assignment 17 - Frac_Mult
Assignment 18 - Decimals

Module 6:
Assignment 19 - Ratio
Assignment 20 - Percent

Total Possible Points – 200

Homework Assignments:
Homework will be worked through CourseCompass using MyMathLab. Your homework assignments will be averaged.
Total Possible Points – 100

Project:

A project will be due in Module 6. You must create something original and, of course, the activity must be one you would use to teach a mathematics concept covered in the six modules. The project will be worth 100 points.
Total Possible Points – 100

Class Participation:

All students must participate in all interactive aspects of the course. Students must communicate with other students through the discussion board, students are expected to communicate with the instructor as a learning resource, and students must check the course bulletin board frequently for announcements.

The grading of class participation are as follows:

Module 1
Introduction – 10 points
Questions and/or Helpful Replies – 10 points

Module 2
Using Children's Literature in Math Class – 10 points
Questions and/or Helpful Replies – 10 points

Module 3
Questions and/or Helpful Replies – 10 points

Module 4
Questions and/or Helpful Replies – 10 points

Module 5
Performance with Fractions – 10 points
Questions and/or Helpful Replies – 10 points

Module 6
Helpful Internet Site – 10 points
Questions and/or Helpful Replies – 10 points

Total Possible Points – 100

Course Ground Rules:

The following two statements (1., 2.) were derived from the TBR System-wide Student Rules document, released January 2012:

RULES OF THE TENNESSEE BOARD OF REGENTS STATE UNIVERSITY AND COMMUNITY COLLEGE SYSTEM OF TENNESSEE SYSTEMWIDE STUDENT RULES CHAPTER 0240-02-03 STUDENT CONDUCT AND DISCIPLINARY SANCTIONS

Read the document in its entirety here.

1. Standards of Conduct:

- Students are required to adhere to the same professional, legal and ethical standards of conduct online as on campus. In addition, students should conform to generally accepted standards of "netiquette" while sending e-mail, posting comments to the discussion board, and while participating in other means of communicating online. Specifically, students should refrain from inappropriate and/or offensive language, comments and actions.

2. Review the TN eCampus Academic Integrity/Academic Honesty Policy**:**

- In their academic activities, students are expected to maintain high standards of honesty and integrity. Academic dishonesty is prohibited.

Such conduct includes, but is not limited to:

- an attempt by one or more students to use unauthorized information in the taking of an exam
- to submit as one's own work, themes, reports, drawings, laboratory notes, computer programs, or other products prepared by another person,
- or to knowingly assist another student in obtaining or using unauthorized materials.

Plagiarism, cheating, and other forms of academic dishonesty are prohibited.

Students guilty of academic misconduct, either directly or indirectly through participation or assistance, are subject to disciplinary action through the regular procedures of the student's home institution. Refer to the student handbook provided by your home institution to review the student conduct policy.

In addition to other possible disciplinary sanctions that may be imposed, the instructor has the authority to assign an "F" or zero for an activity or to assign an "F" for the course.

Other Course Rules:

Students are expected to:

- Participate in all aspects of the course
- Communicate with other students
- Learn how to navigate in Brightspace
- Keep abreast of course announcements
- Use the assigned course management (Brightspace) email address rather than a personal email address
- Address technical problems immediately:
    - Contact Technical Support
    - View Term Calendar here
- Observe course netiquette at all times.

Guidelines for Communications:

Email:

- Always include a subject line.
- Remember without facial expressions some comments may be taken the wrong way. Be careful in wording your emails. Use of emoticons might be helpful in some cases.
- Use standard fonts.
- Do not send large attachments without permission.
- Special formatting such as centering, audio messages, tables, html, etc. should be avoided unless necessary to complete an assignment or other communication.
- Respect the privacy of other class members

Discussions:

- Review the discussion threads thoroughly before entering the discussion. Be a lurker then a discussant.
- Try to maintain threads by using the "Reply" button rather starting a new topic.
- Do not make insulting or inflammatory statements to other members of the discussion group. Be respectful of other’s ideas.
- Be patient and read the comments of other group members thoroughly before entering your remarks.
- Be cooperative with group leaders in completing assigned tasks.
- Be positive and constructive in group discussions.

- Respond in a thoughtful and timely manner.

Library:

The Tennessee Virtual Library is available to all students enrolled in TN eCampus programs and courses. Links to library materials (such as electronic journals, databases, interlibrary loans, digital reserves, dictionaries, encyclopedias, maps, and librarian support) and Internet resources needed by learners to complete online assignments and as background reading will be included within the course modules. To access the Virtual Library, go to the course homepage and select the ***Virtual Library*** link under Course Resources.

Students with Disabilities:

Qualified students with disabilities will be provided reasonable and necessary academic accommodations if determined eligible by the appropriate disability services staff at their home institution. Prior to granting disability accommodations in this course, the instructor must receive written verification of a student's eligibility for specific accommodations from the disability services staff at the home institution. It is the student's responsibility to initiate contact with their home institution's disability services staff and to follow the established procedures for having the accommodation notice sent to the instructor.

Syllabus Changes:

The instructor reserves the right to make changes as necessary to this syllabus. If changes are necessitated during the term of the course, the instructor will immediately notify students of such changes both by individual email communication and posting both notification and nature of change(s) on the course bulletin board.

Disclaimer

The information contained in this syllabus is for general information purposes only. While we endeavor to keep this information up-to-date and accurate, there may be some discrepancies between this syllabus and the one found in your online course. The syllabus of record is the one found in your online course. Please make sure you read the syllabus in your course at the beginning of the semester. Questions regarding course content should be directed to your instructor.