

Survey of Mathematical Ideas
Master Syllabus

Department: Mathematics, Physics and Engineering

Course Prefix/Number: MATH 404 (3)

Master Syllabus Approved by Department on: ___9___/___1___/_2007___
month date year

- I. Catalog Description:** This course is designed to bring together and supplement the technical material of other mathematics courses to communicate mathematics effectively. Topics in algebra, trigonometry, geometry, statistics, and discrete mathematics will be explored. Technology will be used where appropriate.
- II. Prerequisites:** MATH 120 and MATH 302 or MATH 402 or concurrent enrollment.
- III. Expanded Course Description:**
This course is the capstone course for those students seeking Middle School Mathematics Certification (4-8) and Secondary Mathematics Certification (8-12). Emphasis is on the Domains and Competencies of the TExES test and continuing to develop problem solving skills. This course should be one of the last courses students take before the student teaching semester.
- IV. Intended Student Outcomes:** see attached
- V.** Unless otherwise stipulated in this master syllabus by the department, the following items are subject to faculty discretion as described in each faculty member's individual course outline/syllabus:
- a) Course Requirements
 - b) Required Text(s)
 - c) Bibliography
- VI. Academic Honesty:** Cheating, plagiarism (submitting another person's materials or ideas as one's own), or doing work for another person who will receive academic credit are all-impermissible. This includes the use of unauthorized books, notebooks, or other sources in order to secure or give help during an examination, the unauthorized copying of examinations, assignments, reports, or term papers, or the presentation of unacknowledged material as if it were the student's own work. Disciplinary action may be taken beyond the academic discipline administered by the faculty member who teaches the course in which the cheating took place.

VII. Students With Disabilities Policy: It is the policy of Tarleton State University to comply with the Americans with Disabilities Act (ADA) and other federal, state, and local laws relative to the provision of disability services. Students with disabilities attending Tarleton State University may contact the Office of Disability Services at (254) 968-9400 to request appropriate accommodation. Furthermore, formal accommodation requests cannot be made until the student has been officially admitted to Tarleton State University.

Department Head Signature/Date:

Signature

____/____/_____
Date

Math 404: Survey of Mathematical Ideas

Week	Domain	Competency	Activity	Assessment
1	I – Number Concepts	1. The teacher understands the real number system and its structure, operations, algorithms, and representations.	Use activities from Fostering Algebraic Thinking for first 6 weeks of class.	
		2. The teacher understands the complex number system and its structure, operations, algorithms, and representations	Discuss Five Strands of Mathematical Proficiency	Have students identify algebraic habits of mind used in solving problems
		3. The teacher understands number theory concepts and principles and uses numbers to model and solve problems in a variety of situations.	It's a Brick Wall	
2,3, 4, and 5	II – Patterns and Algebra	4. The teacher uses patterns to model and solve problems and formulate conjectures.	Painting Towers	
		5. The teachers understands attributes of functions, relations, and their graphs.	Moving in the Right Direction or Match My Graph Walk	
		6. The teacher understands linear and quadratic functions, analyzes their algebraic and graphical properties, and uses them to model and solve problems.	Building Chimneys Generalizing – Activities 3&4 Figurate numbers	Rectangular numbers
		7. The teachers understands polynomial, rational, radical, absolute value, and piecewise functions, analyzes their algebraic and graphical properties, and uses them to model and solve problems.	Use finite differences and analyze the meaning of the constant for linear, and quadratic functions.	Have students analyze the meaning of the constant for cubic functions.
		8. The teacher understands exponential and logarithmic functions, analyzes their algebraic and graphical properties, and uses them to model and solve problems.	M&M Growth M&M Decay	Bacterial growth Half life
		9. The teacher understands trigonometric and circular functions, analyzes their algebraic and graphical properties, and uses them to model and solve problems.		
		10. The teacher understands and solves problems using differential and integral calculus.	Length of line segment p.29 from Supporting and Strengthening Standards-Based Teacher Preparation	Shaded square problem p 26 from Supporting and Strengthening Standards-Based Teacher Preparation

Week	Domain	Competency	Activity	Assessment
6	V – Mathematical processes and perspectives	18. The teacher understands mathematical reasoning and problem solving.		
		19. The teacher understands mathematical connections both within and outside of mathematics and how to communicate mathematical ideas and concepts.		
7, 8, and 9	III – Geometry and Measurement	11. The teacher understands measurement as a process.	The Hands of Time Rectangles Shape-Up Geometry and Measurement Activity	
		12. The teacher understands geometries, in particular Euclidean geometry, as axiomatic systems.		
		13. The teacher understands the results, uses, and applications of Euclidean geometry.		
		14. The teacher understands coordinate, transformational, and vector geometry and their connections.	Let's Go Sailing	
10, and 11	IV – Probability and Statistics	15. The teacher understands how to use appropriate graphical and numerical techniques to explore data, characterize patterns, and describe departures from patterns.	Stem and Leaf plots Scatter plots Box and whisker plots Measures of Central Tendency Activity	
		16. The teacher understands concepts and applications of probability.	On the Edge	
		17. The teacher understands the relationships among probability theory, sampling, and statistical inference, and how statistical inference is used in making and evaluating predictions.		
12	VI – Mathematical Learning,	20. The teacher understands how children learn mathematics and plans, organizes, and implements instruction using knowledge of students, subject	Use Ratio of Pears, Apples, and Oranges with accompanying video to get at	

Week	Domain	Competency	Activity	Assessment
	Instruction, and Assessment	matter, and statewide curriculum [Texas Essential Knowledge and Skills]).	good questioning.	
		21. The teacher understands assessment and uses a variety of formal and informal assessment techniques to monitor and guide mathematics instruction and to evaluate student progress.	Design a rubric for grading TExES project prior to part one due date.	