

#22-
~~23~~-UCCh.
Stacked ref. #7 - GCCh. (sign)

FORMAT 2

Submit originals (including syllabus) and one copy and electronic copy to the Faculty Senate Office
See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/> for a complete description of the rules governing curriculum & course changes.

CHANGE COURSE (MAJOR) and DROP COURSE PROPOSAL
Attach a syllabus, except if dropping a course.

SUBMITTED BY:

Department	Elementary	College/School	School of Education
Prepared by	Jann Laiti/Carol Barnhardt	Phone	6447/6457
Email Contact	jmlaiti@alaska.edu cabarnhardt@alaska.edu	Faculty Contact	Carol Barnhardt

1. COURSE IDENTIFICATION: As the course now exists.

Dept	ED	Course #	478/678	No. of Credits	2
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COURSE TITLE Math Methods and Curriculum Development

2. ACTION DESIRED: Changes to be made to the existing course.

Change Course If Change, indicate below what change. Drop Course

NUMBER		TITLE		DESCRIPTION	
PREREQUISITES				FREQUENCY OF OFFERING	
CREDITS (including credit distribution)			3	COURSE CLASSIFICATION	
CROSS-LISTED		Dept.		(Requires approval of both departments and deans involved. Add lines at end of form for such signatures.)	
STACKED (400/600) Include syllabi.	<input checked="" type="checkbox"/>	Dept.	ED	Course #	478/678
OTHER (please specify)	To take effect FALL 2013.				

3. COURSE FORMAT

NOTE: Course hours may not be compressed into fewer than three days per credit. Any course compressed into fewer than six weeks must be approved by the college or school's curriculum council and the appropriate Faculty Senate curriculum committee. Furthermore, any core course compressed to less than six weeks must be approved by the core review committee.

COURSE FORMAT: (check all that apply) 1 2 3 4 5 6 weeks to full semester

OTHER FORMAT (specify all that apply)
Mode of delivery (specify lecture, field trips, labs, etc)

4. COURSE CLASSIFICATIONS: (undergraduate courses only. Use approved criteria found on Page 10 & 17 of the manual. If justification is needed, attach on separate sheet.)

H = Humanities S = Social Sciences

Will this course be used to fulfill a requirement for the baccalaureate core? **YES** **NO**

IF YES, check which core requirements it could be used to fulfill:

O = Oral Intensive, Format 6 also submitted
 W = Writing Intensive, Format 7 submitted
 Natural Science, Format 8 submitted

5. COURSE REPEATABILITY:

Is this course repeatable for credit? YES NO

Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).

How many times may the course be repeated for credit? **TIMES**

If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course? **CREDITS**

6. CURRENT CATALOG DESCRIPTION AS IT APPEARS IN THE CATALOG: Including dept., number, title and credits

ED F478 Math Methods and Curriculum Development
 2 Credits
 Offered Fall

 Study and application in the classroom of best practices from research-based strategies for the teaching and learning of mathematical concepts, content and methods for students in elementary classrooms with diverse populations. Requires development and classroom implementation of mathematics unit. Concurrent internship required. Prerequisites: Admission to Internship Year. Stacked with ED F678. (2+0)

ED F678 Mathematics Methods and Curriculum Development
 2 Credits
 Offered Fall

 Study and application in the classroom of best practices from research-based strategies for the teaching and learning of mathematical concepts, content and methods for students in elementary classrooms with diverse populations. Requires development and classroom implementation of mathematics unit. Concurrent internship required. Prerequisites: Admission to the post-baccalaureate elementary licensure program; graduate standing; or permission of instructor. Stacked with ED F478. (2+0)

7. COMPLETE CATALOG DESCRIPTION AS IT WILL APPEAR WITH THESE CHANGES: (Underline new wording strike-through old wording and use complete catalog format including dept., number, title, credits and cross-listed and stacked.) PLEASE SUBMIT NEW COURSE SYLLABUS. For stacked courses the syllabus must clearly indicate differences in required work and evaluation for students at different levels.

ED F478 Math Methods and Curriculum Development
 ≥ 3 Credits
 Offered Fall

 Study and application in the classroom of best practices from research-based strategies for the teaching and learning of mathematical concepts, content and methods for students in elementary classrooms with diverse populations. Requires development and classroom implementation of mathematics unit. Concurrent internship required. Prerequisites: Admission to Internship Year. Stacked with ED F678. (~~2+0+3~~) (2+0+8)

ED F678 Mathematics Methods and Curriculum Development

2 3 Credits
Offered Fall

Study and application in the classroom of best practices from research-based strategies for the teaching and learning of mathematical concepts, content and methods for students in elementary classrooms with diverse populations. Requires development and classroom implementation of mathematics unit. Concurrent internship required. Prerequisites: Admission to the post-baccalaureate elementary licensure program; graduate standing; or permission of instructor. Stacked with ED F478. (~~2+0+3~~) (2+0+8)

8. IS THIS COURSE CURRENTLY CROSS-LISTED?

YES/N <input checked="" type="radio"/>	No <input type="radio"/>	If Yes, DEPT <input type="text"/>	NUMBER <input type="text"/>
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(Requires written notification of each department and dean involved. Attach a copy of written notification.)

9. GRADING SYSTEM: Specify only one

LETTER : <input checked="" type="checkbox"/>	PASS/FAIL: <input type="checkbox"/>
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10. ESTIMATED IMPACT

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

No impact.

11. LIBRARY COLLECTIONS

Have you contacted the library collection development officer (kljensen@alaska.edu, 474-6695) with regard to the adequacy of library/media collections, equipment, and services available for the proposed course? If so, give date of contact and resolution. If not, explain why not.

No Yes No change

12. IMPACTS ON PROGRAMS/DEPTS:

What programs/departments will be affected by this proposed action?
Include information on the Programs/Departments contacted (e.g., email, memo)

None other than the School of Education.

13. POSITIVE AND NEGATIVE IMPACTS

Please specify **positive and negative** impacts on other courses, programs and departments resulting from the proposed action.

None.

JUSTIFICATION FOR ACTION REQUESTED

The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. If you ask for a change in # of credits, explain why; are you increasing the amount of material covered in the class? If you drop a prerequisite, is it because the material is covered elsewhere? If course is changing to stacked (400/600), explain higher level of effort and performance required on part of students earning graduate credit. Use as much space as needed to fully justify the proposed change and explain what has been done to ensure that the quality of the course is not compromised as a result.

Teacher education programs are under a great deal of scrutiny to assure policy makers and the general public that future elementary teachers have sufficient content knowledge and skills in the areas in which they have teaching responsibilities and that they have clearly defined coursework to assure that they also have opportunities to acquire the methods needed to successfully teach and develop meaningful curriculum in multiple content areas.

UAF elementary teacher education interns (i.e., students in their senior year of the BA in Elementary Education degree and elementary post-baccalaureate students completing their year-long internship) currently DO have these opportunities and requirements but this has not been accurately reflected in the current distribution of credits during their internship year. As an artifact of the process of development of the original BAE degree, the number of hours that interns spend in their elementary classroom placements and in their university methods and curriculum development courses has never been accurately reflected in the course credit allocations.

It is important that we correct these inaccuracies now for the following reasons:

1. External agencies (political entities and accreditation groups) now want more specific evidence that elementary teacher education students have dedicated coursework and internship requirements to prepare them to teach Reading, Writing, Math, Science, PE/Health and the Arts. This evidence needs to be reflected more directly and more accurately on our program requirements than it has been. Some of the work currently completed by students as part of ED 468 (a 6 credit course currently co-taught by 4 instructors) is being distributed to other courses so that the content of the courses is more clearly evident to reviewers.

To be eligible for the newly created Alaska Performance Scholarship, university students must be enrolled in 30 credits per academic year. The intern year requirements in the current BA in Elementary Education degree include only 26 credits. These 26 credits are not an accurate representation of the amount of coursework and fieldwork that students actually complete.

SEE ATTACHED SIGNATURES

APPROVALS: (Additional signature blocks may be added as necessary.)

	Date	
Signature, Chair, Program/Department of: Elementary Education	Carol Barnhart	

	Date	
Signature, Chair, College/School Curriculum Council for: Education		

	Date	
Signature, Dean, College/School of: Education	Allan Morotti	

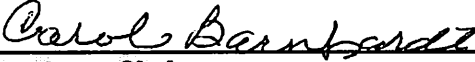
	Date	
Signature of Provost (if applicable)		
Offerings above the level of approved programs must be approved in advance by the Provost.		

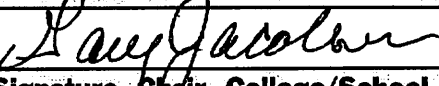
ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE.

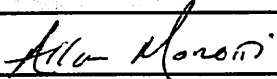
	Date	
Signature, Chair, UAF Faculty Senate Curriculum Review Committee		

fieldwork that students actually complete.

APPROVALS: (Additional signature blocks may be added as necessary.)

	Date	9-21-12
Signature, Chair, Program/Department of: Elementary Education	Carol Barnhart	

	Date	9/24/12
Signature, Chair, College/School Curriculum Council for: Education		

	Date	9-26-12
Signature, Dean, College/School of: Education	Allan Morotti	

	Date	
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Signature of Provost (if applicable)

Offerings above the level of approved programs must be approved in advance by the Provost.

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE.

	Date	
Signature, Chair, UAF Faculty Senate Curriculum Review Committee		

ADDITIONAL SIGNATURES: (As needed for cross-listing and/or stacking)

	Date	
Signature, Chair, Program/Department of:		

	Date	
Signature, Chair, College/School Curriculum Council for:		

	Date	
Signature, Dean, College/School of:		

Note: The guidelines are online:

<http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures-/uaf-syllabus-requirements/>

The Faculty Senate curriculum committees will review the syllabus to ensure that each of the items listed below are included. If items are missing or unclear, the proposed course (or changes to it) may be denied.

SYLLABUS CHECKLIST FOR ALL UAF COURSES

During the first week of class, instructors will distribute a course syllabus. Although modifications may be made throughout the semester, this document will contain the following information (as applicable to the discipline):

1. Course Information:

Title, number, credits, prerequisites, location, meeting time
(make sure that contact hours are in line with credits).

2. Instructor (and if applicable, Teaching Assistant) Information:

Name, office location, office hours, telephone, email address.

3. Course readings/materials:

Course textbook title, author, edition/publisher.
 Supplementary readings (indicate whether required or recommended) and
 any supplies required.

4. Course description:

Content of the course and how it fits into the broader curriculum;
 Expected proficiencies required to undertake the course, if applicable.
 Inclusion of catalog description is *strongly* recommended, and
 Description in syllabus must be consistent with catalog course description.

5. Course Goals (general), and (see #6)

6. Student Learning Outcomes (more specific)

7. Instructional methods:

Describe the teaching techniques (eg: lecture, case study, small group discussion, private instruction, studio instruction, values clarification, games, journal writing, use of Blackboard, audio/video conferencing, etc.).

8. Course calendar:

A schedule of class topics and assignments must be included. Be specific so that it is clear that the instructor has thought this through and will not be making it up on the fly (e.g. it is not adequate to say "lab". Instead, give each lab a title that describes its content). You may call the outline Tentative or Work in Progress to allow for modifications during the semester.

9. Course policies:

Specify course rules, including your policies on attendance, tardiness, class participation, make-up exams, and plagiarism/academic integrity.

10. Evaluation:

Specify how students will be evaluated, what factors will be included, their relative value, and how they will be tabulated into grades (on a curve, absolute scores, etc.) Publicize UAF regulations with regard to the grades of "C" and below as applicable to this course. (This is not required in the syllabus, but it's a convenient way to publicize this if applicable.) Faculty Senate Meeting #171:

<http://www.uaf.edu/uafgov/faculty-senate/meetings/2010-2011-meetings/#171>

11. Support Services:

Describe the student support services such as tutoring (local and/or regional) appropriate for the course.

12. Disabilities Services:

The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. State that you will work with the Office of Disabilities Services (208 WHITAKER BLDG, 474-5655) to provide reasonable accommodation to students with disabilities.

**ED 478: Elementary Mathematics Methods
Fall**

During the elementary internship year students are required to participate in university coursework with UAF faculty and in aligned internship year responsibilities in an elementary classroom with a qualified mentor teacher. The internship year follows the school district calendars for teachers (approximately 190 days per academic year) and during each school day, interns are required to be in their elementary classroom whenever they are not participating in university required coursework with their UAF instructor or UAF supervisor. There are additional evening and weekend requirements for students during the internship year.

Following the UAF formula for credit distribution, ED 478 includes approximately 27 hours of "lecture" (i.e., face-to-face instruction and individual e-mail interaction with a UAF instructor and with a UAF supervisor) and 120 hours of internship time in the assigned elementary classroom with a qualified mentor teacher. In the catalog, the credit distribution for this 3 credit class is shown as ED 478 (2+0+3).

Time and Place: 1-4 p.m. in 150 OUP on these dates:
8/24, 9/7, 9/14, 9/28, 10/12, 10/19.
In addition, the week of 9/17 to 9/21 is a week of mathematics teaching in your internship placement and the elementary education seminar on 9/10 from 4:30-6 p.m. will focus on the week of mathematics teaching.

Instructor: Dr. Anthony Rickard
102 Chapman
adrickard@alaska.edu
Office hours by appointment.

Course Materials: *About Teaching Mathematics* (2007; 3rd edition) by Marilyn Burns; additional readings and materials will be used and/or distributed in class, including the *Alaska Mathematics Standards* (2012), the *NCTM Principles and Standards for School Mathematics* (2000), and excerpts from *Implementing Standards-Based Mathematics Instruction: A Casebook for Professional Development* (2000).
NOTE: Bring a copy of your school math text or other math curriculum resource to each class along with your laptop computer for web access and work time.

You are entering the teaching profession at an exciting and challenging time. While K-12 education is more important than ever, public schools are confronted with serious questions about what students should learn, how students, schools, and teachers should be held accountable for achieving specific learning outcomes, and how schools and teachers should meet the needs of all students who come from widely varying communities,

backgrounds, and cultures. We will study how to use national and state standards as a guide to teaching and learning K-8 mathematics and about how such standards serve multiple purposes for planning, assessment, and accountability. We will also connect the methods, materials, and manipulatives we will learn about for teaching K-8 mathematics to strategies for meeting the needs of diverse students. Your work in this course is intended to help you develop as a teacher of K-8 mathematics and produce assignments, lessons, and a year-long grade-level mathematics curriculum plan for your internship to demonstrate how you will implement effective mathematics instruction in your classroom. All four of the assignments you complete for ED 478 may be used in your professional portfolio.

Course Requirements

You will be required to complete four written assignments for ED 478. Each assignment will be evaluated using a rubric that is provided in this syllabus. The four written assignments are described chronologically below and will also be discussed in detail in class:

- **Assignment 1 (lesson plan)**: In consultation with your mentor teacher, select one of the activities from Burns (2007) to teach in your classroom. Decide with your mentor teacher if you will teach the lesson to the whole class or to a small group of students. Plan for teaching the activity carefully, being sure to think through classroom organization and management issues, as well as what materials and assessment will be needed, and how you will modify the activity to meet the needs of your students. You should follow the lesson plan format discussed in the Internship Year Handbook, using the IES format discussed in Burns for your procedure. After teaching the lesson, analyze what happened using the Mathematical Tasks Framework. Your lesson plan and analysis combined should be 3-4 pages in length. Remember that you are adapting a Burns (2007) lesson, not creating an original lesson!
- **Assignment 2 (week of math teaching)**: You will develop a full week of detailed mathematics instruction and a professional reflection as a key assignment for ED 478; your liaison and mentor teachers will provide you with input and evaluation on how you teach these lessons in your internship classroom. Your lesson plans for the week of math teaching should follow the format discussed in the Internship Year Handbook, using the IES format discussed in Burns (2007) for your procedure; a total of five lesson plans are expected for the week of math teaching plus a summative assessment for the entire week. The reflection at the end of the week of math teaching is summative and is in addition to the reflection for each specific lesson plan and should be based on your entire week of math teaching from 9/17 to 9/21. Your daily reflections for your individual lessons should follow the Mathematical Tasks Framework, describing (a) the cognitive level at which your lesson task(s) are intended to engage students, (b) how you set up the task(s) for your students, (c) how your students engaged with the task(s), and (d) what learning occurred and your evidence for this (the MTF will be discussed in detail in class). Your summative reflection for the entire week of mathematics teaching should address the following:

(a) How your own conceptions about teaching and learning K-8 mathematics have (not) changed and explain why (not); (b) identify and explain issues you feel present special challenges to implementing the Alaska and/or NCTM mathematics standards (e.g., teacher knowledge, curriculum materials, professional support); and, (c) identify 1-2 areas for your own future professional development to continue to develop and refine your teaching of K-8 mathematics (e.g., leading classroom discussions about mathematics, your own knowledge of mathematics). When you hand in this assignment, you should also include copies of any handouts or other materials you use. The write up of your reflection should be 1-2 pages in length and each lesson plan should be 1-2 pages in length. You should also include copies of samples of your students' work for at least one of the five lessons with your comments; three samples, representing not meeting, meeting, and exceeding expectations, should be provided that include your feedback to the student (students' names should be blanked out for confidentiality).

- **Assignment 3 (textbook/resource analysis):** You will provide an analysis of how the major curriculum resource for mathematics you are using in your internship placement (e.g., textbook) addresses the 11 different content domains for school mathematics, as defined by the *Alaska Mathematics Standards* (2012); you should download the Alaska Mathematics Standards (2012) document at the Alaska Department of Education and Early Development website (<http://www.eed.state.ak.us/>). For each of the 11 content domains, provide your assessment of how it is addressed by the text, including one sample problem to support your claim. After your analysis of each of the 11 content domains, you should also identify the predominant kinds of problems in your major curriculum resource using the Task Analysis Guide and describe if/how you would supplement your major curriculum resource in your own class. Your final write up should be about 5-6 pages in length.
- **Assignment 4 (year-long math plan):** You will develop a comprehensive mathematics curriculum plan for the entire school year for the grade level at which you are interning. The plan will be organized chronologically for the entire year to show, for each of the 36 weeks of the school year, how you would address the *Alaska Mathematics Standards* (2012) content domains for your grade. Specifically, you will document how you will use your text and/or other curriculum resource(s) to address each of the 11 different content domains (this will be done in 1-2 sentences with one accompanying example problem from one of the resources). Your year-long curriculum plan should provide 1-2 sentences for each week describing what you would teach, including page references from your curriculum resource; in addition, for 11 of the weeks, you will also provide the aforementioned explanation of how the 11 content domains are addressed. Your final write up should be 12-15 pages.

NOTE: All assignments should be provided to the instructor in hardcopy form. If you choose to email an assignment to the instructor by attachment, you will receive only a completed rubric back (i.e., it is not the instructor's responsibility to print your assignments for you).

Lesson Plan Format

As a reminder, your lesson plans for ED 478 should follow the format described in the Internship Year Handbook and include the following components:

- Objective(s)
- Alaska Mathematics Standard(s) (should be written out) aligned with objective(s).
- Materials or Resources
- Estimated Duration
- Procedures (this will follow the IES format discussed in Burns)
- Assessment
- Differentiation
- Professional Self-Reflection

Grading Distribution

Lesson plan based on Burns activity:	50	pts.
Analysis of text and/or curriculum resource:	50	pts.
Professional reflection (with lesson plans):	120	pts.
<u>Comprehensive mathematics curriculum plan:</u>	<u>120</u>	<u>pts.</u>
Total Points:	340	pts.

Grading Policy

306 – 340 points:	A
272 – 305 points:	B
238 – 271 points:	C
204 – 237 points:	D
203 points or less:	F

Attendance Policy

Attendance will be taken at the beginning of each class meeting. You are encouraged to attend all course meetings. If you need to miss a class, contact me immediately.

Assignments due when you are absent should be turned in prior to the due date or, if that is not possible, you will need to document an emergency or extenuating circumstances beyond your control or the assignment will not be accepted.

Collecting Samples of Students' Work

When you teach mathematics for ED 478 (scheduled for the week of 9/17-9/21), you will be required to collect samples of your students' work. The samples of students' work should protect the identity of all students, should only be collected with permission of students' parents, and should represent a range of student achievement, (i.e., advanced, proficient, and nonproficient levels). The samples of students' work should be used to

document the impact of your planning and teaching mathematics with your students; these materials will also provide data that will be used to evaluate the effectiveness of and guide improvements in the UAF Elementary Education Program.

Manipulatives for Teaching Mathematics

Throughout ED 478 we will routinely use mathematics manipulatives in class and investigate how to use them most effectively in your K-8 mathematics teaching. Manipulatives we will use include Cuisenaire rods, geoboards, square tiles, pattern blocks, base 10 blocks, dice, algebra tiles, among others.

Course Calendar

- 8/24: Introductions, overview of course, review of syllabus, Mathematical Tasks Framework, activities, discuss Burns and IES format, download *Alaska Mathematics Standards* (2012), discuss first assignment due next week.
- 9/7: Review Mathematical Tasks Framework, go over Burns activities (i.e., contrast different teaching methods used in activities and connect to constructivism and standards-based mathematics teaching), and discuss and hand in first assignment. Discuss week of mathematics teaching and draft lessons due next week. **First assignment due.**
- 9/10: Elementary education seminar at Ticasuk Brown Elementary 4:30-6 p.m. Bring textbook and/or other planning materials for mathematics so that you and your mentor can plan for the Week of Math Teaching.
- 9/14: Discuss the *Alaska Mathematics Standards* (2012) and the NCTM *Principles and Standards for School Mathematics* (2000). Discuss the Week of Math Teaching assignment, hand in draft lessons approved by mentor teacher. Discuss manipulatives and activities, use of manipulatives as teaching tools for mathematics. NOTE: Five draft lessons need not include daily reflections nor summative reflection; however, all five lessons should be approved by mentor teacher. **Draft of second assignment due.**
- 9/17 – 9/21: Teaching mathematics for full week in internship placement. No class meeting this week. NOTE: Your work teaching mathematics, including lesson plans, assessments, and samples of students' work, should form the basis for your reflection (see rubric).
- 9/28: Hand in final version of lesson plans for week of math teaching, including daily reflections and summative reflection. Clarify and discuss the third assignment on textbook/resource analysis. Various activities to illustrate methods for teaching measurement, algebra and algebraic thinking, geometry, number and operations, and probability and statistics. **Final version of second assignment (week of mathematics teaching) due.**
- 10/12: Hand in third assignment and discuss teaching mathematics for conceptual and procedural understanding, linking teaching and assessment, and use of curriculum resources. Discuss the Math in a Cultural Context (MCC) curriculum. **Third assignment due.**
- 10/19: Discuss assessment, additional activities from Burns, MCC curriculum and multicultural education. Final wrap-up discussion. **Fourth assignment due by 10/29 in instructor's mailbox at 101 Chapman on UAF campus.**

First Assignment: Rubric for lesson plan to teach an activity from Burns (2007) and analysis of lesson using the Mathematical Tasks Framework.

Standard	Does not meet Standard	Meets Standard	Exceeds Standard
2-1 Apply knowledge of developmental abilities of students when assessing student work and make appropriate revisions to instruction based on the demonstrated ability and knowledge level of students			
5-1 Recognize the differences in cultural and linguistic backgrounds of students and demonstrate the ability to build upon the diversity within the classroom in their teaching responsibilities (e.g., lesson and unit development, assignments, assessments, classroom structure and management)			
6-4 Make plans ahead of time (for short term and long term lessons, projects, units, activities, etc.).			

Second Assignment: Rubric for week of math teaching and reflection on teaching (with a brief professional development plan), including five lesson plans (prior approval by mentor teacher required and documented with a signature), summative assessment, copies of handouts provided (with pages from text also provided and/or cited), and summative reflection on entire week of math teaching; samples of students' work should also be included from one of the lessons (three required, with intern's comments/feedback, representing below, at, and above, expectations). Also submit copy of mentor's feedback for the week of math teaching.

Standard	Does not meet Standard	Meets Standard	Exceeds Standard
2-3 Differentiate instruction in the context of a variety of teaching activities to adequately meet the needs of students with different learning styles.			
3-1 Develop and teach a variety of units or lessons that meaningfully incorporate characteristics of the student's and local community culture into instructional strategies that support student learning.			
4-1 Develop and teach a series of lessons (e.g. unit) in each major content area as defined by ACEI that demonstrates knowledge of the content (i.e., reflects accurate information in the subject area), knowledge of central concepts (i.e., focuses on an important area of the subject that is recognized as valuable to teach) knowledge of tools of inquiry (i.e., reflects "best practice" approaches to teaching that subject area).			
4-6 Provide evidence of on-going professional development and a commitment lifelong learning.			
6-2 Prepare a plan for the physical organization/environment of a classroom that provides evidence of understanding of the need to appropriately accommodate the physical, social, and emotional needs of all children.			
8-3 Recognize that self-reflection is one of the key components of the lifelong process of becoming a better teacher and demonstrate a capacity to engage in thoughtful self-reflection.			

Third Assignment: Rubric for analysis of how text/resource(s) for mathematics addresses the 11 Alaska content domains for mathematics, including one sample problem for each domain to support your claim and an overall assessment of the predominant kinds of problems included throughout the curriculum resource using the Task Analysis Guide.

Standard	Does not meet Standard	Meets Standard	Exceeds Standard
2-2 Differentiate instruction in the context of a variety of teaching activities to adequately meet the needs of students from multiple developmental levels.			
5-2 Develop and use instructional plans (e.g., lessons, units, projects) that are directly aligned with the district's and state's standards and curriculum.			
5-3 Supplement teacher's manuals and textbooks with both modified and original instructional resources and teaching strategies that are relevant to the lives of his/her students and meaningful in the real-world contexts of students' communities.			

Fourth Assignment: Rubric for year-long mathematics curriculum plan, providing 1-2 sentence outline for each of the 36 weeks of the school year (also providing page references from major curriculum resource), plus, for 11 weeks, showing how a different content domain from the Alaska Mathematics Standards (2012) is addressed with a sample problem to support your claim.

Standard	Does not meet Standard	Meets Standard	Exceeds Standard
4-2 Apply knowledge of developmental abilities of students when assessing student work and make appropriate revisions to instruction based on the demonstrated ability and knowledge level of students			
4-3 Use a variety of instructional strategies, and when appropriate, uses technology to support instruction in the content areas (uses technology to promote inquiry and collaboration).			
4-4 Help students make connections within and across disciplines.			
4-5 Connect content in a teaching activity to students' prior knowledge and to practical "real-life" situations encountered outside the school (especially in the students' community).			
5-1 Recognize the differences in cultural and linguistic backgrounds of students and demonstrate the ability to build upon the diversity within the classroom in their teaching responsibilities (e.g., lesson and unit development, assignments, assessments, classroom structure and management)			
5-4 Select instructional resources that directly support students in their ability to develop proficiency in the state's performance standards.			

Plagiarism

The following is excerpted from the **UAF Student Code of Conduct (BOR POLICY 09.02.02)**:

As with all members of the university community, the University of Alaska requires students to conduct themselves honestly and responsibly, and to respect the rights of others. Conduct that unreasonably interferes with the learning environment or that violates the rights of others is prohibited by the standards and guidelines described in this section and in University Regulation and MAU rules and procedures, collectively referred to as the Student Code of Conduct, or Code. Students and student organizations will be responsible for ensuring that they and their guests comply with the Code while on property owned or controlled by the university or at activities authorized by the university.

Disciplinary action may be initiated by the university and disciplinary sanctions imposed against any student or student organization found responsible for committing, attempting to commit, or intentionally assisting in the commission of prohibited forms of conduct including *cheating, plagiarism, or other forms of academic dishonesty*.

The University has established procedures for enforcing the UA code of conduct. Each student at the University shall be afforded due process in all disciplinary matters. For a complete guide to these procedures, please refer to Regents regulation 09.02. Copies of this are available in the Dean of Students office, Wood Center, on the University web page (<http://info.alaska.edu/ua/bor/regulation/9r/r09-02.html>), and the library.

Support Services

All written materials prepared outside of class will be assessed on the basis of content and on the use of appropriate writing conventions. The Writing Center on the 8th Floor of the Gruening Building is an excellent resource for all UAF students. Please take advantage of it. There is no charge for UAF students.

Disabilities Services

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**ED 678: Elementary Mathematics Methods
Fall 2012**

During the elementary internship year students are required to participate in university coursework with UAF faculty and in aligned internship year responsibilities in an elementary classroom with a qualified mentor teacher. The internship year follows the school district calendars for teachers (approximately 190 days per academic year) and during each school day, interns are required to be in their elementary classroom whenever they are not participating in university required coursework with their UAF instructor or UAF supervisor. There are additional evening and weekend requirements for students during the internship year.

Following the UAF formula for credit distribution, ED 678 includes approximately 27 hours of "lecture" (i.e., face-to-face instruction and individual e-mail interaction with a UAF instructor and with a UAF supervisor) and 120 hours of internship time in the assigned elementary classroom with a qualified mentor teacher. In the catalog, the credit distribution for this 3 credit class is shown as ED 678 (2+0+3).

Time and Place: 1-4 p.m. in 150 OUP on these dates:
8/24, 9/7, 9/14, 9/28, 10/12, 10/19.
In addition, the week of 9/17 to 9/21 is a week of mathematics teaching in your internship placement and the elementary education seminar on 9/10 from 4:30-6 p.m. will focus on the week of mathematics teaching.

Instructor: Dr. Anthony Rickard
102 Chapman
adrickard@alaska.edu
Office hours by appointment.

Course Materials: *About Teaching Mathematics* (2007; 3rd edition) by Marilyn Burns; additional readings and materials will be used and/or distributed in class, including the *Alaska Mathematics Standards* (2012), the *NCTM Principles and Standards for School Mathematics* (2000), Legaspi and Rickard (2005), Rickard (2005), and excerpts from *Implementing Standards-Based Mathematics Instruction: A Casebook for Professional Development* (2000). NOTE: Bring a copy of your school math text or other math curriculum resource to each class along with your laptop computer for web access and work time.

You are entering the teaching profession at an exciting and challenging time. While K-12 education is more important than ever, public schools are confronted with serious questions about what students should learn, how students, schools, and teachers should be held accountable for achieving specific learning outcomes, and how schools and teachers should meet the needs of all students who come from widely varying communities,

backgrounds, and cultures. We will study how to use national and state standards as a guide to teaching and learning K-8 mathematics and about how such standards serve multiple purposes for planning, assessment, and accountability. We will also connect the methods, materials, and manipulatives we will learn about for teaching K-8 mathematics to strategies for meeting the needs of diverse students. Your work in this course is intended to help you develop as a teacher of K-8 mathematics and produce assignments, lessons, and a year-long grade-level mathematics curriculum plan for your internship to demonstrate how you will implement effective mathematics instruction in your classroom. All four of the assignments you complete for ED 678 may be used in your professional portfolio.

Course Requirements

You will be required to complete four written assignments for ED 678. Each assignment will be evaluated using a rubric that is provided in this syllabus. The four written assignments are described chronologically below and will also be discussed in detail in class:

- **Assignment 1 (lesson plan):** In consultation with your mentor teacher, select one of the activities from Burns (2007) to teach in your classroom. Decide with your mentor teacher if you will teach the lesson to the whole class or to a small group of students. Plan for teaching the activity carefully, being sure to think through classroom organization and management issues, as well as what materials and assessment will be needed, and how you will modify the activity to meet the needs of your students. You should follow the lesson plan format discussed in the Internship Year Handbook, using the IES format discussed in Burns for your procedure. After teaching the lesson, analyze what happened using the Mathematical Tasks Framework. Your lesson plan and analysis combined should be 3-4 pages in length. Remember that you are adapting a Burns (2007) lesson, not creating an original lesson!
- **Assignment 2 (week of math teaching):** You will develop a full week of detailed mathematics instruction and a professional reflection as a key assignment for ED 678; your liaison and mentor teachers will provide you with input and evaluation on how you teach these lessons in your internship classroom. Your lesson plans for the week of math teaching should follow the format discussed in the Internship Year Handbook, using the IES format discussed in Burns (2007) for your procedure; a total of five lesson plans are expected for the week of math teaching plus a summative assessment for the entire week. The reflection at the end of the week of math teaching is summative and is in addition to the reflection for each specific lesson plan and should be based on your entire week of math teaching from 9/17 to 9/21. Your daily reflections for your individual lessons should follow the Mathematical Tasks Framework, describing (a) the cognitive level at which your lesson task(s) are intended to engage students, (b) how you set up the task(s) for your students, (c) how your students engaged with the task(s), and (d) what learning occurred and your evidence for this (the MTF will be discussed in detail in class). Your summative reflection for the entire week of mathematics teaching should address the following:

(a) How your own conceptions about teaching and learning K-8 mathematics have (not) changed and explain why (not); (b) identify and explain issues you feel present special challenges to implementing the Alaska and/or NCTM mathematics standards (e.g., teacher knowledge, curriculum materials, professional support); and, (c) identify 1-2 areas for your own future professional development to continue to develop and refine your teaching of K-8 mathematics (e.g., leading classroom discussions about mathematics, your own knowledge of mathematics). When you hand in this assignment, you should also include copies of any handouts or other materials you use. The write up of your reflection should be 1-2 pages in length and each lesson plan should be 1-2 pages in length. You should also include copies of samples of your students' work for at least one of the five lessons with your comments; three samples, representing not meeting, meeting, and exceeding expectations, should be provided that include your feedback to the student (students' names should be blanked out for confidentiality).

- Assignment 3 (textbook/resource analysis): You will provide an analysis of how the major curriculum resource for mathematics you are using in your internship placement (e.g., textbook) addresses the 11 different content domains for school mathematics, as defined by the *Alaska Mathematics Standards* (2012); you should download the Alaska Mathematics Standards (2012) document at the Alaska Department of Education and Early Development website (<http://www.eed.state.ak.us/>). For each of the 11 content domains, provide your assessment of how it is addressed by the text, including one sample problem to support your claim. After your analysis of each of the 11 content domains, you should also identify the predominant kinds of problems in your major curriculum resource using the Task Analysis Guide and describe if/how you would supplement your major curriculum resource in your own class. Your final write up should be about 5-6 pages in length.
- Assignment 4 (year-long math plan): You will develop a comprehensive mathematics curriculum plan for the entire school year for the grade level at which you are interning. The plan will be organized chronologically for the entire year to show, for each of the 36 weeks of the school year, how you would address the *Alaska Mathematics Standards* (2012) content domains for your grade. Specifically, you will document how you will use your text and/or other curriculum resource(s) to address each of the 11 different content domains (this will be done in 1-2 sentences with one accompanying example problem from one of the resources). Integrated into the year-long mathematics plan will be a year-long multicultural connections project. The year-long multicultural connections project format will be discussed in detail in class. The multicultural connections project will entail outlining a meaningful connection between mathematics and multicultural elements ("multicultural elements" will be defined in our reading and class discussions) for each month of mathematics instruction in your year-long mathematics curriculum project. Your year-long curriculum plan should provide 1-2 sentences for each week describing what you would teach, including page references from your curriculum resource; in addition, for 11 of the weeks, you will also provide the aforementioned explanation of

how the 11 content domains are addressed. Your final write up should be 12-15 pages.

NOTE: All assignments should be provided to the instructor in hardcopy form. If you choose to email an assignment to the instructor by attachment, you will receive only a completed rubric back (i.e., it is not the instructor's responsibility to print your assignments for you).

Lesson Plan Format

As a reminder, your lesson plans for ED 678 should follow the format described in the Internship Year Handbook and include the following components:

- Objective(s)
- Alaska Mathematics Standard(s) (should be written out) aligned with objective(s).
- Materials or Resources
- Estimated Duration
- Procedures (this will follow the IES format discussed in Burns)
- Assessment
- Differentiation
- Professional Self-Reflection

Grading Distribution

Lesson plan based on Burns activity:	50	pts.
Analysis of text and/or curriculum resource:	50	pts.
Professional reflection (with lesson plans):	120	pts.
<u>Comprehensive mathematics curriculum plan:</u>	<u>120</u>	<u>pts.</u>
Total Points:	340	pts.

Grading Policy

306 – 340 points:	A
272 – 305 points:	B
238 – 271 points:	C
204 – 237 points:	D
203 points or less:	F

Attendance Policy

Attendance will be taken at the beginning of each class meeting. You are encouraged to attend all course meetings. If you need to miss a class, contact me immediately. Assignments due when you are absent should be turned in prior to the due date or, if that is not possible, you will need to document an emergency or extenuating circumstances beyond your control or the assignment will not be accepted.

Collecting Samples of Students' Work

When you teach mathematics for ED 678 (scheduled for the week of 9/17-9/21), you will be required to collect samples of your students' work. The samples of students' work should protect the identity of all students, should only be collected with permission of students' parents, and should represent a range of student achievement, (i.e., advanced, proficient, and nonproficient levels). The samples of students' work should be used to document the impact of your planning and teaching mathematics with your students; these materials will also provide data that will be used to evaluate the effectiveness of and guide improvements in the UAF Elementary Education Program.

Manipulatives for Teaching Mathematics

Throughout ED 678 we will routinely use mathematics manipulatives in class and investigate how to use them most effectively in your K-8 mathematics teaching. Manipulatives we will use include Cuisenaire rods, geoboards, square tiles, pattern blocks, base 10 blocks, dice, algebra tiles, among others.

Course Calendar

- 8/24: Introductions, overview of course, review of syllabus, Mathematical Tasks Framework, activities, discuss Burns and IES format, download *Alaska Mathematics Standards* (2012), discuss first assignment due next week.
- 9/7: Review Mathematical Tasks Framework, go over Burns activities (i.e., contrast different teaching methods used in activities and connect to constructivism and standards-based mathematics teaching), and discuss and hand in first assignment. Discuss week of mathematics teaching and draft lessons due next week. **First assignment due.**
- 9/10: Elementary education seminar at Ticasuk Brown Elementary 4:30-6 p.m. Bring textbook and/or other planning materials for mathematics so that you and your mentor can plan for the Week of Math Teaching.
- 9/14: Discuss the *Alaska Mathematics Standards* (2012) and the NCTM *Principles and Standards for School Mathematics* (2000). Discuss the Week of Math Teaching assignment, hand in draft lessons approved by mentor teacher. Discuss manipulatives and activities, use of manipulatives as teaching tools for mathematics. NOTE: Five draft lessons need not include daily reflections nor summative reflection; however, all five lessons should be approved by mentor teacher. **Draft of second assignment due.**
- 9/17 – 9/21: Teaching mathematics for full week in internship placement. No class meeting this week. NOTE: Your work teaching mathematics, including

lesson plans, assessments, and samples of students' work, should form the basis for your reflection (see rubric).

- 9/28: Hand in final version of lesson plans for week of math teaching, including daily reflections and summative reflection. Clarify and discuss the third assignment on textbook/resource analysis. Various activities to illustrate methods for teaching measurement, algebra and algebraic thinking, geometry, number and operations, and probability and statistics. **Final version of second assignment (week of mathematics teaching) due.**
- 10/12: Hand in third assignment and discuss teaching mathematics for conceptual and procedural understanding, linking teaching and assessment, and use of curriculum resources. Discuss the Math in a Cultural Context (MCC) curriculum. **Third assignment due.**
- 10/19: Discuss assessment, additional activities from Burns, MCC curriculum and multicultural education. Final wrap-up discussion. **Fourth assignment due by 10/29 in instructor's mailbox at 101 Chapman on UAF campus.**

First Assignment: Rubric for lesson plan to teach an activity from Burns (2007) and analysis of lesson using the Mathematical Tasks Framework.

Standard	Does not meet Standard	Meets Standard	Exceeds Standard
2-1 Apply knowledge of developmental abilities of students when assessing student work and make appropriate revisions to instruction based on the demonstrated ability and knowledge level of students			
5-1 Recognize the differences in cultural and linguistic backgrounds of students and demonstrate the ability to build upon the diversity within the classroom in their teaching responsibilities (e.g., lesson and unit development, assignments, assessments, classroom structure and management)			
6-4 Make plans ahead of time (for short term and long term lessons, projects, units, activities, etc.).			

Second Assignment: Rubric for week of math teaching and reflection on teaching (with a brief professional development plan), including five lesson plans (prior approval by mentor teacher required and documented with a signature), summative assessment, copies of handouts provided (with pages from text also provided and/or cited), and summative reflection on entire week of math teaching; samples of students' work should also be included from one of the lessons (three required, with intern's comments/feedback, representing below, at, and above, expectations). Also submit copy of mentor's feedback for the week of math teaching.

Standard	Does not meet Standard	Meets Standard	Exceeds Standard
2-3 Differentiate instruction in the context of a variety of teaching activities to adequately meet the needs of students with different learning styles.			
3-1 Develop and teach a variety of units or lessons that meaningfully incorporate characteristics of the student's and local community culture into instructional strategies that support student learning.			
4-1 Develop and teach a series of lessons (e.g. unit) in each major content area as defined by ACEI that demonstrates knowledge of the content (i.e., reflects accurate information in the subject area), knowledge of central concepts (i.e., focuses on an important area of the subject that is recognized as valuable to teach) knowledge of tools of inquiry (i.e., reflects "best practice" approaches to teaching that subject area).			
4-6 Provide evidence of on-going professional development and a commitment lifelong learning.			
6-2 Prepare a plan for the physical organization/environment of a classroom that provides evidence of understanding of the need to appropriately accommodate the physical, social, and emotional needs of all children.			
8-3 Recognize that self-reflection is one of the key components of the lifelong process of becoming a better teacher and demonstrate a capacity to engage in thoughtful self-reflection.			

Third Assignment: Rubric for analysis of how text/resource(s) for mathematics addresses the 11 Alaska content domains for mathematics, including one sample problem for each domain to support your claim and an overall assessment of the predominant kinds of problems included throughout the curriculum resource using the Task Analysis Guide.

Standard	Does not meet Standard	Meets Standard	Exceeds Standard
2-2 Differentiate instruction in the context of a variety of teaching activities to adequately meet the needs of students from multiple developmental levels.			
5-2 Develop and use instructional plans (e.g., lessons, units, projects) that are directly aligned with the district's and state's standards and curriculum.			
5-3 Supplement teacher's manuals and textbooks with both modified and original instructional resources and teaching strategies that are relevant to the lives of his/her students and meaningful in the real-world contexts of students' communities.			

Fourth Assignment: Rubric for year-long mathematics curriculum plan, providing 1-2 sentence outline for each of the 36 weeks of the school year (also providing page references from major curriculum resource), plus, for 11 weeks, showing how a different content domain from the Alaska Mathematics Standards (2012) is addressed with a sample problem to support your claim.

Standard	Does not meet Standard	Meets Standard	Exceeds Standard
4-2 Apply knowledge of developmental abilities of students when assessing student work and make appropriate revisions to instruction based on the demonstrated ability and knowledge level of students			
4-3 Use a variety of instructional strategies, and when appropriate, uses technology to support instruction in the content areas (uses technology to promote inquiry and collaboration).			
4-4 Help students make connections within and across disciplines.			
4-5 Connect content in a teaching activity to students' prior knowledge and to practical "real-life" situations encountered outside the school (especially in the students' community).			
5-1 Recognize the differences in cultural and linguistic backgrounds of students and demonstrate the ability to build upon the diversity within the classroom in their teaching responsibilities (e.g., lesson and unit development, assignments, assessments, classroom structure and management)			
5-4 Select instructional resources that directly support students in their ability to develop proficiency in the state's performance standards.			

Plagiarism

The following is excerpted from the **UAF Student Code of Conduct (BOR POLICY 09.02.02)**:

As with all members of the university community, the University of Alaska requires students to conduct themselves honestly and responsibly, and to respect the rights of others. Conduct that unreasonably interferes with the learning environment or that violates the rights of others is prohibited by the standards and guidelines described in this section and in University Regulation and MAU rules and procedures, collectively referred to as the Student Code of Conduct, or Code. Students and student organizations will be responsible for ensuring that they and their guests comply with the Code while on property owned or controlled by the university or at activities authorized by the university.

Disciplinary action may be initiated by the university and disciplinary sanctions imposed against any student or student organization found responsible for committing, attempting to commit, or intentionally assisting in the commission of prohibited forms of conduct including *cheating, plagiarism, or other forms of academic dishonesty*.

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ED 478
MATH METHODS AND CURRICULUM DEVELOPMENT
OFF-CAMPUS,

During the elementary internship year students are required to participate in university coursework with UAF faculty and in aligned internship year responsibilities in an elementary classroom with a qualified mentor teacher. The internship year follows the school district calendars for teachers (approximately 190 days per academic year) and during each school day, interns are required to be in their elementary classroom whenever they are not participating in university required coursework with their UAF instructor or UAF supervisor. There are additional evening and weekend requirements for students during the internship year.

Following the UAF formula for credit distribution, ED 478 includes approximately 27 hours of "lecture" (i.e., face-to-face instruction and individual e-mail interaction with a UAF instructor and with a UAF supervisor) and 120 hours of internship time in the assigned elementary classroom with a qualified mentor teacher. In the catalog, the credit distribution for this 3 credit class is shown as ED 478 (2+0+3).

COURSE INFORMATION

Credits: 3

Prerequisites: Participating in the Internship Year or Permission of Instructor

Location:

Audio-Conference Number 1-800-570-3591 & Pin Number: 6944438

If problems are encountered please call Customer Service at 1-800-290-5900. Have the course number and instructor information available.

Blackboard: <http://classes.uaf.edu>

ED F478 F678 STACKED 201203 (CRN 75141, 75186) MATHEMATICS MTHDS/CRRICLM DEV

Meeting Time: Dates and times are noted on the internship year calendar

INSTRUCTOR INFORMATION

Instructor: Cindy Fabbri

Office: 714D Gruening Building

Office Hours: Following the audio-conference or by appointment

Telephone: (907) 474-1558

Fax: (907) 474-5451

Email: cfabbri@alaska.edu

MATERIALS

Tipps, Steve, Johnson, Art, and Kennedy, Leonard M. 2011. *Guiding Children's Learning of Mathematics (12th Edition)*. Wadsworth Publishing: U.S. ISBN-10: 0495810975

Burns, Marilyn. 2007. *About Teaching Mathematics: A K-8 Resource, 3rd Edition*. Math Solutions Publications: Sausalito, California.

National Council of Teachers of Mathematics Student Membership (Recommended) [online] <http://www.nctm.org/membership/default.aspx?id=56>

Alaska State Board of Education & Early Development. 2012. *Alaska Mathematics Standards*. Alaska Department of Education & Early Development: Juneau, AK. [online] http://www.eed.state.ak.us/tls/assessment/standards/Math_StandardsJune2012.pdf

Alaska State Board of Education & Early Development. 2012. *Tools for the Transition to the New Standards for Mathematics* [online] <http://www.eed.state.ak.us/tls/assessment/transition.html>

Alaska State Board of Education & Early Development. 2005. *Standards: Content & Performance Standards for Alaska Students, Third Edition*. Alaska Department of Education & Early Development: Juneau, AK. [online] <http://www.eed.state.ak.us/standards/>

National Council of Teacher of Mathematics. 2000. *Principles and Standards for School Mathematics*. National Council of Teacher of Mathematics: U.S. [online] <http://www.nctm.org/standards/content.aspx?id=26792> or <http://www.fayar.net/east/teacher.web/math/Standards/document/index.htm>

Math curriculum framework for your school district

Math textbook for your students/grades

Math manipulatives as appropriate (as available in your school or from online sources)

Additional readings TBA

COURSE DESCRIPTION

“Study and application in the classroom of best practices from research-based strategies for the teaching and learning of mathematical concepts, content and methods for students in elementary classrooms with diverse populations. Requires development and classroom implementation of mathematics unit. Concurrent internship required. Prerequisites: Admission to Internship Year” (UAF Catalog, 2011).

COURSE GOALS

The overarching goal for this course is to prepare you to be an effective teacher of mathematics (Figure 1).

It is expected that students have acquired mathematics content knowledge in prerequisite mathematics courses and through prior life experiences with math. This includes content areas (numbers and operations, algebra, geometry, measurement, and data analysis and probability), as well as in areas that describe math processes (problem solving, reasoning and proof, communicating, connecting, and representing) (NCTM, 2000; ACEI 2007).

- **Effective teaching requires knowing and understanding mathematics, students as learners, and pedagogical strategies.**
- **Effective teaching requires a challenging and supportive classroom learning environment.**
- **Effective teaching requires seeking improvement.**

Figure 1. Important elements of the teaching principle (NCTM, Pages 17-18, 2000)

The main focus of this course is on the pedagogical content knowledge that teachers need to teach mathematics. This includes an understanding of learners and learning, teaching, curriculum, and assessment (AMTE, 2010). To achieve this goal of learning pedagogical content knowledge, the course will use the *Principles for School Mathematics* as a framework for the course (Figure 2).

- Equity
- Curriculum
- Teaching
- Learning
- Assessment
- Technology

Figure 2. Principles for School Mathematics (NCTM, 2000)

Within this framework, the aim will be to provide opportunities to learn theory and experience it through practice. Students will study and use current standards to facilitate teaching and learning in their classrooms.

Finally, as espoused by the Association for Childhood Education International (ACEI) Elementary Education Standards, students understand and apply professional practices and behaviors. This includes reflection and collaborating with families, colleagues, and community (ACEI, 2007).

STUDENT LEARNING OUTCOMES

Through study, experience, and reflection, students will gain a beginning teacher level of pedagogical content knowledge in each area identified as a Principle for School Mathematics (equity, curriculum, teaching, learning, assessment, and technology). Specific outcomes with which the student will gain familiarity are shown on the course diagnostic assessment.

INSTRUCTIONAL METHODS

To facilitate individual and group learning opportunities students will participate in a professional learning community (Figure 3).

- **Shared values & goals - a collaboratively defined understanding of what constitutes worthwhile student learning, with all members of the professional learning community (PLC) working together on that vision**
- **Collective responsibility- Team members should have shared and appropriately differentiated responsibilities**
- **Self-directed reflection**

Figure 3. Principles that make a learning community effective, as relevant for a university course setting (Fulton and Britton, 2011)

With this in mind, instructional methods will include, at least:

- Collaborating and discussing mathematics teaching and learning with peers
- Reviewing case studies and reading theory/literature
- Designing and implementing mathematics learning experiences
- Analyzing and evaluating mathematics resources
- Writing papers
- Presenting knowledge and ideas
- Reflecting on work done by oneself and peers

ASSIGNMENTS

ED 478: 1000 points possible

Audio-conference attendance and participation (70 points = 10 pts/class x 7 classes)

Each class you will receive points for attending class, being prepared and contributing to class discussions. You cannot “make-up” these points if you miss a class.

Show & Tell: Bring three mathematics resources to class (50 points = 16.67 pts/resource x 3 resources)

You will need to bring three mathematics resources to share with your colleagues. The resource (book, website, curricula, “app” etc.) should be something not likely to be known by everyone. You will explain a bit about the resource, why it is high quality and how to find it. At least one of your resources during the semester must use technology to improve math instruction/learning. Please remember to post the resource in the Blackboard “Discussion Board” as I will use this list to enter final grades.

Assignment 1: Write lesson plan & teach lesson (100 points; Rubric will be provided)

In consultation with your mentor teacher, select one of the activities from Burns (2007) to teach in your classroom. Decide with your mentor teacher if you will teach the lesson to the whole class or to a small group of students. Plan for teaching the activity carefully, being sure to think through classroom organization and management issues, as well as what materials and assessment will be needed, and how you will modify the activity to meet the needs of your students. You will then write up a lesson plan for this activity using the lesson plan format provided below. Please reference the Alaska Mathematics Standards (2012) for the standards section. Use the “Introduce, Explore and Summarize” (IES) format discussed in Burns (Pages 54-57) for the procedure section. After teaching the lesson, analyze what happened using the Mathematical Tasks Framework (See Stein Chapter 1). Your lesson plan and analysis combined should be 3-5 pages in length. Remember that you are adapting a Burns (2007) lesson, not creating an original lesson. Guidelines and a rubric will be provided.

Assignment 2: Week of teaching math (WOTM) (300 points; Rubric will be provided)

You will develop a full week of detailed mathematics instruction and a professional reflection as a key assignment for ED 478/678; your liaison and mentor teachers will provide you with input and evaluation on how you teach these lessons in your internship classroom. Your lesson plans for the week of math teaching will follow the format discussed in class; a total of five lesson plans are expected for the week of teaching math. A daily reflection and a summative assessment for the entire week will be submitted after the lessons are taught. When you hand in this assignment, you should also include copies of any handouts or other materials you use. You should also include copies of samples of your students’ work for at least one of the five lessons with your comments; three samples, representing not meeting, meeting, and exceeding expectations, should be provided that include your feedback to the student (students’ names should be blanked out for confidentiality). Specific guidelines and grading criteria will be provided.

Assignment 3: Textbook/resource analysis (240 points; Rubric will be provided)

You will provide an analysis of the major mathematics curriculum resource (e.g. textbook) you are using in your internship placement. Your analysis will focus on reviewing the textbook as it relates to the Principles for School Mathematics and the Alaska Standards. For each principle, you will analyze your text, discuss your findings, and suggest how you might need to supplement your resource. Your final write up will be about 10 pages. Specific guidelines and grading criteria will be provided.

Assignment 4: Year-long math plan (240 points; Rubric will be provided)

You will develop a comprehensive mathematics curriculum plan for the entire school year for the grade level at which you are interning. The plan will be organized chronologically for the entire year to show, for each of the 36 weeks of the school year, how you would address Alaska Content Standard A for your grade. Specifically, you will document how you will use your text and/or other curriculum resource(s) to address Alaska Content Standard A by showing how 12 different Performance Standards of your choice are met (this will be done in 1-2 sentences with two accompanying example problems from one of the resources). Your year-long curriculum plan should provide 1-2 sentences for each week describing what you would teach, including page references from your curriculum resource; in addition, for 12 of the weeks, you will also provide the aforementioned explanation of how the six Performance Standards is addressed. Your final write up should be 12-15 pages in length.

EVALUATION

As outlined in the UAF catalog, the grading system is as follows:

- A An honor grade, indicates originality and independent work, a thorough mastery of the subject and the satisfactory completion of more work than is regularly required.
- B Indicates outstanding ability above the average level of performance (80% or better)
- C Indicates a satisfactory or average level of performance. (70% or better)
- D The lowest passing grade, indicates work of below-average quality and performance. (60% or better)
- F Indicates failure. (Below 60%)

Grades will be posted using the following scale:

- A 90-100%
- B 80-89%
- C 70-79%

- D 60-69%
- F 59% or below

As one of the culminating courses of the internship year, students are required to earn a “C” or better in order to successfully complete the licensure program. In addition to obtaining minimum grade requirements, students must meet all required ESAAP competencies in order to pass the class and continue with the internship. Any student in jeopardy of failing, based on failure of competencies or failing grades, should contact the instructor immediately to discuss the options.

POLICIES

As a compressed course, a great deal of information is covered each session. For this reason, attendance at all classes is expected. If you need to miss class, please contact me immediately.

Assignments are expected on or before the stated due date. If you are unable to turn in an assignment on time, you will need to document an emergency or extenuating circumstances (beyond your control) or the assignment may not be accepted. If accepted, the instructor reserves the right to award a reduced point value for late work.

Please let me know, as soon as possible, if you are having difficulties with the coursework or workload.

Students are expected to adhere to the Student Code of Conduct (Board of Regents’ Policy 09.02.01). Students are required to conduct themselves honestly and responsibly, and to respect the rights of others. Academic integrity is essential and expected from all students. Cheating or plagiarism is not acceptable. For more information on plagiarism please see <http://library.uaf.edu/lis101-plagiarism>.

SUPPORT SERVICES

If you have questions, concerns, comments, or individual needs please contact me immediately. In addition, please be aware that these other forms of assistance are also available:

Kelly Mendez, Elementary Intern Coordinator
474-7981
ksmendez@alaska.edu

Tina Buxbaum, Elementary Intern Coordinator
474-7981
tmbuxbaum@alaska.edu

Rural Student Services (RSS)
Tel: (888) 478-1452
Email: fyrss@uaf.edu

Student Support Services (SSS)
Tel: (907) 474-6844
Email: sssp@uaf.edu

Tutoring Services:
Writing Center (907) 474-5314
Math Laboratory (907) 474-7332

DISABILITIES SERVICES

If you have a special need please notify the Office of Disability Services (474-5655 or www.uaf.edu/disability/ or uaf-disabilityservices@alaska.edu) and me. I will make every effort to provide reasonable accommodations for you.

LITERATURE REFERENCED

ACEI. 2007. *Elementary Education Standards and Supporting Explanation*. [online] <http://acei.org/education/ncate/>

Alaska State Board of Education & Early Development. 2012. *Alaska Mathematics Standards*. Alaska Department of Education & Early Development: Juneau, AK. [online] http://www.eed.state.ak.us/tls/assessment/standards/Math_StandardsJune2012.pdf

AMTE. 2010. *Standards for Elementary Mathematics Specialists: A Reference for Teacher Credentialing and Degree Programs*. Association of Mathematics Teacher Educators: U.S. [online] www.amte.net/sites/all/themes/amte/.../EMSSStandards_Final_Mar2010.pdf

Fulton, Kathleen and Britton, Ted. 2011. *STEM Teachers in Professional Learning Communities: From Good Teachers to Great Teaching*. National Commission on Teaching and America's Future. Washington, DC.

NCTM. 2000. *Principles and Standards for School Mathematics*. National Council of Teacher of Mathematics: U.S. [online] <http://www.nctm.org/standards/content.aspx?id=26792>

CALENDAR

Please note, that this is a tentative schedule and it may be modified. Each week we will discuss:

- One NCTM Principle for School Mathematics
- Alaska Standard(s) for Mathematical Content (2012)
- Alaska Standard(s) for Mathematical Practice (2012)
- Upcoming assignments

Students should be prepared to discuss readings and assignments that are due. Additional readings/videos may be announced in class and will be posted on Blackboard.

Class	NCTM Principles of School Mathematics	Alaska Standards for Mathematical Content, K-8 (2012)	Alaska Standards for Mathematical Practice (2012)	Introduce Upcoming Assignment	Readings due this week (Other readings TBA)	Assignments due this week
Aug 30	Curriculum	No content standard this week Instead... Course diagnostic assessment and course syllabus	1. Make sense of problems and persevere in math	Assignment 1: Teach a Lesson	- Tipps Chapter 1 & 2 - Tipps Chapter 8	Diagnostic assessment (in class)
Sep 14	Learning	Counting and Cardinality (CC)	2. Reason abstractly and quantitatively	Assignment 2: Week of Teaching Math	- Stein Chapters 1 & 2 and Burns pages 54-57 (required for Assignment 1) - Tipps Chapter 4 - Tipps Chapter 9	Assignment 1: Teach a Lesson
Sep 28	Teaching	Number & Operations in Base Ten (NBT) Ratios & Proportional Relationships (RP)	3. Construct viable arguments and critique the reasoning of others		- Tipps Chapter 5 - Tipps Chapter 10, 11, 12 - Tipps Chapter 15	Assignment 2: Week of Teaching Math (Draft)

Oct 12	Assessment	Number and Operations - Fractions (NF) Number System (NS)	4. Model with mathematics	Assignment 3: Textbook Analysis	- Tipps Chapter 7 - Tipps Chapters 13 & 14 - Tipps Chapter - Ashlock chapter to be assigned	
Oct 15-19	Week of Teaching Math					
Oct 26	Teaching & Assessment (continued)	Operations & Algebraic Thinking (OA) Expressions & Equations (EE) Functions (F)	5. Use appropriate tools strategically		- Tipps Chapter 11 & 12 - Tipps Chapter 16	Assignment 2: Week of Teaching Math (Final)
Nov 9	Equity	Geometry (G)	6. Attend to precision	Assignment 4: Year-long math plan	- Tipps Chapter 3 - Tipps Chapter 17	Assignment 3: Textbook Analysis
Dec 7	Technology and Teaching: Professional Development	Measurement & Data (MD) Statistics & Probability (SP)	7. Look for and make use of structure 8. Look for & express regularity in repeated reasoning	NA	- Tipps Chapter 6 - Tipps Chapter 18 & 19 - Tipps Chapter 20	Assignment 4: Year-long math plan Summative Assessment

ED 678
MATH METHODS AND CURRICULUM DEVELOPMENT
OFF-CAMPUS

During the elementary internship year students are required to participate in university coursework with UAF faculty and in aligned internship year responsibilities in an elementary classroom with a qualified mentor teacher. The internship year follows the school district calendars for teachers (approximately 190 days per academic year) and during each school day, interns are required to be in their elementary classroom whenever they are not participating in university required coursework with their UAF instructor or UAF supervisor. There are additional evening and weekend requirements for students during the internship year.

Following the UAF formula for credit distribution, ED 678 includes approximately 27 hours of "lecture" (i.e., face-to-face instruction and individual e-mail interaction with a UAF instructor and with a UAF supervisor) and 120 hours of internship time in the assigned elementary classroom with a qualified mentor teacher. In the catalog, the credit distribution for this 3 credit class is shown as ED 678 (2+0+3).

COURSE INFORMATION

Credits: 3

Prerequisites: Participating in the Internship Year or Permission of Instructor

Location:

Audio-Conference Number 1-800-570-3591 & Pin Number: 6944438

If problems are encountered please call Customer Service at 1-800-290-5900. Have the course number and instructor information available.

Blackboard: <http://classes.uaf.edu>

ED F478 F678 STACKED 201203 (CRN 75141, 75186) MATHEMATICS MTHDS/CRRICLM DEV

Meeting Time: Dates and times are noted on the internship year calendar

INSTRUCTOR INFORMATION

Instructor: Cindy Fabbri

Office: 714D Gruening Building

Office Hours: Following the audio-conference or by appointment

Telephone: (907) 474-1558

Fax: (907) 474-5451

Email: cfabbri@alaska.edu

MATERIALS

Tipps, Steve, Johnson, Art, and Kennedy, Leonard M. 2011. *Guiding Children's Learning of Mathematics (12th Edition)*. Wadsworth Publishing: U.S. ISBN-10: 0495810975

Burns, Marilyn. 2007. *About Teaching Mathematics: A K-8 Resource, 3rd Edition*. Math Solutions Publications: Sausalito, California.

National Council of Teachers of Mathematics Student Membership
[online] <http://www.nctm.org/membership/default.aspx?id=56>

Alaska State Board of Education & Early Development. 2012. *Alaska Mathematics Standards*. Alaska Department of Education & Early Development: Juneau, AK. [online] <http://www.eed.state.ak.us/tls/assessment/standards/MathStandardsJune2012.pdf>

Alaska State Board of Education & Early Development. 2012. *Tools for the Transition to the New Standards for Mathematics* [online] <http://www.eed.state.ak.us/tls/assessment/transition.html>

Alaska State Board of Education & Early Development. 2005. *Standards: Content & Performance Standards for Alaska Students, Third Edition*. Alaska Department of Education & Early Development: Juneau, AK. [online] <http://www.eed.state.ak.us/standards/>

National Council of Teacher of Mathematics. 2000. *Principles and Standards for School Mathematics*. National Council of Teacher of Mathematics: U.S. [online] <http://www.nctm.org/standards/content.aspx?id=26792> or <http://www.fayar.net/east/teacher.web/math/Standards/document/index.htm>

Math curriculum framework for your school district

Math textbook for your students/grades

Math manipulatives as appropriate (as available in your school or from online sources)

Additional readings TBA

COURSE DESCRIPTION

“Study and application in the classroom of best practices from research-based strategies for the teaching and learning of mathematical concepts, content and methods for students in elementary classrooms with diverse populations. Requires development and classroom implementation of mathematics unit. Concurrent internship required. Prerequisites: Admission to Internship Year” (UAF Catalog, 2011).

COURSE GOALS

The overarching goal for this course is to prepare you to be an effective teacher of mathematics (Figure 1).

It is expected that students have acquired mathematics content knowledge in prerequisite mathematics courses and through prior life experiences with math. This includes content areas (numbers and operations, algebra, geometry, measurement, and data analysis and probability), as well as in areas that describe math processes (problem solving, reasoning and proof, communicating, connecting, and representing) (NCTM, 2000; ACEI 2007).

- **Effective teaching requires knowing and understanding mathematics, students as learners, and pedagogical strategies.**
- **Effective teaching requires a challenging and supportive classroom learning environment.**
- **Effective teaching requires seeking improvement.**

Figure 1. Important elements of the teaching principle (NCTM, Pages 17-18, 2000)

The main focus of this course is on the pedagogical content knowledge that teachers need to teach mathematics. This includes an understanding of learners and learning, teaching, curriculum, and assessment (AMTE, 2010). To achieve this goal of learning pedagogical content knowledge, the course will use the *Principles for School Mathematics* as a framework for the course (Figure 2).

- Equity
- Curriculum
- Teaching
- Learning
- Assessment
- Technology

Figure 2. Principles for School Mathematics (NCTM, 2000)

Within this framework, the aim will be to provide opportunities to learn theory and experience it through practice. Students will study and use current standards to facilitate teaching and learning in their classrooms.

Finally, as espoused by the Association for Childhood Education International (ACEI) Elementary Education Standards, students understand and apply professional practices and behaviors. This includes reflection and collaborating with families, colleagues, and community (ACEI, 2007).

STUDENT LEARNING OUTCOMES

Through study, experience, and reflection, students will gain a beginning teacher level of pedagogical content knowledge in each area identified as a Principle for School Mathematics (equity, curriculum, teaching, learning, assessment, and technology). Specific outcomes with which the student will gain familiarity are shown on the course diagnostic assessment.

INSTRUCTIONAL METHODS

To facilitate individual and group learning opportunities students will participate in a professional learning community (Figure 3).

- **Shared values & goals - a collaboratively defined understanding of what constitutes worthwhile student learning, with all members of the professional learning community (PLC) working together on that vision**
- **Collective responsibility- Team members should have shared and appropriately differentiated responsibilities**
- **Self-directed reflection**

Figure 3. Principles that make a learning community effective, as relevant for a university course setting (Fulton and Britton, 2011)

With this in mind, instructional methods will include, at least:

- Collaborating and discussing mathematics teaching and learning with peers
- Reviewing case studies and reading theory/literature
- Designing and implementing mathematics learning experiences
- Analyzing and evaluating mathematics resources
- Writing papers
- Presenting knowledge and ideas
- Reflecting on work done by oneself and peers

ASSIGNMENTS

ED 678: 1300 points possible

Audio-conference attendance and participation (70 points = 10 pts/class x 7 classes)
Each class you will receive points for attending class, being prepared and contributing to class discussions. You cannot “make-up” these points if you miss a class.

Show & Tell: Bring three mathematics resources to class (50 points = 16.67 pts/resource x 3 resources)

You will need to bring three mathematics resources to share with your colleagues. The resource (book, website, curricula, “app” etc.) should be something not likely to be known by everyone. You will explain a bit about the resource, why it is high quality and how to find it. At least one of your resources during the semester must use technology to improve math instruction/learning. Please remember to post the resource in the Blackboard “Discussion Board” as I will use this list to enter final grades.

Assignment 1: Write lesson plan & teach lesson (100 points; Rubric will be provided)

In consultation with your mentor teacher, select one of the activities from Burns (2007) to teach in your classroom. Decide with your mentor teacher if you will teach the lesson to the whole class or to a small group of students. Plan for teaching the activity carefully, being sure to think through classroom organization and management issues, as well as what materials and assessment will be needed, and how you will modify the activity to meet the needs of your students. You will then write up a lesson plan for this activity using the lesson plan format provided below. Please reference the Alaska Mathematics Standards (2012) for the standards section. Use the “Introduce, Explore and Summarize” (IES) format discussed in Burns (Pages 54-57) for the procedure section. After teaching the lesson, analyze what happened using the Mathematical Tasks Framework (See Stein Chapter 1). Your lesson plan and analysis combined should be 3-5 pages in length. Remember that you are adapting a Burns (2007) lesson, not creating an original lesson. Guidelines and a rubric will be provided.

Assignment 2: Week of teaching math (WOTM) (300 points; Rubric will be provided)

You will develop a full week of detailed mathematics instruction and a professional reflection as a key assignment for ED 478/678; your liaison and mentor teachers will provide you with input and evaluation on how you teach these lessons in your internship classroom. Your lesson plans for the week of math teaching will follow the format discussed in class; a total of five lesson plans are expected for the week of teaching math. A daily reflection and a summative assessment for the entire week will be submitted after the lessons are taught. When you hand in this assignment, you should also include copies of any handouts or other materials you use. You should also include copies of samples of your students’ work for at least one of the five lessons with your comments; three samples, representing not meeting, meeting, and exceeding expectations, should be provided that

include your feedback to the student (students' names should be blanked out for confidentiality). Specific guidelines and grading criteria will be provided.

Assignment 3: Textbook/resource analysis (240 points; Rubric will be provided)

You will provide an analysis of the major mathematics curriculum resource (e.g. textbook) you are using in your internship placement. Your analysis will focus on reviewing the textbook as it relates to the Principles for School Mathematics and the Alaska Standards. For each principle, you will analyze your text, discuss your findings, and suggest how you might need to supplement your resource. Your final write up will be about 10 pages. Specific guidelines and grading criteria will be provided.

Assignment 4: Year-long math plan (240 points; Rubric will be provided)

You will develop a comprehensive mathematics curriculum plan for the entire school year for the grade level at which you are interning. The plan will be organized chronologically for the entire year to show, for each of the 36 weeks of the school year, how you would address Alaska Content Standard A for your grade. Specifically, you will document how you will use your text and/or other curriculum resource(s) to address Alaska Content Standard A by showing how 12 different Performance Standards of your choice are met (this will be done in 1-2 sentences with two accompanying example problems from one of the resources). Your year-long curriculum plan should provide 1-2 sentences for each week describing what you would teach, including page references from your curriculum resource; in addition, for 12 of the weeks, you will also provide the aforementioned explanation of how the six Performance Standards is addressed. Your final write up should be 12-15 pages in length.

ED 678 Graduate Student Assignment: (300 points = 75 points/paper or presentation)

Graduate students will write two short papers (3-5 pages) based on their review of resources (lessons, articles, journal papers, etc.) found at the National Council of Teachers of Mathematics (NCTM) website or from other scholarly sources. Each paper will focus on a key area of mathematics education. Papers should describe what is considered best practice in that area and give examples that illustrate the concept. Papers should use an accepted citation method.

Students will prepare two in-class presentations. Each presentation will focus on an Alaska content standard (2012). Students will use powerpoint to highlight the standard they are presenting and then will engage their classmates in activities that teach the concept.

Specific guidelines and an assignment rubric will be provided.

EVALUATION

As outlined in the UAF catalog, the grading system is as follows:

- A An honor grade, indicates originality and independent work, a thorough mastery of the subject and the satisfactory completion of more work than is regularly required.
- B Indicates outstanding ability above the average level of performance (80% or better)
- C Indicates a satisfactory or average level of performance. (70% or better)
- D The lowest passing grade, indicates work of below-average quality and performance. (60% or better)
- F Indicates failure. (Below 60%)

Grades will be posted using the following scale:

- A 90-100%
- B 80-89%
- C 70-79%
- D 60-69%
- F 59% or below

As one of the culminating courses of the internship year, students are required to earn a “C” or better in order to successfully complete the licensure program. In addition to obtaining minimum grade requirements, students must meet all required ESAAP competencies in order to pass the class and continue with the internship. Any student in jeopardy of failing, based on failure of competencies or failing grades, should contact the instructor immediately to discuss the options.

POLICIES

As a compressed course, a great deal of information is covered each session. For this reason, attendance at all classes is expected. If you need to miss class, please contact me immediately.

Assignments are expected on or before the stated due date. If you are unable to turn in an assignment on time, you will need to document an emergency or extenuating circumstances (beyond your control) or the assignment may not be accepted. If accepted, the instructor reserves the right to award a reduced point value for late work.

Please let me know, as soon as possible, if you are having difficulties with the coursework or workload.

Students are expected to adhere to the Student Code of Conduct (Board of Regents’ Policy 09.02.01). Students are required to conduct themselves honestly and responsibly, and to respect the rights of others. Academic integrity is essential and expected from all students.

Cheating or plagiarism is not acceptable. For more information on plagiarism please see <http://library.uaf.edu/lis101-plagiarism>.

SUPPORT SERVICES

If you have questions, concerns, comments, or individual needs please contact me immediately. In addition, please be aware that these other forms of assistance are also available:

Kelly Mendez, Elementary Intern Coordinator
474-7981
ksmendez@alaska.edu

Tina Buxbaum, Elementary Intern Coordinator
474-7981
tmbuxbaum@alaska.edu

Rural Student Services (RSS)
Tel: (888) 478-1452
Email: fyrss@uaf.edu

Student Support Services (SSS)
Tel: (907) 474-6844
Email: sssp@uaf.edu

Tutoring Services:
Writing Center (907) 474-5314
Math Laboratory (907) 474-7332

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Nov 9	Equity	Geometry (G)	6. Attend to precision	Assignment 4: Year-long math plan	- Tipps Chapter 3 - Tipps Chapter 17	Assignment 3: Textbook Analysis
Dec 7	Technology and Teaching: Professional Development	Measurement & Data (MD) Statistics & Probability (SP)	7. Look for and make use of structure 8. Look for & express regularity in repeated reasoning	NA	- Tipps Chapter 6 - Tipps Chapter 18 & 19 - Tipps Chapter 20	Assignment 4: Year-long math plan Summative Assessment