Undergraduate Academic Board
Agenda

February 22, 2013
2:00-5:00
ADM 204

I. Roll

( ) Dave Fitzgerald (CBPP)	( ) Ira Ortega (COE)	( ) Christina Stuive (SA)	( ) Adjunct vacancy
( ) Paola Banchero (CAS)	( ) Jeffrey Callahan (CTC)	( ) Francisco Miranda (FS CAS)	( ) USUAA vacancy
( ) Mari Ippolitio (CAS)	( ) Utpal Dutta (SOE)	( ) Alberta Harder (FSAL)	Ex-Officio Members:
( ) Barbara Harville(CAS)	( ) Michael Hawfield (KPC)	( ) Soren Orley (FSAL)	(x) Susan Kalina
( ) Len Smiley (CAS)	( ) Kevin Keating (LIB)	( ) FS at large vacancy	( ) Lora Volden
( ) Lynn Senette (COH)	( ) Joan O'Leary (Mat-su)	( ) Kathrynn Hollis Buchanan(Kodiak)	( ) S&P
( ) Eileen Weatherby (COH)	( ) Vacant (Adjunct)		

II. Approval of the Agenda (pg.1-2)

III. Approval of Meeting Summary (pg. 3-4)

IV. Administrative Report

A. Vice Provost for Undergraduate Academic Affairs Susan Kalina

B. University Registrar Lora Volden

V. Chair's Report

A. UAB Chair- Dave Fitzgerald

B. GERC

VI. Program/Course Action Request- Second Readings

Chg	BA A166	Small Business Management (3 cr)(3+0)(pg. 5-9)
Chg	CSCE A311	Data Structures and Algorithms (3 cr)(3+0)(pg. 10-15)

VII. Program/Course Action Request- First Readings

Chg	RUSS A490	Selected Topics in Russian Culture (3 cr)(3+0)(pg. 16-22)
Chg		Associate of Arts (pg. 23-36)
Add		CSCE, Prefix (pg. 37-39)
Chg	CSCE A320	Operating Systems (3 cr)(3+0)(pg. 40-44)
Chg	CSCE A351	Automata, Algorithms, and Complexity (3 cr)(3+0)(pg. 45-50)
Chg	CSCE A360	Database Systems (3 cr)(3+0)(pg. 51-55)
Chg	CSCE A365	Computer Networks (3 cr)(3+0)(pg. 56-59)
Chg	CSCE A385	Computer Graphics (3 cr)(3+0)(pg. 60-65)
Chg	CSCE A395	Internship in Computing (3 cr)(0+9)(pg. 66-69)
Chg	CSCE A401	Software Engineering (3 cr)(3+0)(pg. 70-74)
Chg	CSCE A411	Artificial Intelligence (3 cr)(3+0)(pg. 75-79)

Chg	CSCE A412	Evolutionary Computing (3 cr)(3+0)(pg. 80-84)
Chg	CSCE A431	Compilers (3 cr)(3+0)(pg. 85-88)
Chg	CSCE A442	VLSI Circuit Design (3 cr)(3+0)(pg. 89-93)
Chg	CSCE A445	Computer Design and Simulation (4 cr)(3+3)(pg. 94-97)
Chg	CSCE A448	Computer Architecture (3 cr)(3+0)(pg. 98-103)
Chg	CSCE A465	Computer and Network Security (3 cr)(3+0)(pg. 104-107)
Chg	CSCE A470	Computer Science and Engineering Capstone Project (3 cr)(3+0)(GER)(pg. 108-113)
Chg	CSCE A490	Topics in Computer Science and Computer Systems Engineering (3 cr)(3+0)(pg. 114-117)
Chg	CSCE A495	Computing Internship Project (3 cr)(0+9)(pg. 118-122)
Chg	CSCE A498	Individual Research (1-3 cr)(1-3+0)(pg. 123-125)
Chg	RE A100	Introduction to Sustainable Energy (3 cr)(3+0)(pg. 126-130)
Chg	RE A102	Applied Physics for Sustainable Energy (3 cr)(3+0)(pg. 131-135)
Chg	RE A110	Introduction to Solar Photovoltaic Systems (1 cr)(1+0)(pg. 136-140)
Chg	RE A120	Introduction to Solar Thermal Hot Water Systems (1 cr)(1+0)(pg. 141-144)
Chg	RE A130	Introduction to Small Wind Systems (1 cr)(1+0)(pg. 145-148)
Chg	RE A140	Home Energy Basics (1 cr)(1+0)(pg. 149-152)
Chg	RE A203	Sustainable Energy Project Development (3 cr)(3+0)(pg. 153-157)
Chg	RE A210	Cold Climate Construction (3 cr)(3+0)(pg. 158-163)
Chg		OEC, Sustainable Energy (pg. 164-169)
Chg		BS, Geomatics (pg. 170-187)
Chg		AAS, General Business (pg. 188-192)

VIII. Old Business

IX. New Business

A. Draft Academic Program Suspension and Deletion Policies and Cover Memo Template (pg. 193-200)
B. First Reading of Purge Lists (pg. 201-204)
C. Memo Regarding Concentrations, Tracks, Options, and Emphasis (pg. 205)

X. Informational Items and Adjournment

Undergraduate Academic Board
Summary

February 15, 2013
2:00-5:00
ADM 204

I. Roll

(x) Dave Fitzgerald (CBPP)	(x) Ira Ortega (COE)	(x) Christina Stuive (SA)	( ) Adjunct vacancy
(x) Paola Banchero (CAS)	(x) Jeffrey Callahan(CTC)	(x) Francisco Miranda (FS CAS)	( ) USUAA vacancy
(x) Mari Ippolitio (CAS)	( ) Utpal Dutta (SOE)	(x) Alberta Harder (FSAL)	Ex-Officio Members:
(x) Barbara Harville(CAS)	(x) Michael Hawfield (KPC)	(x) Soren Orley (FSAL)	(x) Susan Kalina
(x) Len Smiley (CAS)	(x) Kevin Keating (LIB)	( ) FS at large vacancy	(x) Lora Volden
(e) Lynn Senette (COH)	(x) Joan O'Leary (Mat-su)	(x) Kathrynn Hollis Buchanan(Kodiak)	(x) S&P
(x) Eileen Weatherby (COH)	( ) Vacant (Adjunct)		

II. Approval of the Agenda (pg.1-2)
Add UAB Disputed Curriculum Procedures and discussion of concentrations, tracks, options, and emphasis under new business

III. Approval of Meeting Summary (pg. 3-4)
Amend the sentence under Curriculum Process to read: Discussed what the faculty considers an appropriate curriculum review cycle and/or policy regarding maintaining currency in the curriculum.

IV. Administrative Report

A. Vice Provost for Undergraduate Academic Affairs Susan Kalina
No report

B. University Registrar Lora Volden
Summer registration opens February 28th and Fall registration opens April 1st; gave a reminder that changes to existing courses cannot be implemented in Fall 2013 after registration opens

V. Chair's Report

A. UAB Chair- Dave Fitzgerald
Constitution and by-laws does not mandate a joint UAB and GAB meeting, however, the board chairs agree that one is necessary. Joint meeting is tentatively scheduled for March 29th at 11:30.
UAB and GAB chairs are looking at developing CAFÉ trainings for the curriculum process

B. GERC
Both BA A151 and ENGL A111 were approved
Discussed the new social science outcomes and how that might affect initiators

VI. Program/Course Action Request- Second Readings

Chg BA A151 Introduction to Business (3)(3+0)(pg. 5-11)
Unanimously Approved

Chg ENGL A111 Introduction to Composition (3)(3+0)(pg. 12-27)
Unanimously Approved

VII. Program/Course Action Request- First Readings

Chg Minor, Athletic Training (pg. 28)
Accepted for first reading

Chg Bachelor of Science, Physical Education (pg. 29-49)
Accepted for first reading

Chg BA A166 Small Business Management (3)(3+0)(pg. 50-54)
Accepted for first reading

Chg BA A480 Social Media Marketing
(Stacked with BA A680) (3)(3+0)(pg. 55-65)
Waive first reading, approve for second

Chg ACCT A495 Advanced Accounting Internship (3)(0+9)(pg. 66-70)
Waive first reading, approve for second

Chg CSCE A201 Computer Programming I (4)(3+2)(pg. 71-75)
Waive first reading, approve for second

Chg CSCE A202 Object-Oriented Programming (3)(3+0)(pg. 76-81)
Waive first reading, approve for second

Chg CSCE A211 Computer Programming II (4)(3+2)(pg. 82-86)
Waive first reading, approve for second

Chg CSCE A241 Computer Hardware Concepts
(Cross Listed with EE A241) (4)(3+3)(pg. 87-92)
Waive first reading, approve for second

Chg EE A241 Computer Hardware Concepts
(Cross Listed with CSCE A241) (4)(3+3)(pg. 93-98)
Waive first reading, approve for second

Chg CSCE A248 Computer Organization and Assembly Language Programing
(3)(3+0)(pg. 99-105)
Waive first reading, approve for second

Chg CSCE A302 Object-Oriented Design Patterns (3)(3+0)(pg. 106-109)
Waive first, approve for second

Add CSCE A305 Android Programming (3)(3+0)(pg. 110-113)
Waive first reading, approve for second

Chg CSCE A311 Data Structures and Algorithms (3)(3+0)(pg. 114-119)
Accepted for first reading

Chg CSCE A331 Programming Language Concepts (3)(3+0)(pg. 120-125)
Waive first reading, approve for second

Chg CSCE A342 Digital Circuits Design (3)(3+0)(pg. 126-130)
Waive first reading, approve for second

VIII. Old Business

A. Curriculum Review Process
Discussed what the faculty might consider an appropriate curriculum review cycle and/or policy regarding maintaining currency in the curriculum.
Created a subcommittee to devise a policy regarding the curriculum review cycle with the intent of maintaining currency in the curriculum. Michael Hawfield volunteered to chair the subcommittee.

IX. New Business

A. Draft Academic Program Suspension and Deletion Policies and Cover Memo Template (pg. 131-138)

B. UAB Disputed Curriculum Procedures – Mari Ippolito
Discussed how to approach curriculum procedures regarding improper coordination.

X. Informational Items and Adjournment

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
CB CBPP	ADBP Division of Business Programs	BA

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
BA	A166	N/A	3	(3+0)

6. Complete Course Title
Small Business Management

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☐ Prefix
- ☐ Credits
- ☐ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☐ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions
- ☒ Other Update CCG (please specify)

9. Repeat Status No # of Repeats Max Credits

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: /9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1. See attached			
2.			
3.			

Initiator Name (typed): Gary Selk Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 02/01/2013
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 02/01/2013

14. General Education Requirement
Mark appropriate box:
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Introduces business planning as a key to successful small business management. Examines practical aspects of management for starting and operating a small business. Assists students in furthering their understanding of personal finance, business planning, marketing, production, and business finance.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
N/A	N/A	N/A

16d. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
N/A

17. ☒ Mark if course has fees Standard CBPP computer lab fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
To update the outline, textbook, and bibliography

Initiator (faculty only) Date
Gary Selk
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved
Department Chairperson Date

☐ Approved
☐ Disapproved
Curriculum Committee Chairperson Date

☐ Approved
☐ Disapproved
Dean/Director of School/College Date

☐ Approved
☐ Disapproved
Undergraduate/Graduate Academic Board Chairperson Date

☐ Approved
☐ Disapproved
Provost or Designee Date

13a. Impacted courses or programs BA A166

Impacted program/course	Catalog page(s)	Date of coordination	Chair/ Coordinator contacted
Digital Art, Digital Photography Concentration, AAS	97	02/01/2013	Celia Anderson
Digital Art, Darkroom/Digital Concentration, AAS	98	02/01/2013	Celia Anderson
Small Business Management, Undergraduate Certificate	137	02/01/2013	Steve Horn
Small Business Management, AAS	139	02/01/2013	Ed Forrest

COURSE CONTENT GUIDE
UNIVERSITY OF ALASKA ANCHORAGE
COLLEGE OF BUSINESS AND PUBLIC POLICY

I. Date Initiated February 19, 2013

II. Course Information

College/School: College of Business and Public Policy
Department: Business Administration
Program: Associate of Applied Science, Small Business Administration;
Associate of Applied Science, Digital Art, Digital Photography Concentration;
Associate of Applied Science, Digital Art, Darkroom/Digital Concentration
Course Title: Small Business Management
Course Number: BA A166
Credits: 3
Contact Hours: 3 per week x 15 weeks = 45 hours
0 lab hours
6 hours outside of class per week x 15 weeks = 90 hours
Grading Basis: A - F
Course Description: Introduces business planning as a key to successful small business management. Examines practical aspects of management for starting and operating a small business. Assists students in furthering their understanding of personal finance, business planning, marketing, production, and business finance**.**
Course Prerequisites: N/A
Registration Restrictions: N/A
Fees: Standard CBPP computer lab fee

III. Course Activities

A. Lectures and discussions
B. In-class exercises
C. Guest speakers
D. Research projects

IV. Course Level Justification

This 100-level course examines the basic principles of starting and operating a small business.

V. Outline

A. The Dynamic Role of Small Business
   1. Start your small business
   2. Family owned businesses
   3. Forms of ownership

B. How to Plan and Organize a Business
   1. Plan, organize, and manage a small business
   2. Obtain the right financing for your business

C. How to Market Goods and Services
   1. Develop marketing strategies
   2. Promotion and distribution

D. How to Organize and Manage the Business
   1. Human resources
   2. Maintain relationships with your employees

E. How to Operate the Business
   1. Facility layout
   2. Purchasing and inventory control

F. Basic Financial Management
   1. Profit planning
   2. Budget, operations control, and taxes

G. Providing Security for the Business
   1. Risk management
   2. Insurance
   3. Crime prevention

VI. Suggested Text

Megginson, Leon C., and Mary Jane Byrd. *Small Business Management: An Entrepreneur's Guidebook*. 6th ed. New York: McGraw-Hill Inc., 2009. Print.

VII. Bibliography

Katz, Jerome and Green, Richard, *Entrepreneurial Small Business*, 3rd ed. New York: McGraw-Hill, 2011. Print.

Longnecker, Justin, William Petty , Leslie Palich, and Francis Hoy. *Small Business Management*. 16th ed. Mason: Cengage South-Western, 2012. Print.

State of Alaska Department of Commerce, Community, and Economic Development. *Establishing a Business in Alaska*. Juneau: , 2009. Web. <http://commerce.alaska.gov/ded/fin/pdf/EstablishingABusiness.pdf>.

U.S. Small Business Administration. *Resource Handbook*. Reni Publishing, Web. <www.sba.gov/sites/default/files/files/resourceguide_national.pdf>.

VIII. Instructional Goals and Student Learning Outcomes

A. Instructional Goals. **The instructor will:**
1. Present an overview of small business management.
2. Explain the value of ethical decision making and social responsibilities of small business ownership.
3. Explain the various forms of business planning.
4. Discuss business failure and explain ways to recognize and avoid common pitfalls.
5. Explain how to write a comprehensive business plan.
6. Discuss human resource management.
7. Discuss marketing requirements of small business ownership.
8. Explain how to analyze various key financial statements.
9. Explain how to calculate break-even.
10. Explain how to forecast sales and the importance of cash-flow analysis.

B. Student Learning Outcomes. **Students will be able to:**	**Assessment Method**
1. Demonstrate ethical decision-making.	In-class exercise and quiz
2. Demonstrate working knowledge of various functions of small business ownership.	Research project
3. Describe the common pitfalls of small business ownership and how to avoid them.	Quizzes, homework and exam
4. Describe the various functions of human resource management.	Quizzes, homework and exam
5. Demonstrate knowledge of sales forecasting, cash-flow analysis, and break-even.	Quizzes and exam
6. Explain the difference between insurable risk and uninsurable risk and discuss how to control risk.	Quizzes and exam

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science and Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A311	CS A330	3	(3+0)

6. Complete Course Title
Data Structures and Algorithms

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☒ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☒ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions
- ☒ Other Update Course Content Guide, Division Code, Department Code (please specify)

9. Repeat Status No # of Repeats n/a Max Credits n/a

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Date of Coordination*	*Chair/Coordinator Contacted*
1. B.A., B.S., Computer Science	12/10/2012	Kenrick Mock
2. BSE CSE, Required course	12/10/2012	Kenrick Mock
3. BS Natural Science, Selective	12/10/2012	Khrys Duddleston

Initiator Name (typed): Martin Cenek Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 12/10/2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12/10/2012

14. General Education Requirement
Mark appropriate box:
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Representation and organization of digital information in the form of effective and efficient data structures, manipulation of data structures in a procedural fashion, and the analysis and evaluation of various algorithms. The following topics will be covered: Abstract Data Types (ADT), arrays, tables, linked lists, stacks, queues, trees, sorting, searching, graphs, hashing, spanning trees, disjoint sets, and heaps.

16a. Course Prerequisite(s) *(list prefix and number or test code and score)*
(CSCE A211 and MATH A231) with a minimum grade of C.

16b. Co-requisite(s) *(concurrent enrollment required)*
n/a

16c. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16d. Registration Restriction(s) *(non-codable)*
n/a

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide. The course title rearranged to emphasize data structures. Addition of MATH A231 as a prerequisite to better prepare students for the logical and mathematical analysis in the course.

Initiator (faculty only)	Date	☐ Approved ☐ Disapproved	Dean/Director of School/College	Date
Martin Cenek Initiator (TYPE NAME)				
☐ Approved ☐ Disapproved	Department Chair	Date	☐ Approved ☐ Disapproved	Undergraduate/Graduate Academic Board Chair	Date
☐ Approved ☐ Disapproved	College/School Curriculum Committee Chair	Date	☐ Approved ☐ Disapproved	Provost or Designee	Date

Course Content Guide
University of Alaska Anchorage
School of Engineering
Department of Computer Science and Engineering

I. **Revision Date**: February 5, 2013

II. **Course Information**

A. **College**: School of Engineering
B. **Course Subject/Number**: CSCE A311
C. **Credits**: 3
D. **Contact Hours**: (3+0) 45 contact lecture hours (3 contact lecture hours/week x 15 weeks = 45) plus 90 hours outside work (6 hours outside lecture/week x 15 weeks = 90) for a total of 135 hours
E. **Course Title**: Data Structures and Algorithms
F. **Repeat Status**: No
G. **Grading Basis**: A-F
H. **Course Description**: Representation and organization of digital information in the form of effective and efficient data structures, manipulation of data structures in a procedural fashion, and the analysis and evaluation of various algorithms. The following topics will be covered: ADT, arrays, tables, linked lists, stacks, queues, trees, sorting, searching, graphs, hashing, spanning trees, disjoint sets, and heaps.
I. **Course Prerequisites**: (CSCE A211 and MATH A231) with a minimum grade of C.
J. **Fees**: Yes, standard SOE fee

III. **Course Level Justification**

This is the third course in the programming sequence. Familiarity of 200 level programming concepts is necessary to build data structures and familiarity of 200 level concepts from discrete mathematics is necessary to analyze algorithms. This course prepares students for other upper division courses that require an understanding of data structures and algorithms.

IV. **Instructional Goals and Student Learning Outcomes**

A.	**Instructional Goals.** The instructor will:
1.	Aid students to achieve an expert knowledge of how to represent and organize digital information by variety of data-structures applicable in most object-oriented languages.
2.	Introduce students to the techniques of manipulating these structures by algorithms to perform common actions on the data structures such as finding, retrieving, adding, and deleting information.
3.	Illustrate benefits and drawbacks of different algorithms by analytically and experimentally evaluating algorithmic efficiency.
4.	Provide students with the background knowledge and skills needed to successfully design, implement, modify and evaluate digital information in subsequent upper-division computer science courses.

B. **Student Learning Outcomes**. Students will be able to:	**Assessment method**
1. Design suitable information representations for a variety of problems.	Assignments, Quizzes, Exams
2. Describe appropriate algorithms and data structures for a number of well-defined problems.	Assignments, Quizzes, Exams
3. Design algorithms to solve given problems using techniques such as divide-and-conquer.	Assignments, Quizzes, Exams
4. Implement algorithms and data structures in a computer programming language: C++ or Java.	Assignments, Quizzes, Exams
5. Analyze the time and space efficiency of an algorithm, use the big-O notation.	Assignments, Quizzes, Exams
6. Measure the time and space requirements of an algorithm.	Assignments, Quizzes, Exams

V. **Guidelines for Evaluation**

A. Assignments
B. Exams
C. Quizzes

VI. **Topical Course Outline**

1. Design and analysis of algorithms
   a. From problems to programs
   b. Data types, data structures and abstract data types
   c. Program run time calculations: asymptotic notation, summation, recurrence
   d. Structured programming concepts

2. Basic data types
   a. Linked lists
   b. Stacks
   c. Queues
   d. Last In First Out (LIFO), First In First Out (FIFO), circular, priority
   e. Mappings
   f. Stacks and recursive procedures
3. Trees
   a. The Abstract Data Type (ADT) tree
   b. Implementation of trees
   c. Binary trees

4. Basic operation on sets
   a. Introduction to sets
   b. Bit-vector and linked list implementation of sets
   c. Dictionaries and their implementation
   d. Hash tables

e. Priority queues

5. Advanced set representation methods
   a. Binary search trees
   b. Sets with the UNION and FIND operations
   c. An ADT with UNION and SPLIT

6. Graphs
   a. Basic definitions
   b. Single-source and all-paths shortest path problem
   c. Traversal of directed graphs, Breadth First Search, Depth First Search
   d. Minimum cost spanning trees: Kruskal, Prim
   e. Directed graph traversals

7. Algorithm analysis techniques
   a. Divide and conquer algorithms
   b. Dynamic programming

8. Data structures and algorithms for external storage
   a. External sorting
   b. Quick sort, Merge sort, Selection sort, Insertion sort, Heap sort, Bucket sort
   c. External search trees

VII. Suggested Texts

Cormen T.H., Leiserson, C.E, Rivest, R.L, and Stein, C. Introduction to Algorithms, 3rd Edition, MIT Press, Cambridge, MA, 2009.

Levitin, A. Introduction to the Design and Analysis of Algorithms, 3rd edition, Addison-Wesley, Upper Saddle River, NJ, 2011.

VIII. Bibliography

*Aho, A., Ullman, J., and Hopcroft, J. Data Structures and Algorithms, Addison-Wesley, Upper Saddle River, NJ, 1983.

*Bentley, J. Programming Pearls, 2nd Edition, Addison-Wesley, Upper Saddle River, NJ, 1999.

Drozdek, A. Data Structures and Algorithms in Java, 2nd Edition, Cengage Learning, Boston, MA, 2004.

Drozdek, A. Data Structures and Algorithms in C++, 3rd Edition, Cengage Learning, Boston, MA, 2012.

Kleinberg, J. Algorithm Design, Addison-Wesley, Upper Saddle River, NJ, 2013.

*Knuth, D.E. The Art of Computer Programming, Addison-Wesley, Upper Saddle River, NJ, 1998.

Weiss, M.A. Data Structures and Algorithm Analysis in C++, 3rd Edition, Addison-Wesley, Upper Saddle River, NJ, 2011.

* denotes classic text

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
AS CAS	AHUM Division of Humanities	Languages

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
RUSS	A490	RUSS A490A	3	(3+0)

6. Complete Course Title
Selected Topics in Russian Culture
ST: Russian Culture
Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☐ Prefix
- ☒ Credits
- ☐ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☒ Course Number
- ☒ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☒ Registration Restrictions
- ☒ Other CCG Update (please specify)

9. Repeat Status Yes # of Repeats unlimited Max Credits unlimited

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: Spring/9999

12. ☐ Cross Listed with _____
☐ Stacked with Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Date of Coordination*	*Chair/Coordinator Contacted*
1. BA International Studies	January 27, 2013	Professor Dorn Van Dommelen
2.		
3.		

Initiator Name (typed): Amanda Murphy Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: January 27, 2013
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: January 27, 2013

14. General Education Requirement
Mark appropriate box:
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Focuses on critical analysis of diverse artistic traditions from Russian-speaking communities using a variety of disciplinary methodologies (e.g. historical, cultural, socio-political) and related terminology. Enhances Russian language skills in writing, reading, speaking, listening, and cross-cultural literacy.
Special note: Course may be repeated for credit with change of subtitle. Course conducted in Russian.

16a. Course Prerequisite(s) *(list prefix and number or test code and score)*
RUSS A302 with a minimum grade of C.

16b. Co-requisite(s) *(concurrent enrollment required)*
N/A

16c. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16d. Registration Restriction(s) *(non-codable)*
N/A

17. ☒ Mark if course has fees

18. ☒ Mark if course is a selected topic course

19. Justification for Action
Updating of CCG to reflect new course description, course number, contact hours, registration restrictions, prerequisites, instructional goals, student learning outcomes, and bibliography.

Initiator (faculty only)	Date	☐ Approved ☐ Disapproved	Dean/Director of School/College — Date
Amanda Murphy Initiator (TYPE NAME)			
☐ Approved ☐ Disapproved	Department Chair — Date	☐ Approved ☐ Disapproved	Undergraduate/Graduate Academic Board Chair — Date
☐ Approved ☐ Disapproved	College/School Curriculum Committee Chair — Date	☐ Approved ☐ Disapproved	Provost or Designee — Date

University of Alaska Anchorage

Course Content Guide

Department of Languages

RUSS A490

Selected Topics in Russian Culture

I.	Initiation Date:	January 11, 2013
II.	Course Information:	
	A. College:	College of Arts and Sciences
	B. Course Title:	Selected Topics in Russian Culture
	C. Course Subject/Number	RUSS A490
	D. Credit Hours:	3.0
	E. Contact Time:	3 + 0 hours per week
	F. Grading Information:	A-F
	G. Course Description:	Focuses on critical analysis of diverse artistic traditions from Russian-speaking communities using a variety of disciplinary methodologies (e.g. historical, cultural, socio-political) and related terminology. Enhances Russian language skills in writing, reading, speaking, listening, and cross-cultural literacy. Special note: Course may be repeated for credit with change of subtitle. Course conducted in Russian.
	H. Status of Course Relative to Degree or Certificate Programs:	Course may be used as an elective to satisfy the upper-division component of a Russian major or minor.
	I. Course Attributes:	Applies toward the upper-division requirement for Russian majors and minors.
	J. Lab Fees:	Yes
	K. Coordination:	UAA Faculty List Serve
	L. Course Prerequisite:	Russian A302 with a minimum grade of C.

III. Instructional Goals and Student Learning Outcomes:

Instructional Goals:

1. Conduct the class in Russian, soliciting student participation via discussion of course material.
2. Present representative works and relate them to the historical and cultural contexts in which they were composed.
3. Present opportunities for the students to enhance linguistic proficiency and rhetorical skills through engagement with selected works.
4. Guide students in critically analyzing and interpreting representative works, using appropriate disciplinary approaches and terminology.

Student Learning Outcomes	**Assessment Methods**
Demonstrate effective analytical writing skills in Russian through the interpretation of the material studied in the course.	Papers Exams and quizzes
Employ appropriate disciplinary approaches and terminology in critical analyses.	Exams and quizzes Class discussions Papers Class presentations
Demonstrate enhancement and refinement of oral skills in Russian.	Class discussions Class presentations
Demonstrate appropriate understanding of the historical and cultural context in which the discussed works were composed.	Exams and quizzes Class discussions Papers Class presentations

IV. Course Activities:

This course reflects a balance of learner-centered, small-group collaboration as well as instructor-delivered lesson format based on analysis and interpretation of authentic Russian cultural works.

V. Course-level Justification:

Course requires prior formal study of college Russian grammar and composition at the upper-division level, building upon the concepts presented in RUSS A302.

VI. Sample Course Outline:

The following is a possible version of the course: "Russian Cinema and Conversation."

A. Terminology for Discussing Films in Russian
B. Theoretical Background: The Myth of the "Great Family" in Soviet Art
C. Historical Background of the Post-Soviet Era: *My Perestroika*
D. The Stalinist Legacy in Post-Soviet Films: *Утомленные солнцем (Burnt by the Sun)* and *Вор (The Thief)*
E. Social and Political Problems in Post-Soviet Russia: *Брат (Brother), Окно в Париж (Window to Paris),* and *Кавказский пленник (Prisoner of the Mountains)*

VII. Suggested Texts:

Mesropova, Olga. *Kinotalk: Russian Cinema and Conversation*. Bloomington, IN: Slavica Publishing, 2006. Print

Kashper, Mara, Olga Kagan and Yuliya Morozova. *Cinema for Russian Conversation: Volumes 1 and 2*. Newburyport, MA: Focus Publishing, 2006. Print

VIII. Bibliography:

Attwood, Lynne and Maya Turovskaya. *Red Women on the Silver Screen*. London: Harpercollins, 1993. Print

Attwood, Lynne. "'Rodina-Mat'' and the Soviet Cinema." *Gender Restructuring in Russian Studies*. Ed. Marianne Liljestrom. Tempere, Finland: University of Tampere Press, 1993. 15-28. Print

Barker, Adele. Ed. *Consuming Russia: Popular Culture, Sex and Society Since Gorbachev.* Durham, NC: Duke UP, 1999. Print

Berry, Ellen and Anesa Miller-Pogacar. Eds. *Re-Entering the Sign: Articulating New Russian Culture.* Ann Arbor: University of Michigan Press, 1995. Print

Beumers, Birgit. Ed. *Russia on Reels: The Russian Idea in Post-Soviet Cinema*. New York: I. B. Tauris Publishers, 1999. Print

Beumers, Birgit. *Burnt by the Sun*. New York: I. B. Tauris, 2001. Print

Beumers, Birgit. "Cinemarket, or the Russian Film Industry in 'Mission Possible.'" *Europe-Asia Studies* 51.5 (1999): 871-96. Print

Beumers, Birgit. *Pop Culture Russia!: Media, Arts, and Lifestyle.* Santa Barbara: ABC-CLIO, 2005. Print

Boym, Svetlana. "Post-Soviet Cinematic Nostalgia: From 'Elite Cinema' to Soap Opera." *Discourse* 17.3 (1995): 75-84. Print

Броуде, Инна. *Такое вот кино.* Tenafly, NJ: Hermitage, 2001. Print

Clark, Katerina. *The Soviet Novel: History as Ritual*. Bloomington: Indiana UP, 2000. Print

Condee, Nancy. Ed. *Soviet Hieroglyphics: Visual Culture in Late Twentieth-Century Russia.* Bloomington: Indiana UP, 1995. Print

Faraday, George. *Revolt of the Filmmakers: The Struggle for Artistic Autonomy and the Fall of the Soviet Film Industry.* University Park: Penn State UP, 2000. Print

Freidin, Gregory. Ed. *Russian Culture in Transition*. Stanford: Stanford UP, 1993. Print

Gillespie, David. *Russian Cinema*. London: Longman, 2003. Print

Goscilo, Helena. *Dehexing Sex: Russian Womanhood During and After Glasnost.* Ann Arbor: University of Michigan Press, 1996. Print

Graham, Seth. "Chernukha and Russian Film." *Studies in Slavic Cultures* 1 (2000): 9-27. Print

Horton, Andrew and Michael Brashinsky. Eds. *Russian Critics on the Cinema of Glasnost.* New York: Cambridge UP, 1994. Print

Horton, Andrew and Michael Brashinsky. *The Zero Hour: Glasnost and Soviet Cinema in Transition*. Princeton: Princeton UP, 1992. Print

Kelly, Catriona and D. Shepherd. Eds. *Russian Cultural Studies: An Introduction.* New York: Oxford UP, 1998. Print

Кокарев, Игорь. *Российский кинематограф между прошлым и будущим*. Москва: Российский фонд культуры «Русская панорама», 2001. Print

Larsen, Susan. "National Identity, Cultural Authority, and the Post-Soviet Blockbuster: Nikita Mikhalkov and Aleksei Balabanov." *Slavic Review* 62.3 (2003): 491-511. Print

Lawton, Anna. *Imaging Russia 2000: Film and Facts*. Washington, DC: New Academia Publishing, 2004. Print

Lawton, Anna. *Kinoglasnost: Soviet Cinema in Our Time*. Cambridge: Cambridge UP, 1992. Print

Menashe, Louis. "Moscow Believes in Tears: The Problems (and Promise?) of Russian Cinema in the Transition Period." *Cineaste* 26.3 (2001): 10-17. Print

Shalin, Dmitri. *Russian Culture at the Crossroads: Paradoxes of Postcommunist Consciousness.* Boulder, CO: Westview Press, 1996. Print

Smith, Kathleen E. *Mythmaking in the New Russia: Politics and Memory during the Yeltsin Era.* Ithaca: Cornell UP, 2002. Print

Stites, Richard. *Russian Popular Culture: Entertainment and Society since 1900*. Cambridge: Cambridge UP, 1992. Print

Taylor, Richard and Derek Spring, Eds. *Stalinism and Soviet Cinema.* London: Routledge, 1993. Print

Date: January 24, 2013

To: UAA Curriculum Boards

From: Suzanne Forster, Chair, Associate of Arts Program

RE: Proposed Emphases in the Associate of Arts Degree Program

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The College of Arts and Sciences (CAS) proposes adding four divisional emphases to the Associate of Arts program: Fine Arts, Humanities, Natural Sciences, and Social Sciences. These emphases would be in geared to students academically unprepared for admittance into a baccalaureate degree program based on high school grades and/or placement testing in mathematics, reading, and composition. In addition to the existing General Studies AA, these emphases would provide students with additional pathways to succeed in the disciplinary area of their choice.

Although CAS awarded 129 AA degrees in 2011-2012 (256 MAU total), students typically see a baccalaureate degree as more prestigious than the AA, so they declare for a Bachelor of Arts or Bachelor of Sciences rather than the more accessible degree. They often do so even when planning to transfer well before completing the baccalaureate or when there is a likelihood that the baccalaureate is not achievable due to academic, job-related, family or other impediments. In some cases, baccalaureate students have taken the necessary coursework at UAA but leave without realizing they have done so, and so leave with no degree.

There are several reasons for developing emphases in the AA:

- Emphases focused on completing GERs for baccalaureate degrees will prepare students for further work at the baccalaureate level better than the existing General Program AA.
- For under-prepared students, the AA is more readily achievable than a BS or BA. Some of these students are overwhelmed by the number of baccalaureate degree requirements and fail to persist, or they lose direction when they fail to achieve a specific degree goal. These students might see the AA as more desirable if they saw it as a clear path leading toward their desired field.
- UAA's graduation rates will improve. UAA is one of the few universities with a community college function as part of its mission; most students spend one or more years at a community college before beginning a baccalaureate program. As a consequence of our combined mission, our graduation rate is one of the lowest in the nation. If underprepared students were to complete the AA prior to beginning the baccalaureate our graduation rates would increase as these students would enter a baccalaureate program only after completing the AA, significantly shortening (on paper) time to graduation for baccalaureate degrees.
- Students who would otherwise have declared for the BA/BS and leave UAA before degree completion would have a better chance of completing an AA degree. To make the AA more appealing to students, UAA could consider developing a pass-through mechanism from the AA to the BA/BS so students who have completed the appropriate emphasis are automatically allowed to progress into a baccalaureate degree program without having to pay a second fee, as UAS does now.

- Having an AA degree would make transferring easier. Articulated Transfer Programs have become increasingly popular in many states, often mandated by state legislators, to ensure that students can smoothly transition into state-funded universities from their community colleges or into specific degree programs. Such transfer agreements might be crafted with individual departments here at UAA.
- Advising would be easier. Having more focused AA degree emphases will "take out some of the hassle" for students deciding which courses to take (this was a concern of President Gamble to the Faculty Senate in September). According to Linda Morgan, the Director of the Advising and testing Center, the Associate of Arts is the "most valuable tool the institution has for low performing students."

Program/Prefix Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Program of Study or Prefix

1a. School or College	1b. Department
AS CAS	N/A

2. Complete Program Title/Prefix
Associate of Arts

3. Type of Program

Choose one from the appropriate drop down menu: Undergraduate: Associate of Arts or Graduate: CHOOSE ONE

This program is a Gainful Employment Program: ☐ Yes or ☒ No

4. Type of Action:

	PROGRAM	**PREFIX**
	☐ Add	☐ Add
	☒ Change	☐ Change
	☐ Delete	☐ Inactivate

5. Implementation Date (semester/year)
From: F/2013 To: 99/99

6a. Coordination with Affected Units Department, School, or College: CAS

Initiator Name (typed): Suzanne Forster Initiator Signed Initials: _____
Date:_____

6b. Coordination Email submitted to Faculty Listserv (uaa-faculty@lists.uaa.alaska.edu) Date: 1/25/13

6c. Coordination with Library Liaison Date: 1/25/13

7. Title and Program Description - Please attach the following:

☒ Cover Memo ☒ Catalog Copy in Word using the track changes function

8. Justification for Action
To expand AA students' program choices, improve retention, provide additional advising tools, and improve graduation rates.

Initiator (faculty only) Date
Suzanne Forster, Chair, AA Degree Program
Initiator (TYPE NAME)

☐ Approved ☐ Disapproved Department Chair Date

☐ Approved ☐ Disapproved College/School Curriculum Committee Chair Date

☐ Approved ☐ Disapproved Dean/Director of School/College Date

☐ Approved ☐ Disapproved Undergraduate/Graduate Academic Board Chair Date

☐ Approved ☐ Disapproved Provost or Designee Date

From Chapter 10 Page 80

Associate Degrees

The University of Alaska Anchorage offers two types of associate degrees, both of which require the completion of 60 credits or more:

- The Associate of Arts (AA) degree combines broad studies in written communication, oral communication, humanities, mathematics, natural sciences and social sciences, with elective coursework selected by the student. The degree provides broad exposure to systems of thought and inquiry, allows exploration of a variety of disciplines and learning experiences, and provides a solid foundation for further study at the baccalaureate level. The AA degree offers a General Studies emphasis and emphases in Fine Arts, Humanities, Natural Sciences, and Social Sciences. The AA degree is administered by the College of Arts and Sciences (CAS). The complete program description is found under the CAS section of this chapter.
- Associate of Applied Science (AAS) degrees provide applied or specialized studies that are used to satisfy a student's specific educational needs. Many AAS programs prepare students for work in a particular field of employment. Some AAS degrees are designed to provide a foundation for a specific related baccalaureate degree. Students in AAS degree programs build knowledge and skills needed to carry out specific tasks while they develop abilities in the essential elements of communications, computation and human relations.

From Chapter 10 Page 90

ASSOCIATE OF ARTS

The Associate of Arts (AA) degree provides a solid foundation in mathematics, written and oral communication, the natural and social sciences, the humanities, and fine arts. The AA degree prepares students for career advancement and baccalaureate programs and to better understand their world. The AA offers a General Studies emphasis and, for students planning to pursue a baccalaureate degree, emphases in Fine Arts, Humanities, Natural Sciences, and Social Sciences.

Student Learning Outcomes

Students graduating with an AA degree from UAA will be able to:

- Communicate effectively with diverse audiences (individual, group, or public) using a variety of verbal and nonverbal communication strategies;
- Respond effectively to writing assignments using appropriate genres and standard written English;
- Use library and electronic research responsibly and appropriately;
- Identify, describe, and evaluate the aesthetic, historical and philosophical aspects of material culture, including artistic expressions, language, and texts;
- Apply critical thinking skills to identify the premises and conclusions of arguments, evaluate their soundness, and recognize common fallacies;
- Use appropriate mathematical language and symbols to develop and communicate solutions and demonstrate quantitative and analytical skills and knowledge;
- Articulate the fundamentals, developments, and impacts of one or more scientific disciplines and develop and analyze evidence-based conclusions about the natural and social world.

Admission Requirements

Complete the Undergraduate Certificate and Associate Degree Program Admission Requirements located at the beginning of Chapter 7, Academic Standards and Regulations.

General University Requirements

Complete General University Requirements for the Associate of Arts located at the beginning of this chapter.

Degree Requirements

- This degree requires a minimum of 60 credits.
- Students must complete at least 15 credits in residence.
- Students must earn a cumulative GPA of at least a 2.00 at UAA.
- All courses must be at the 100 level or above.
- At least 20 credits of the required 60 credits must be at the 200 level or higher.

General Studies Emphasis

1. Oral Communication Skills* **3**

COMM A111 Fundamentals of Oral Communication (3)
COMM A235 Small Group Communication (3)
COMM A237 Interpersonal Communication (3)
COMM A241 Public Speaking (3)

**Note: At least 20 credits at the 200 level or above are required for the AA degree. Taking a 200-level Oral Communications*

course will enable students to complete that requirement more quickly.

2. Written Communication Skills **6**

ENGL A111 Methods of Written Communication (3)
and one of the following:
CIOS A260A* Business Communications (3)
ENGL A211 Academic Writing About Literature (3)
ENGL A212 Technical Writing (3)
ENGL A213 Writing in the Social and Natural Sciences (3)
ENGL A214 Persuasive Writing (3)

3. Humanities and Fine Arts **9**

Three courses from the GER Classification List.
At least one course each from the Humanities and Fine Arts areas.

4. Mathematical and Natural Sciences **9**

MATH A105* Intermediate Algebra (3)
or
One course from the Quantitative Skills area of the GER Classification List (3)
and
Two courses from the Natural Science area of the GER Classification List (6)**

5. Social Sciences **6**

Two courses (from two different disciplines) from the Social Sciences area of GER Classification List

6. Electives **27**

Total minimum credits **60**

** Note: CIOS A260A and MATH A105 do not meet the General Education Requirements for the baccalaureate degree.*

*** Note: Students who have taken two Natural Science courses as part of their AA program should be aware that a 1-credit science laboratory is required for the baccalaureate degree.*

Advising Note for AA Students Who Plan to Pursue a Baccalaureate Degree

AA students who plan to pursue a baccalaureate degree must take care in planning their curriculum. Students who know the program or major they are going to transfer into should consult the General Education Requirements for their specific program or major. Programs often require specific GER courses for their majors. The AA emphases in Fine Arts, Humanities, Natural Sciences, and Social Sciences are designed to prepare students to go on to baccalaureate work in related disciplines.

Fine Arts, Humanities, Natural Sciences and Social Sciences Emphases

1. Oral Communication Skills * **3**

COMM A111 Fundamentals of Oral Communication (3)
COMM A235 Small Group Communication (3)
COMM A237 Interpersonal Communication (3)
COMM A241 Public Speaking (3)

**Note: At least 20 credits at the 200 level or above are required for the AA degree. Taking a 200-level Oral Communications course will enable students to complete that requirement more quickly.*

2. Written Communication Skills **6**

ENGL A111 Methods of Written Communication (3)
and one of the following:
ENGL A211 Academic Writing about Literature (3)
ENGL A212 Technical Writing (3)
ENGL A213 Writing in the Social and Natural Sciences (3)
ENGL A214 Persuasive Writing (3)

3. Quantitative Skills **3-6**

MATH A105* Intermediate Algebra (3)
MATH A107 College Algebra (4)
MATH A108 Trigonometry (3)
MATH A109 Precalculus (6)
MATH A172 Applied Finite Mathematics (3)
STAT A252 Elementary Statistics (3)

**Note: MATH A105 does not satisfy the General Education Requirement in Quantitative Skills for a baccalaureate degree. MATH A107, A108 or A109 are recommended for students planning to pursue baccalaureate studies in the natural or social sciences.*

4. Fine Arts **3**

AKNS/
MUS A215* Music of Alaska Natives and Indigenous Peoples of Northern Regions (3)
ART A160 Art Appreciation (3)
ART A261 History of Western Art I (3)
ART A262 History of Western Art II (3)
DNCE A170 Dance Appreciation (3)
MUS A121 * Music Appreciation* (3)
MUS A124* History of Jazz (3)
MUS A221* History of Music I (3)
MUS A222* History of Music II (3)
THR A111 Introduction to the Theatre (3)

** Note: Students majoring in Music must select courses outside their major.*

Additional Requirements for Fine Arts Emphasis

5. Cultural Heritages and Social Sciences **15**

ANTH A250 The Rise of Civilization (3)
and the following:
HIST A101 Western Civilization I (3)
HIST A102 Western Civilization II (3)
and one of the following:
HIST A131 History of the United States I (3)
HIST A132 History of the United States II (3)
PS A101 Introduction to American Government (3)
and one of the following:
ECON A201 Principles of Macroeconomics (3)
JPC A101 Media and Society (3)
PS A102 Introduction to Political Science (3)
PSY A111 General Psychology (3)
SOC A101 Introduction to Sociology (3)
SWK A243 Cultural Diversity and Community Service Learning (3)

6. Languages/Humanities **6-8**

Complete any two-semester sequence in one of the following humanities sequences or in a language other than English (with same letter suffix):
ART A261 History of Western Art I (3)
ART A262 History of Western Art II (3)
ENGL A201 Masterpieces of World Literature I (3)
ENGL A202 Masterpieces of World Literature II (3)
MUS A221* History of Music I (3)
MUS A222* History of Music II (3)
PHIL A211 History of Philosophy I (3)
PHIL A212 History of Philosophy II (3)
** Note: Students majoring in Music must select courses outside their major.*

7. Natural Sciences **7**

Complete two courses from the Natural Sciences area of the GER Classification List, including a laboratory course.

8. Ways of Knowing **3**

ENGL A120 Critical Thinking (3)
PHIL A101 Introduction to Logic (3)
PHIL A201 Introduction to Philosophy (3)

9. An additional 9-14 credits from courses other than those used for degree requirements above. A minimum of 20 credits at the 200 level or above are required for the degree. Recommendations include any of the Fine Arts courses listed above as well as: **9-14**
ART A105 Beginning Drawing (3)
ART A111 Two-Dimensional Design (3)
ART A113 Three-Dimensional Design (3)
ART A203 Introduction to Art Education (3)
ART A204 History and Philosophy of Art Education (3)
ART A205 Intermediate Drawing (3)
DNCE A262 Theory and Improvisation (2)
MUS A111* Fundamentals of Music (3)
MUS A131* Music Theory I (3)
MUS A132* Music Theory II (3)
MUS A133* Aural Skills I (2)
MUS A134 * Aural Skills II (2)
MUS A154D* Functional Piano IV (1)
MUS A161, A162, A261, A262 Private Lessons* (4)
MUS A231* Music Theory III (3)
MUS A232* Music Theory IV (3)
MUS A233* Aural Skills III (2)
MUS A234* Aural Skills IV (2)
MUS A280* Basic Conducting (2)
THR A121 Introduction to Acting (3)
THR A131 Theatrical Production Techniques (3)
THR A141 Stagecraft I (3)
THR A221 Movement for the Actor (3)
THR A222 Voice for the Actor (3)
THR A243 Scene Design (3)
THR A257 Costume design and Construction I (3)
THR A295 Theatre Practicum: Technical (1-3)
Or other courses, with department approval, from the following disciplines: Art, Dance, Music, Theatre.
** Note: Students majoring in Music must select courses outside their major.*

Total minimum credits **60**

Additional Requirements for Humanities Emphasis

5. Cultural Heritages and Social Sciences **15**

ANTH A250 The Rise of Civilization (3)
and the following:
HIST A101 Western Civilization I (3)
HIST A102 Western Civilization II (3)
and one of the following:
HIST A131 History of the United States I (3)
HIST A132 History of the United States II (3)
PS A101 Introduction to American Government (3)
and one of the following:
ECON A201 Principles of Macroeconomics (3)
JPC A101 Media and Society (3)
PS A102 Introduction to Political Science (3)
PSY A111 General Psychology (3)
SOC A101 Introduction to Sociology (3)
SWK A243 Cultural Diversity and Community Service Learning (3)

6. Languages/Humanities **6-8**

Complete any two-semester sequence in one of the following humanities sequences or in a language other than English (with same letter suffix):

ART A261	History of Western Art I (3)
ART A262	History of Western Art II (3)
ENGL A201	Masterpieces of World Literature I (3)
ENGL A202	Masterpieces of World Literature II (3)
MUS A221*	History of Music I (3)
MUS A222*	History of Music II (3)
PHIL A211	History of Philosophy I (3)
PHIL A212	History of Philosophy II (3)

** Note: Students majoring in Music must select courses outside their major*

7. Natural Sciences **7**

Complete two courses from the Natural Sciences area of the GER Classification List, including a laboratory course.

8. Ways of Knowing **3**

ENGL A120	Critical Thinking (3)
PHIL A101	Introduction to Logic (3)
PHIL A201	Introduction to Philosophy (3)

9. An additional 9-14 credits from courses other than those used for degree requirements above. A minimum of 20 credits at the 200 level or above are required for the degree. Recommendations include courses, with department approval, from the following disciplines: Alaska Native Studies, American Sign Language, Chinese, Communication, Creative Writing and Literary Arts, English, French, German, History, International Studies, Japanese, Journalism and Public Communications, Linguistics, Philosophy, Russian, Spanish. **15-20**

Total minimum credits: **60**

Additional Requirements for Natural Science Emphasis

5. Computer Science **3**

CS A109	Computer Programming (Languages Vary) (3)
CS A110	Java Programming (3)
CS A111	Visual Basic .NET Programming (3)

6. Languages/Humanities **6-8**

Complete any two-semester sequence in French, German, Japanese, Russian, or Spanish, or one of the following humanities sequences not used to satisfy the Fine Arts requirement:

ART A261	History of Western Art I (3)
ART A262	History of Western Art II (3)
ENGL A201	Masterpieces of World Literature I (3)
ENGL A202	Masterpieces of World Literature II (3)
MUS A221*	History of Music I (3)
MUS A222*	History of Music II (3)
PHIL A211	History of Philosophy I (3)
PHIL A212	History of Philosophy II (3)

** Note: Students majoring in Music must select courses outside their major.*

7. Social Sciences **6**

ANTH A202	Cultural Anthropology (3)
ANTH A205	Biological Anthropology (3)
ANTH A211	Fundamentals of Archaeology (3)
ANTH A250	The Rise of Civilization (3)
ENVI A212	Living on Earth: People and the Environment (3)
GEOG/ INTL A101	Local Places/Global Regions: An Introduction to Geography (3)
JUST/ SOC A251	Crime and Delinquency (3)
PS A101	Introduction to American Government (3)
PS A102	Introduction to Political Science (3)
PSY A111	General Psychology (3)
PSY A260/L	Statistics for Psychology (4)
SOC A101	Introduction to Sociology (3)

8. Natural Sciences* **25-30**

Complete 25-30 credits from courses other than those used for degree requirements above. A minimum of 20 credits at the 200 level or above are required for the degree. Recommended courses include:

BIOL A242	Fundamentals of Cell Biology (4)
BIOLA252	Principles of Genetics (4)
BIOL A271	Principles of Ecology (4)
CHEM A253	Principles of Inorganic Chemistry (3)
ENVI A211/L	Environmental Science: Systems and Processes (4)

Other courses, with department approval, from the following disciplines: Astronomy, Biology, Chemistry, Environmental Studies, Geography, Geology, Liberal Studies Integrated Sciences, Physics.

** Note: Students majoring in Biological Science , Geology, or Natural Sciences must take CHEM A105/L, CHEM A106/L, PHYS A123/L, and PHYS A124/L. Therefore, it is highly advisable that students consider taking these courses. In addition to those aforementioned courses, all Biological Science majors must also take BIOL A115 and BIOL A116 and all Geological Science majors must take GEOL A111 and GEOL A221 prior to advancing on to higher level courses.*

Total minimum credits: **60**

Additional Requirements for Social Science Emphasis

5. Language/Humanities 6-8

Complete any two-semester sequence in French, German, Japanese, Russian, or Spanish, or one of the following Humanities sequences not used to satisfy the Fine Arts requirement:

ART A261	History of Western Art I (3)
ART A262	History of Western Art II (3)
ENGL A201	Masterpieces of World Literature I (3)
ENGL A202	Masterpieces of World Literature II (3)
MUS A221*	History of Music I (3)
MUS A222*	History of Music II (3)
PHIL A211	History of Philosophy I (3)
PHIL A212	History of Philosophy II (3)

** Note: Students majoring in Music must select courses outside their major.*

6. Computer Science/Cultural Heritages 3

Students planning to go on for a BS should take one of the following Computer Science courses (3):

CS A109	Computer Programming (Languages Vary) (3)
CS A110	Java Programming (3)
CS A111	Visual Basic .NET Programming (3)

Students planning to go on for a BA should take one of the Cultural Heritages courses* (3):

ANTH A250	The Rise of Civilization (3)
HIST A101	Western Civilization I (3)
HIST A102	Western Civilization II (3)
HIST A131	History of the United States I (3)
HIST A132	History of the United States II (3)
PS A101	Introduction to American Government (3)

**Note: At least 20 credits at the 200-level or above are required for the AA degree. Taking a 200-level Cultural Heritages course will enable students to complete that requirement more quickly*

7. Natural Sciences 7

Complete two courses (including a lab) from the following list:

ASTR A103/L	Solar System Astronomy (3)
ASTR A104/L	Solar system Astronomy Lab (1)
BIOL A102	Introductory Biology (3)
BIOL A103	Introductory Biology Laboratory (1)
BIOL A111	Human Anatomy and Physiology I (4)
BIOL A112	Human Anatomy and Physiology II (4)
BIOL A115	Fundamentals of Biology I (4)
BIOL A116	Fundamentals of Biology II (4)
CHEM A103/L	Survey of Chemistry (4)
CHEM A104/L	Introduction to Organic Chemistry and Biochemistry (4)
CHEM A105/L	General Chemistry I (4)
CHEM A106/L	General Chemistry II (4)
ENVI A211/L	Environmental Science: Systems and Processes (4)
GEOG A111	Earth Systems: Elements of Physical Geography (3)
GEOL A111	Physical Geology (4)
GEOL A115/L	Environmental Geology (4)
GEOL A221	Historical Geology (4)
PHYS A123/L	Basic Physics I (4)
PHYS A124/L	Basic Physics II (4)

8. Social Sciences 24-29

Complete 24-29 credits from courses other than those used for other degree requirements above. A minimum of 20 credits at the 200 level and above are required for the degree.

Recommended courses include:

ANTH A202	Cultural Anthropology (3)
ANTH A205	Biological Anthropology (3)
ANTH A211	Fundamentals of Archaeology (3)
ENVI A212	Living on Earth: People and the Environment (3)
GEOG / INTL A101	Local Places/Global Regions: An Introduction to Geography (3)
JUST/ SOC A251	Crime and Delinquency (3)
PS A102	Introduction to Political Science (3)
PSY A111	General Psychology (3)
PSY A260/L	Statistics for Psychology (4)
SOC A101	Introduction to Sociology (3)

Other courses, with department approval, from the following disciplines: Anthropology, Environmental Sciences, Geography, Political Science, Psychology, Sociology.

Total minimum credits: 60

From Chapter 10 Page 80

Associate Degrees

The University of Alaska Anchorage offers two types of associate degrees, both of which require the completion of 60 credits or more:

- The Associate of Arts (AA) degree combines broad studies in written communication, oral communication, humanities, mathematics, natural sciences and social sciences, with elective coursework selected by the student. The degree provides broad exposure to systems of thought and inquiry, allows exploration of a variety of disciplines and learning experiences, and provides a solid foundation for further study at the baccalaureate level. The AA degree offers a General Studies emphasis and emphases in Fine Arts, Humanities, Natural Sciences, and Social Sciences. The AA degree is administered by the College of Arts and Sciences (CAS). The complete program description is found under the CAS section of this chapter.
- Associate of Applied Science (AAS) degrees provide applied or specialized studies that are used to satisfy a student's specific educational needs. Many AAS programs prepare students for work in a particular field of employment. Some AAS degrees are designed to provide a foundation for a specific related baccalaureate degree. Students in AAS degree programs build knowledge and skills needed to carry out specific tasks while they develop abilities in the essential elements of communications, computation and human relations.

From Chapter 10 Page 90

ASSOCIATE OF ARTS

The Associate of Arts (AA) degree provides a solid foundation in mathematics, ~~and~~ written and oral communication, the natural and social sciences, the humanities, and fine arts. The AA degree prepares students for career advancement and baccalaureate programs and to better understand their world. The AA offers a General Studies emphasis and, for students planning to pursue a baccalaureate degree, emphases in Fine Arts, Humanities, Natural Sciences, and Social Sciences.

Student Learning Outcomes

Students graduating with an AA degree from UAA will be able to:

- Communicate effectively with diverse audiences (individual, group, or public) using a variety of verbal and nonverbal communication strategies;
- Respond effectively to writing assignments using appropriate genres and standard written English;
- Use library and electronic research responsibly and appropriately;
- Identify, describe, and evaluate the aesthetic, historical and philosophical aspects of material culture, including artistic expressions, language, and texts;
- Apply critical thinking skills to identify the premises and conclusions of arguments, evaluate their soundness, and recognize common fallacies;
- Use appropriate mathematical language and symbols to develop and communicate solutions and demonstrate quantitative and analytical skills and knowledge;
- Articulate the fundamentals, developments, and impacts of one or more scientific disciplines and develop and analyze evidence-based conclusions about the natural and social world.

Admission Requirements

Complete the Undergraduate Certificate and Associate Degree Program Admission Requirements located at the beginning of Chapter 7, Academic Standards and Regulations.

General University Requirements

Complete General University Requirements for the Associate of Arts located at the beginning of this chapter.

Degree Requirements

~~All courses must be at the 100 level or above. At least 20 credits of the required 60 credits must be at the 200 level. Students intending to complete the AA degree and then continue on to a baccalaureate degree should consult the Advising Note for AA Students Who Plan to Pursue a Baccalaureate Degree below.~~

- This degree requires a minimum of 60 credits.
- Students must complete at least 15 credits in residence.
- Students must earn a cumulative GPA of at least a 2.00 at UAA.
- All courses must be at the 100 level or above.
- At least 20 credits of the required 60 credits must be at the 200 level or higher.

General Studies Emphasis

Course Requirements

1. Oral Communication Skills*		**3**
COMM A111	Fundamentals of Oral Communication (3)	
COMM A235	Small Group Communication (3)	
COMM A237	Interpersonal Communication (3)	
COMM A241	Public Speaking (3)	
**Note: At least 20 credits at the 200 level or above are required for the AA degree. Taking a 200-level Oral Communications course will enable students to complete that requirement more quickly.*		
2. Written Communication Skills		**6**
ENGL A111	Methods of Written Communication (3)	
	and one of the following:	
CIOS A260A*	Business Communications (3)*	
ENGL A211	Academic Writing About Literature (3)	
ENGL A212	Technical Writing (3)	
ENGL A213	Writing in the Social and Natural Sciences (3)	
ENGL A214	Persuasive Writing (3)	
3. Humanities and Fine Arts		**9**
Three courses from the GER Classification List. At least one course each from the Humanities and Fine Arts areas.		
4. Mathematical and Natural Sciences		**9**
MATH A105*	Intermediate Algebra (3)*	
	or	
~~one~~ One	course from the Quantitative Skills area of the GER Classification List (3)	
	and	
Two ~~Natural Science~~	courses from the Natural Science area of the GER Classification List ~~(3+3)~~ (6)**	
5. Social Sciences		**6**
Two ~~Social Sciences~~	courses (from two different disciplines) from the Social Sciences area of GER Classification List	
~~**Degree Completion Requirements**~~		
6. Electives		**27**
Total minimum credits		**60**

* ~~*Please note*~~*Note: CIOS A260A and MATH A105 do not meet the General Education Requirements for the baccalaureate degree.*

*** Note: Students who have taken two Natural Science courses as part of their AA program should be aware that a 1-credit science laboratory is required for the baccalaureate degree.*

Advising Note for AA Students Who Plan to Pursue a Baccalaureate Degree

AA students who plan to pursue a baccalaureate degree must take care in planning their curriculum~~. Please see an advisor and take note of the following:~~ Students who know the program or major they are going to transfer into should consult the General education Requirements for their specific program or major. Programs often require specific GER courses for their majors. The AA Emphases in Fine Arts, Humanities, Natural Sciences, and Social Sciences are designed to prepare students to go on to a baccalaureate work in related disciplines.

- ~~UAA baccalaureate students are required to complete 12 credits of basic college-level skills from the Oral Communication (3), Written Communication (6), and Quantitative Skills (3) areas of the General Education Classification List prior to completing 60 total degree-applicable credits.~~
- ~~Students with 60 credits or more who have not completed the baccalaureate 12-credit, basic college-level skills requirement will have one full academic year to fulfill this requirement, after which they will not be allowed to take additional courses as degree-seeking students. MATH A105 and CIOS A260A do not count toward completing the baccalaureate GER requirements.~~
- ~~Students who have taken two Natural Science courses as part of their AA program should be aware that a 1-credit science laboratory is required for the baccalaureate degree.~~
- ~~Students who plan to apply AA credits to a UAA baccalaureate degree, and who know the program or major they are going to transfer into, should consult the General Education Requirements for their specific program or major. Programs often require specific GER courses for their majors. Students planning to transfer should use AA electives to fulfill prerequisites and requirements for their anticipated major.~~
- ~~Students who plan to apply AA credits to a UAA baccalaureate degree, and who do not know which program or major they wish to pursue, should plan as follows:~~

Fine Arts, Humanities, Natural Sciences and Social Sciences Emphases

1. Oral Communication Skills *		**3**
COMM A111	Fundamentals of Oral Communication (3)	
COMM A235	Small Group Communication (3)	
COMM A237	Interpersonal Communication (3)	
COMM A241	Public Speaking (3)	
**Note: At least 20 credits at the 200 level or above are required*		

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for the AA degree. Taking a 200-level Oral Communications course will enable students to complete that requirement more quickly.

2. Written Communication Skills **6**

ENGL A111 Methods of Written Communication (3)

and one of the following:

ENGL A211 Academic Writing about Literature (3)
ENGL A212 Technical Writing (3)
ENGL A213 Writing in the Social and Natural Sciences (3)
ENGL A214 Persuasive Writing (3)

3. Quantitative Skills **3-6**

MATH A105* Intermediate Algebra (3)
MATH A107 College Algebra (4)
MATH A108 Trigonometry (3)
MATH A109 Precalculus (6)
MATH A172 Applied Finite Mathematics (3)
STAT A252 Elementary Statistics (3)

**Note: MATH A105 does not satisfy the General Education Requirement in Quantitative Skills for a baccalaureate degree. MATH A107, A108 and A109 are recommended for students planning to pursue baccalaureate studies in the natural or social sciences.*

4. Fine Arts **3**

AKNS/
MUS A215* Music of Alaska Natives and Indigenous Peoples of Northern Regions (3)
ART A160 Art Appreciation (3)
ART A261 History of Western Art I (3)
ART A262 History of Western Art II (3)
DNCE A170 Dance Appreciation (3)
MUS A121 * Music Appreciation* (3)
MUS A124* History of Jazz (3)
MUS A221* History of Music I (3)
MUS A222* History of Music II (3)
THR A111 Introduction to the Theatre (3)

** Note: Students majoring in Music must select courses outside their major.*

Additional Requirements for Fine Arts Emphasis

5. Cultural Heritages and Social Sciences **15**

ANTH A250 The Rise of Civilization (3)

and the following:

HIST A101 Western Civilization I (3)
HIST A102 Western Civilization II (3)

and one of the following:

HIST A131 History of the United States I (3)
HIST A132 History of the United States II (3)
PS A101 Introduction to American Government (3)

and one of the following:

ECON A201 Principles of Macroeconomics (3)
JPC A101 Media and Society (3)
PS A102 Introduction to Political Science (3)
PSY A111 General Psychology (3)
SOC A101 Introduction to Sociology (3)
SWK A243 Cultural Diversity and Community Service Learning (3)

6. Languages/Humanities **6-8**

Complete any two-semester sequence in one of the following humanities sequences or in a language other than English (with same letter suffix):

ART A261 History of Western Art I (3)
ART A262 History of Western Art II (3)
ENGL A201 Masterpieces of World Literature I (3)
ENGL A202 Masterpieces of World Literature II (3)
MUS A221* History of Music I (3)
MUS A222* History of Music II (3)
PHIL A211 History of Philosophy I (3)
PHIL A212 History of Philosophy II (3)

** Note: Students majoring in Music must select courses outside their major.*

7. Natural Sciences **7**

Complete two courses from the Natural Sciences area of the GER Classification List, including a laboratory course.

8. Ways of Knowing **3**

ENGL A120 Critical Thinking (3)
PHIL A101 Introduction to Logic (3)
PHIL A201 Introduction to Philosophy (3)

9. An additional 9-14 credits from courses other than those used for degree requirements above. A minimum of 20 credits at the 200 level or above are required for the degree. Recommendations include any of the Fine Arts courses listed above as well as: **9-14**

ART A105 Beginning Drawing (3)
ART A111 Two-Dimensional Design (3)
ART A113 Three-Dimensional Design (3)
ART A203 Introduction to Art Education (3)
ART A204 History and Philosophy of Art Education (3)
ART A205 Intermediate Drawing (3)
DNCE A262 Theory and Improvisation (2)
MUS A111* Fundamentals of Music (3)
MUS A131* Music Theory I (3)
MUS A132* Music Theory II (3)
MUS A133* Aural Skills I (2)
MUS A134 * Aural Skills II (2)
MUS A154D* Functional Piano IV (1)

MUS A161, A162, A261, A262 Private Lessons* (4)
MUS A231* Music Theory III (3)
MUS A232* Music Theory IV (3)
MUS A233* Aural Skills III (2)
MUS A234* Aural Skills IV (2)
MUS A280* Basic Conducting (2)
THR A121 Introduction to Acting (3)
THR A131 Theatrical Production Techniques (3)
THR A141 Stagecraft I (3)
THR A221 Movement for the Actor (3)
THR A222 Voice for the Actor (3)
THR A243 Scene Design (3)
THR A257 Costume design and Construction I (3)
THR A295 Theatre Practicum: Technical (1-3)
Or other courses, with department approval, from the following disciplines: Art, Dance, Music, Theatre.
** Note: Students majoring in Music must select courses outside their major.*

Total minimum credits 60

Additional Requirements for Humanities Emphasis

5. Cultural Heritages and Social Sciences 15

ANTH A250 The Rise of Civilization (3)
and the following:
HIST A101 Western Civilization I (3)
HIST A102 Western Civilization II (3)
and one of the following:
HIST A131 History of the United States I (3)
HIST A132 History of the United States II (3)
PS A101 Introduction to American Government (3)
and one of the following:
ECON A201 Principles of Macroeconomics (3)
JPC A101 Media and Society (3)
PS A102 Introduction to Political Science (3)
PSY A111 General Psychology (3)
SOC A101 Introduction to Sociology (3)
SWK A243 Cultural Diversity and Community Service Learning (3)

6. Languages/Humanities 6-8

Complete any two-semester sequence in one of the following humanities sequences or in a language other than English (with same letter suffix):
ART A261 History of Western Art I (3)
ART A262 History of Western Art II (3)
ENGL A201 Masterpieces of World Literature I (3)
ENGL A202 Masterpieces of World Literature II (3)
MUS A221* History of Music I (3)
MUS A222* History of Music II (3)
PHIL A211 History of Philosophy I (3)
PHIL A212 History of Philosophy II (3)
** Note: Students majoring in Music must select courses outside their major*

7. Natural Sciences 7

Complete two courses from the Natural Sciences area of the GER Classification List, including a laboratory course.

8. Ways of Knowing 3

ENGL A120 Critical Thinking (3)
PHIL A101 Introduction to Logic (3)
PHIL A201 Introduction to Philosophy (3)

9. An additional 9-14 credits from courses other than those used for degree requirements above. A minimum of 20 credits at the 200 level or above are required for the degree. Recommendations include courses, with department approval, from the following disciplines: Alaska Native Studies, American Sign Language, Chinese, Communication, Creative Writing and Literary Arts, English, French, German, History, International Studies, Japanese, Journalism and Public Communications, Linguistics, Philosophy, Russian, Spanish. **15-20**

Total minimum credits: 60

Additional Requirements for Natural Science Emphasis

5. Computer Science 3

CS A109 Computer Programming (Languages Vary) (3)
CS A110 Java Programming (3)
CS A111 Visual Basic .NET Programming (3)

6. Languages/Humanities 6-8

Complete any two-semester sequence in French, German, Japanese, Russian, or Spanish, or one of the following humanities sequences not used to satisfy the Fine Arts requirement:
ART A261 History of Western Art I (3)
ART A262 History of Western Art II (3)
ENGL A201 Masterpieces of World Literature I (3)
ENGL A202 Masterpieces of World Literature II (3)
MUS A221* History of Music I (3)
MUS A222* History of Music II (3)
PHIL A211 History of Philosophy I (3)
PHIL A212 History of Philosophy II (3)
** Note: Students majoring in Music must select courses outside their major.*

7. Social Sciences 6

ANTH A202 Cultural Anthropology (3)
ANTH A205 Biological Anthropology (3)
ANTH A211 Fundamentals of Archaeology (3)

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ANTH A250 The Rise of Civilization (3)
ENVI A212 Living on Earth: People and the Environment (3)
GEOG/
INTL A101 Local Places/Global Regions: An Introduction to Geography (3)
JUST/
SOC A251 Crime and Delinquency (3)
PS A101 Introduction to American Government (3)
PS A102 Introduction to Political Science (3)
PSY A111 General Psychology (3)
PSY A260/L Statistics for Psychology (4)
SOC A101 Introduction to Sociology (3)

8. Natural Sciences* 25-30

Complete 25-30 credits from courses other than those used for degree requirements above. A minimum of 20 credits at the 200 level or above are required for the degree. Recommended courses include:

BIOL A242 Fundamentals of Cell Biology (4)
BIOLA252 Principles of Genetics (4)
BIOL A271 Principles of Ecology (4)
CHEM A253 Principles of Inorganic Chemistry (3)
ENVI A211/L Environmental Science: Systems and Processes (4)

Other courses, with department approval, from the following disciplines: Astronomy, Biology, Chemistry, Environmental Studies, Geography, Geology, Liberal Studies Integrated Sciences, Physics.

** Note: Students majoring in Biological Science , Geology, or Natural Sciences must take CHEM A105/L, CHEM A106/L, PHYS A123/L, and PHYS A124/L. Therefore, it is highly advisable that students consider taking these courses. In addition to those aforementioned courses, all Biological Science majors must also take BIOL A115 and BIOL A116 and all Geological Science majors must take GEOL A111 and GEOL A221 prior to advancing on to higher level courses.*

Total minimum credits: 60

Additional Requirements for Social Science Emphasis

5. Language/Humanities 6-8

Complete any two-semester sequence in French, German, Japanese, Russian, or Spanish, or one of the following Humanities sequences not used to satisfy the Fine Arts requirement:

ART A261 History of Western Art I (3)
ART A262 History of Western Art II (3)
ENGL A201 Masterpieces of World Literature I (3)
ENGL A202 Masterpieces of World Literature II (3)
MUS A221* History of Music I (3)
MUS A222* History of Music II (3)
PHIL A211 History of Philosophy I (3)
PHIL A212 History of Philosophy II (3)

** Note: Students majoring in Music must select courses outside their major.*

6. Computer Science/Cultural Heritages 3

Students planning to go on for a BS should take one of the following Computer Science courses (3):

CS A109 Computer Programming (Languages Vary) (3)
CS A110 Java Programming (3)
CS A111 Visual Basic .NET Programming (3)

Students planning to go on for a BA should take one of the Cultural Heritages courses* (3):

ANTH A250 The Rise of Civilization (3)
HIST A101 Western Civilization I (3)
HIST A102 Western Civilization II (3)
HIST A131 History of the United States I (3)
HIST A132 History of the United States II (3)
PS A101 Introduction to American Government (3)

**Note: At least 20 credits at the 200-level or above are required for the AA degree. Taking a 200-level Cultural Heritages course will enable students to complete that requirement more quickly*

7. Natural Sciences 7

Complete two courses (including a lab) from the following list:

ASTR A103/L Solar System Astronomy (3)
ASTR A104/L Solar system Astronomy Lab (1)
BIOL A102 Introductory Biology (3)
BIOL A103 Introductory Biology Laboratory (1)
BIOL A111 Human Anatomy and Physiology I (4)
BIOL A112 Human Anatomy and Physiology II (4)
BIOL A115 Fundamentals of Biology I (4)
BIOL A116 Fundamentals of Biology II (4)
CHEM A103/L Survey of Chemistry (4)
CHEM A104/L Introduction to Organic Chemistry and Biochemistry (4)
CHEM A105/L General Chemistry I (4)
CHEM A106/L General Chemistry II (4)
ENVI A211/L Environmental Science: Systems and Processes (4)
GEOG A111 Earth Systems: Elements of Physical Geography (3)
GEOL A111 Physical Geology (4)
GEOL A115/L Environmental Geology (4)
GEOL A221 Historical Geology (4)
PHYS A123/L Basic Physics I (4)
PHYS A124/L Basic Physics II (4)

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8. Social Sciences 24-29

Complete 24-29 credits from courses other than those used for other degree requirements above. A minimum of 20 credits at the 200 level and above are required for the degree.

Recommended courses include:

ANTH A202	Cultural Anthropology (3)
ANTH A205	Biological Anthropology (3)
ANTH A211	Fundamentals of Archaeology (3)
ENVI A212	Living on Earth: People and the Environment (3)
GEOG / INTL A101	Local Places/Global Regions: An Introduction to Geography (3)
JUST/ SOC A251	Crime and Delinquency (3)
PS A102	Introduction to Political Science (3)
PSY A111	General Psychology (3)
PSY A260/L	Statistics for Psychology (4)
SOC A101	Introduction to Sociology (3)

Other courses, with department approval, from the following disciplines: Anthropology, Environmental Sciences, Geography, Political Science, Psychology, Sociology.

Total minimum credits: 60

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12/12/12
Memo regarding: Computer Science and Computer Systems Engineering Curriculum
From: Kenrick Mock, Chair, Dept. of Computer Science & Engineering

Curriculum Committees:

Effective July 1, 2012 the primary faculty supporting the Computer Science program and the Computer Systems Engineering program merged into a single department in the School of Engineering, the Department of Computer Science & Engineering. As a result of the merger we have modified the curriculum in the following ways:

1. Merged courses from separate programs with similar coverage into single courses supporting both programs.
2. Updated curriculum so students learn both Java and C++ early in the curriculum so they can more easily take upper division courses that were previously designated CSE (requiring C++) or upper division courses previously designated CS (requiring Java).
3. Updated the curriculum and existing courses to better meet industry, ABET, and student outcomes while helping students to more easily graduate.
4. Added new courses reflecting faculty expertise, industry and student demand, and trends in the discipline.
5. Stacked courses with graduate electives in advance of a proposed MS degree in computing.

We have designed the curriculum with a new prefix, CSCE, that is common to all courses required for the CS or CSE degrees. The new prefix reinforces to both CS and CSE students that they will be able to and should consider taking courses that were once labeled CS or CSE. CS and CSE support courses have been left with the CS and CSE prefixes so other programs do not need to change their program descriptions or websites.

We have analyzed the new curriculum and have a plan to offer a majority of required core lower division courses every semester and upper division core courses at least once a year. Electives are offered yearly or once every other year.

The largest individual course change is to move the first two introductory programming courses to 4 credit courses from 3 credits. The change to 4 credits allows us to add a one credit laboratory component. The lecture portion will become larger than current sections but we believe the addition of the hands-on lab component with the ability for an instructor to interact 1:1 with a student and their code will ultimately increase student success and retention.

Sincerely,

Kenrick Mock

2/14/13
Memo regarding: Computer Science and Computer Systems Engineering Curriculum
From: Kenrick Mock, Chair, Dept. of Computer Science & Engineering

Members of the UAB:

We respectfully request that the board consider waiving the first reading of the CSCE courses at the 2/22/13 meeting. If the courses are approved this will allow them to be offered in fall 2013. It is our understanding that the faculty senate meeting on 3/1/13 is the final opportunity to have courses approved in time for the fall semester student enrollment which typically begins at the end of March.

Sincerely,

Kenrick Mock

Program/Prefix Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Program of Study or Prefix

1a. School or College	1b. Department
EN SOENGR	Computer Science & Engineering

2. Complete Program Title/Prefix
CSCE / Bachelor of Arts and Bachelor of Science, Computer Science; Bachelor of Science in Engineering, Computer Systems Engineering

3. Type of Program

Choose one from the appropriate drop down menu: Undergraduate: or Graduate:
Other: specify type in box 2 CHOOSE ONE

This program is a Gainful Employment Program: ☐ Yes or ☒ No

4. Type of Action:

PROGRAM	**PREFIX**
☐ Add	☒ Add
☐ Change	☐ Change
☐ Delete	☐ Inactivate

5. Implementation Date (semester/year)
From: Fall/2013 To: 99/9999

6a. Coordination with Affected Units Department, School, or College: SOE

Initiator Name (typed): Kenrick Mock Initiator Signed Initials: _____
Date:_____

6b. Coordination Email submitted to Faculty Listserv (uaa-faculty@lists.uaa.alaska.edu) Date: 12-10-12

6c. Coordination with Library Liaison Date: 12-10-12

7. Title and Program Description - Please attach the following:

☒ Cover Memo ☐ Catalog Copy in Word using the track changes function

8. Justification for Action
New prefix of CSCE requested for core courses in the CS and CSE degree programs.

Initiator (faculty only) Date
Kenrick Mock
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved
Department Chair Date

☐ Approved
☐ Disapproved
College/School Curriculum Committee Chair Date

☐ Approved
☐ Disapproved
Dean/Director of School/College Date

☐ Approved
☐ Disapproved
Undergraduate/Graduate Academic Board Chair Date

☐ Approved
☐ Disapproved
Provost or Designee Date

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science and Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A320	CSE A335	3	(3+0)

6. Complete Course Title
Operating Systems

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☒ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☒ Other Course Content Guide (please specify)
- ☒ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☐ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status No # of Repeats n/a Max Credits n/a

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1. BA Computer Science (required)	241	12/1/12	Kenrick Mock
2. BSE Computer Science (required)	242	12/1/12	Kenrick Mock
3. CSE A465, Network Security	382	12/1/12	Kenrick Mock

Initiator Name (typed): Sam Siewert Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 12/10/2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12/10/2012

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
An introductory course on operating systems. Topics covered include all aspects of resource management and abstraction required to support application programs including: basic security, processes and threads, processor scheduling, synchronization, memory management, virtual memory, virtual machines, device drivers and Input/Output (I/O), and file systems.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
CSCE A311 with minimum grade of C.	n/a	n/a

16d. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
n/a

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide.

Initiator (faculty only) Date
Sam Siewert
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved
Department Chairperson Date

☐ Approved
☐ Disapproved
Curriculum Committee Chairperson Date

☐ Approved
☐ Disapproved
Dean/Director of School/College Date

☐ Approved
☐ Disapproved
Undergraduate/Graduate Academic Board Chairperson Date

☐ Approved
☐ Disapproved
Provost or Designee Date

UNIVERSITY OF ALASKA ANCHORAGE
COURSE CONTENT GUIDE

I. Initiation Date: December 2012

II. Course Information

A.	College/School:	School of Engineering
B.	Course Title:	Operating Systems
C.	Course Subject/Number:	CSCE A320
D.	Credit Hours:	3.0 Credits
E.	Contact Time:	3+0 Contact Time
F.	Grading Information:	A-F
G.	Course Description:	An introductory course on operating systems. Topics covered include all aspects of resource management and abstraction required to support application programs including: basic security, processes and threads, processor scheduling, synchronization, memory management, virtual memory, virtual machines, device drivers and Input/Output (I/O), and file systems.
H.	Fees:	Yes, standard SOE fee
I.	Course Prerequisites:	CSCE A311 with minimum grade of C.
J.	Registration Restrictions:	None

III. Evaluation

Grades are based on exams, class assignments, and programming projects.

IV. Course Level Justification

This course is fundamental to computer systems to bridge application programming and the hardware interface, providing abstraction of hardware, usage policies, and general resource management, protection, and security of systems. The course builds upon data structures and algorithms presented in CSCE A311 and provides the systems foundation for senior level courses.

V. Outline

A. Lecture
1. Operating System (OS) Concepts and Requirements
    a. Brief history
    b. Purpose
    c. Future challenges
2. Overview Exploration of OS Abstractions
    a. Quick hardware review
    b. Major abstractions – processes/threads, files, device drivers, protection domains, shells, Graphical User Interface (GUI), virtual memory and machines
    c. System calls
    d. OS design and architecture approaches
    e. Run time environment for applications
3. Processes and Threads

a. Processes - Portable Operating Systems Interface (POSIX)
b. POSIX threads
c. Scheduling (best effort, fair, real-time)
d. Inter-process communication
e. Thread safety and re-entrant code

4. Memory Management
    a. Review of hardware Memory Management Unit (MMU) and Virtual Memory (VM) features
    b. Logical and physical addressing
    c. Protection domains
    d. Paging and page replacement
    e. Segmentation and paged/segmented systems (e.g., Linux)
5. File systems
    a. File abstraction
    b. Directory structure (name spaces)
    c. File system data structures and indirection
    d. File system cache
    e. File system interface to block storage devices
6. Device Drivers and I/O
    a. Programmed character I/O interfaces (serial, terminal)
    b. Block oriented I/O and Direct Memory Access (DMA) interfaces (e.g., disk and network)
    c. Interrupts and I/O attention, request and completion
    d. Clocks
    e. Graphical User Interface (GUI) and Human Computer Interface (HCI) basics
    f. Power management
7. Synchronization
    a. Data corruption, race conditions and need for synchronization
    b. Semaphores and monitors (test-set-lock instructions)
    c. Critical sections for shared memory and resources
    d. Deadlock: conditions, avoidance, prevention, detection, recovery
    e. Barriers, spin-locks, and multi-core
    f. Message queues
8. Basic Security
    a. Threats – bug exploitation and denial of service attacks
    b. Authentication methods for login, biometrics, and passwords
    b. Fundamentals of encryption
    c. Access Control
9. Multi-Core Operating Systems
    a. Quick hardware review of multi-core Uniform Memory Access (UMA), Non-Uniform Memory Access (NUMA)
    b. Symmetric Multi-processing (SMP) and Asymmetric Multi-processing (AMP) concepts for multi-core
    c. Load balancing
    d. Virtualization and type-1/type-2 hypervisors

e. Distributed systems

B. Example Projects in any POSIX with source – e.g. Linux, Android Operating System (AOS), Apple Macintosh OS (OS/X), Unix, Solaris, Windows
1. Fork and exec for basic shell
2. Multi-threaded applications (e.g., image processing, prime hunting, interactive)
3. Memory allocation, use monitoring, translation in kernel space, paging
4. Simple file system exploration using Random Access Memory (RAM) disks
5. Kernel I/O driver module - General Purpose I/O (GPIO), RAM disk, etc.
6. Synchronization and inter-process communication (IPC), e.g. create and remove deadlock
7. Multi-core and virtual machines (e.g., Virtual Box Linux with multi-core)

VI. Instructional Goals and Student Learning Outcomes

A. Instructional Goals. The instructor will
1. Instill and develop student understanding of the principles of operating systems.
2. Explain purpose and policies for use of hardware by applications via the OS and the engineering challenges in so doing, today and the future.
3. Instruct students on the use and extension of a prevalent operating system such as Linux, Windows, or suitable pedagogical operating system simulator.

B. Student Learning Outcomes. Upon completion of this course, students will be able to:	**Assessment Methods**
1. Explain the operation of the building blocks of modern operating systems and use in general purpose computing.	Exams, quizzes, assignments, class projects
2. Demonstrate methodologies used in the design of operating systems.	Exams, quizzes, assignments, class projects
3. Extend existing operating systems and implement basic mechanisms in both the user space and kernel space protection domains.	Exams, quizzes, assignments, class projects
4. Develop the necessary code to complete the course projects.	Exams, quizzes, assignments, class projects
5. Implement course projects, test their operation, and report their findings to the instructor and colleagues.	Class project
6. Demonstrate recognition of the engineering tradeoffs necessary in the design of modern operating systems.	Exams, quizzes, assignments, class projects

VII. Suggested Texts

Stallings, W. Operating Systems, Internals and Design Principals, 7th Edition, Prentice Hall, Upper Saddle River, NJ, 2012.

Tanenbaum, A.S. Modern Operating Systems, 3rd Edition, Prentice Hall, Upper Saddle River, NJ, 2008.

VIII. Bibliography and Resources

Nutt, G. Operating Systems: A Modern Perspective, 2nd Edition, Addison Wesley, Upper Saddle River, NJ 2002.

Patterson, D.A. and Hennessy, J.L. Computer Organization and Design, Revised 4th Edition, Elsevier, Waltham, MA, 2012.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science and Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A351	CS A351	3	(3+0)

6. Complete Course Title
Automata, Algorithms, and Complexity
Automata, Algo, and Comp
Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☒ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions
- ☒ Other Course Content Guides (please specify)

9. Repeat Status No # of Repeats n/a Max Credits 3

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with
☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Date of Coordination*	*Chair/Coordinator Contacted*
1. See attached spreadsheet		
2.		
3.		

Initiator Name (typed): Martin Cenek Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 12/10/2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12/10/2012

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Study of the theory of computing and algorithm analysis and design. Topics include: context free-grammars and parsing, finite automata and regular languages, pushdown automata and context-free grammars, deterministic and nondeterministic Turing machines, decidability and computability. In the algorithm domain, the course provides an introduction to analysis and complexity of algorithms, searching/sorting algorithms, mathematical algorithms, and graph theoretic algorithms. Introduction to complexity theory.

16a. Course Prerequisite(s) *(list prefix and number or test code and score)*
(CSCE A311 and MATH A231) with minimum grade of C.

16b. Co-requisite(s) *(concurrent enrollment required)*
n/a

16c. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16d. Registration Restriction(s) *(non-codable)*
n/a

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide.

Initiator (faculty only)	Date	☐ Approved ☐ Disapproved	Dean/Director of School/College	Date
Martin Cenek Initiator (TYPE NAME)				
☐ Approved ☐ Disapproved	Department Chair	Date	☐ Approved ☐ Disapproved	Undergraduate/Graduate Academic Board Chair	Date
☐ Approved ☐ Disapproved	College/School Curriculum Committee Chair	Date	☐ Approved ☐ Disapproved	Provost or Designee	Date

Course Being Changed:	**CS A351**				
	Type of Impact (course or program)				
Impacted Program or Course	**Course Impacts** ***examples:*** prerequisite, corequisite, recommended	**Program Impacts** ***examples:*** requirement, selective, program credit total	***Catalog Page***	***Type/Date of Notification***	***Chair/Coordinator Contacted*** (not listserve)
BS, Natural Science		Program requirement	123	12/1/12	Fred Rainey (farainey@uaa.alaska.edu)
BS, Computer Science		Program requirement	242	12/1/12	Kenrick Mock
BA, Computer Science		Program requirement	242	12/1/12	Kenrick Mock
BSE, Computer Systems Engineering		Program selective	245	12/1/12	Kenrick Mock
CS A470	Prerequisite		381	12/1/12	Kenrick Mock

Course Content Guide
University of Alaska Anchorage
School of Engineering
Department of Computer Science and Engineering

I. **Revision Date**: December 20th, 2012

II. **Course Information**

A. **College**: School of Engineering
B. **Course Subject/Number**: CSCE A351
C. **Credits**: 3
D. **Contact Hours**: (3+0) 45 contact lecture hours (3 contact lecture hours/week x 15 weeks = 45) plus 90 hours outside work (6 hours outside lecture/week x 15 weeks = 90) for a total of 135 hours
E. **Course Title**: Automata, Algorithms, and Complexity
F. **Repeat Status**: No
G. **Grading Basis**: A-F
H. **Course Description**: Study of the theory of computing and algorithm analysis and design. Topics include: context free-grammars and parsing, finite automata and regular languages, pushdown automata and context-free grammars, deterministic and nondeterministic Turing machines, decidability and computability. In the algorithm domain, the course provides an introduction to analysis and complexity of algorithms, searching/sorting algorithms, mathematical algorithms, and graph theoretic algorithms. Introduction to complexity theory.
I. **Course Prerequisites**: (CSCE A311 and MATH A231) with minimum grade of C.
J. **Fees**: Yes, standard SOE fee

III. **Course Level Justification**

The course is taught nationwide at the upper division (junior) level as a theory course required for computer science majors. It builds upon concepts presented in CSCE A311 and provides theoretical foundations of computing for senior level courses.

IV. **Instructional Goals and Student Learning Outcomes**

A. **Instructional Goals.** The instructor will:
1. Introduce fundamental topics in the theory of computing such as formal languages, computability, and a formal model of computing.
2. Introduce the notion of computational complexity.
3. Introduce students to mathematical methods of algorithm analysis and design.
4. Expose students to a wide variety of algorithms and algorithmic techniques.

B. **Student Learning Outcomes**. Students will be able to:	**Assessment method**
1. Demonstrate the fundamental nature of computation and complexity.	Assignments, Quizzes, Exams
2. Apply formal language concepts to the design of programs including parsers, compilers, or natural language processors.	Assignments, Quizzes, Exams
3. Devise rigorous and correct proofs relating to automata, algorithms, and complexity.	Assignments, Quizzes, Exams
4. Analyze the space and runtime behavior of algorithms.	Assignments, Quizzes, Exams
5. Implement a variety of algorithms and apply them to solve new problems.	Assignments, Quizzes, Exams

V. **Guidelines for Evaluation**

A. Assignments
B. Exams
C. Quizzes

VI. **Topical Course Outline**

1. Basic Concepts of Computing
   a. Review of set theory
   b. Grammatical basis of language
   c. Historical background

2. Finite Automata and Regular Languages
   a. Lexical analysis
   b. Deterministic finite automata
   c. Nondeterministic finite automata
   d. Regular grammars and expressions

3. Pushdown Automata and Context-Free Languages
   a. Pushdown automata
   b. Context-free grammars
   c. Left-to-right-Leftmost (LL(k)) and Left-to-right-Rightmost (LR(k)) parsers

4. Turing Machines
   a. Turing machines and computability
   b. Language acceptors
   c. Turing-acceptable languages

5. Algorithmic Problem Types
   a. Integer programming
   b. Graph problems
   c. Search problems
   d. Geometric problems

6. Mathematical Techniques
    a. Complexity notations
    b. Recurrence relations
    c. Worst-case and amortized analysis

7. Graph and Geometric Algorithms
    a. Graph searching
    b. Geometric representation and manipulation

8. Complexity Theory
    a. P and NP (Polynomial and Nondeterministic Polynomial)
    b. NP complete problems
    c. NP hard problems

9. Greedy Algorithms
    a. Tree and path problems
    b. String matching
    c. Matroids

VII. **Suggested Texts**

Cormen T.H., Leiserson, C.E, Rivest, R.L, and Stein, C. Introduction to Algorithms, 3rd Edition, MIT Press, Cambridge, MA, 2009.

Sipser, M. Introduction to the Theory of Computation, 3rd Edition, Course Technology, Boston, MA, 2012.

VIII. **Bibliography**

Hein, J. Discrete Structures, Logic, and Computability, 3rd Edition, Jones & Bartlett Publishers, Sudbury, MA, 2009.

Levitin, A. Introduction to the Design and Analysis of Algorithms, 3rd Edition, Addison Wesley, Upper Saddle River, NJ, 2011.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science and Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A360	CS A360	3	(3+0)

6. Complete Course Title
Database Systems

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☐ Title
- ☐ Grading Basis
- ☐ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions
- ☒ Other Course Content Guide (please specify)

9. Repeat Status No # of Repeats n/a Max Credits n/a

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Date of Coordination*	*Chair/Coordinator Contacted*
1. B.A., B.S., Computer Science	12/10/2012	Kenrick Mock
2. B.S. Natural Sciences	12/10/2012	Khrys Duddleston
3.		

Initiator Name (typed): Kirk Scott Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 12/10/2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12/10/2012

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Application of data modeling, relational database concepts and design, normalization theory, and structured query language. Study of underlying data structures and implementations of data processing architectures.

16a. Course Prerequisite(s) *(list prefix and number or test code and score)*
(CSCE A202 or CSCE A211) with minimum grade of C.

16b. Co-requisite(s) *(concurrent enrollment required)*
n/a

16c. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16d. Registration Restriction(s) *(non-codable)*
n/a

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide.

Initiator (faculty only) Date
Kirk Scott
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved
Department Chair Date

☐ Approved
☐ Disapproved
College/School Curriculum Committee Chair Date

☐ Approved
☐ Disapproved
Dean/Director of School/College Date

☐ Approved
☐ Disapproved
Undergraduate/Graduate Academic Board Chair Date

☐ Approved
☐ Disapproved
Provost or Designee Date

Course Content Guide
University of Alaska Anchorage
School of Engineering
Department of Computer Science and Engineering

I. **Revision Date**: November 15th, 2012

II. **Course Information**

A. **College**: School of Engineering
B. **Course Subject/Number**: CSCE A360
C. **Credits**: 3
D. **Contact Hours**: (3+0) 45 contact lecture hours (3 contact lecture hours/week x 15 weeks = 45) plus 90 hours outside work (6 hours outside lecture/week x 15 weeks = 90) for a total of 135 hours
E. **Course Title**: Database Systems
F. **Repeat Status**: No
G. **Grading Basis**: A-F
H. **Course Description**: Application of data modeling, relational database concepts and design, normalization theory, and structured query language. Study of underlying data structures and implementations of data processing architectures.
I. **Course Prerequisites**: (CSCE A202 or CSCE A211) with minimum grade of C.
J. **Fees**: Yes, standard SOE fee

III. **Course Level Justification**

This is an upper division course in the model curriculum developed by the professional association for computing. Success depends on the background and intellectual maturity acquired from introductory programming courses or work experience.

IV. **Instructional Goals and Student Learning Outcomes**

A.	**Instructional Goals.** The instructor will:
1.	Demonstrate how to apply the concepts of relational database theory to the creation and maintenance of databases.
2.	Demonstrate how to apply queries to a relational database.
3.	Guide students through the development, documentation, and implementation of a small database project.

B. **Student Learning Outcomes**. Students will be able to:	**Assessment method**
1. Create entity-relationship diagrams and data dictionaries showing the contents of and relationships within an arbitrary database.	Assignments, Exams, Project
2. Normalize a set of tables given the information sources and requirements that those tables are to be built on and create entity-relationship diagrams and data dictionaries for them.	Assignments, Exams, Project
3. Form queries in the Structured Query Language (SQL) to elicit the correct answers to any possible information request on a given set of tables.	Assignments, Exams, Project
4. Develop a small scale database project in a subject domain of their choice, creating and populating tables, establishing relationships, and creating a representative set of queries for that database.	Project

V. **Guidelines for Evaluation**

A. Assignments
B. Exams
C. Project

VI. **Topical Course Outline**

1. Database Management System Applications
    a. Purpose of database management
    b. Relational and other database technologies
    c. Transaction management
    d. Data mining
2. The Relational Model
    a. Relational algebra
    b. Domains
    c. Functional and multi-valued dependencies
    d. One-to-one, one-to-many, and many-to-many relationships
3. SQL
    a. Data definition syntax
    b. Select, project, and join queries
    c. Subqueries
    d. Complex queries
4. Normalization
    a. Domains and nulls
    b. Referential integrity
    c. First, Second, Third, and Boyce-Codd normal forms

    d. Fourth, Fifth, and Domain-Key Normal forms
5. System Hardware and Software Support
    a. Physical file organization and storage
    b. Indexing and hashing
    c. B-Tree indexes
    d. Bitmap indexes
6. Concurrency Control and Recovery
    a. Lock based techniques
    b. Timestamp based techniques
    c. Deadlock handling
    d. Logging and rollback
7. The PHP Scripting Language
    a. Basic syntax
    b. Arrays, strings, and data manipulation
    c. Object-orientation with PHP
    d. PEAR: PHP Extension and Application Repository
    e. Errors, debugging, and deployment
8. MySQL
    a. MySQL and SQL
    b. Querying Web databases
    c. Writing to Web databases
    d. Validation with PHP and JavaScript
    e. Sessions
    f. Authentication and Security
    g. Report generation

VII. **Suggested Texts**

Gillenson, M. Fundamentals of Database Management Systems, 2nd Edition, Wiley, 2011.

Welling, L. and Thomson, L. PHP and MySQL Web Development. Addison Wesley, Boston, MA, 2009.

VIII. **Bibliography**

Date, C.J. Introduction to Database Systems, Addison Wesley, Boston, MA, 2004.

Elmasri, R. and Navathe, S. Fundamentals of Database Systems, 6th Edition, Addison Wesley, Boston, MA, 2011.

Garcia-Molina, H., Ullman, J. and Widom, J. Database Systems: The Complete Book, 2nd Edition, Prentice Hall, Upper Saddle River, NJ, 2009.

Hoffer, J.A., Venkataraman, R. and Topi, H. Modern Database Management, 11th Edition, Prentice Hall, Upper Saddle River, NJ, 2013.

Nixon, R. Learning PHP, MySQL & JavaScript. O'Reilly, Sebastopol, CA, 2009.

Ramakrishnan, R. and Gehrke, J. Database Management Systems, McGraw Hill, New York, NY, 2003.

Silberschatz, A., Korth, H. and Sudarshan, S. Database System Concepts, 6th edition, McGraw Hill, New York, NY, 2010.

Ullman, J.D. and Widom, J. A First Course in Database Systems, 3rd edition, Prentice Hall, 2008.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science and Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A365	CSE A355	3	(3+0)

6. Complete Course Title
Computer Networks

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☒ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☒ Other Course Content Guide (please specify)
- ☒ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status No # of Repeats n/a Max Credits n/a

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1. BSE CSE Required, BSE CSE Minor	244, 250	12/1/12	Kenrick Mock
2. BSE EE Selective	245	12/10/12	Jens Munk
3. CSE A465	382	12/1/12	Kenrick Mock

Initiator Name (typed): Kenrick Mock Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 2012-12-15
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 2012-12-15

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Network architectures, layered protocols, internet protocols, and network service interfaces. Emphasis on design and implementation of networking hardware, including routers, bridges, switches, hubs, and repeaters. Local networks, addressing, routing, flow control, queuing, routing protocols, packet loss.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
[CSCE A211 and (STAT A307 or STAT A253)] with minimum grade of C.	n/a	n/a

16d. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
n/a

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide; added STAT A307 or STAT A253 as a prerequisite.

Initiator (faculty only) Date
Kenrick Mock
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved Department Chairperson Date

☐ Approved
☐ Disapproved Curriculum Committee Chairperson Date

☐ Approved
☐ Disapproved Dean/Director of School/College Date

☐ Approved
☐ Disapproved Undergraduate/Graduate Academic Board Chairperson Date

☐ Approved
☐ Disapproved Provost or Designee Date

Course Content Guide
University of Alaska Anchorage
School of Engineering
Department of Computer Science and Engineering

I. **Revision Date**: January 25, 2013

II. **Course Information**

A. **College**: Engineering
B. **Course Subject/Number**: CSCE A365
C. **Credits**: 3
D. **Contact Hours**: (3+0) 45 contact lecture hours (3 contact lecture hours/week x 15 weeks = 45) plus 90 hours outside work (6 hours outside lecture/week x 15 weeks = 90) for a total of 135 hours
E. **Course Title**: Computer Networks
F. **Repeat Status**: No
G. **Grading Basis**: A-F
H. **Course Description**: Network architectures, layered protocols, internet protocols, and network service interfaces. Emphasis on design and implementation of networking hardware, including routers, bridges, switches, hubs, and repeaters. Local networks, addressing, routing, flow control, queuing, routing protocols, packet-loss.
I. **Course Prerequisites**: [CSCE A211 and (STAT A307 or STAT A253)] with minimum grade of C.
J. **Fees**: Yes, standard SOE fee

III. **Course Level Justification**

This course builds upon concepts presented at the 200 or 300 level. It provides foundational material in computer networking for 300 and 400 level courses.

IV. **Instructional Goals and Student Learning Outcomes**

A.	**Instructional Goals.** The instructor will:
1.	Aid students in understanding different networking devices.
2.	Show students by example a networked environment with engineering applications.
3.	Demonstrate by example the use of different network layer protocols.
4.	Explain shortest path algorithm code in relation to different engineering applications.
5.	Provide students with the necessary skills to write networked programs.

6. Prepare students for engineering design with the writing a networked application on top of network built during course using protocols learned.

B. **Student Learning Outcomes**. Students will be able to:	**Assessment method**
1. Identify different applications of computer networks in industry.	Assignments, Exams, Project
2. Understand the technologies involved with voice and data communication.	Assignments, Exams, Project
3. Build a network from components that meet certain specifications.	Assignments, Exams, Project
4. Explain multiplexing and different related technologies.	Assignments, Exams, Project
5. Explain the difference between the Transmission Control Protocol (TCP) and the User Datagram Protocol (UDP).	Assignments, Exams, Project
6. Differentiate the different multiple-access schemes and use them in an engineering application.	Assignments, Exams, Project

V. Guidelines for Evaluation

A. Assignments
B. Exams
C. Project

VI. Topical Course Outline

1. Introduction to object-oriented programming
2. Network topologies
3. Signaling, modulation, multiplexing, synchronization
4. Frame synchronization
5. Error detection and control
6. Flow control mechanisms
7. Circuit, virtual circuit, and packet switching
8. Local area network technologies
9. Multiple-access schemes (Collision Sense Multiple Access / Collision Detection, Collision Sense Multiple Access, Collision Avoidance, token passing)
10. Network Programming
11. Networking devices – repeaters, hubs, bridges, switches, routers, gateways
12. Network layer protocols (Internet Protocol, Address Resolution Protocol, Internet Control Message Protocol)
13. Internet routing protocols (Routing Information Protocol, Open Shortest Path First, Border Gateway Protocol)
14. Shortest path algorithms

15. TCP and UDP
16. Application layer protocols, including Hypertext Transfer Protocol, File Transfer Protocol, Domain Name System, Simple Mail Transport Protocol, Telnet, Dynamic Host Configuration Protocol

VII. **Suggested Texts**

Kurose, J. and Ross, K. Computer Networking: A Top-Down Approach, 4th Edition, Addison Wesley, Boston, MA, 2007.

Tanenbaum, A. Computer Networks, 5th Edition, Prentice Hall, Hoboken, NJ, 2010.

VIII. **Bibliography**

Dumas, B, and Schwartz, M. Principles of Computer Networks and Communications, Prentice Hall, Upper Saddle River, NJ, 2008.

Mir, N. Computer and Communication Networks, Prentice Hall, Upper Saddle River, NJ, 2006.

Olifer, N, and Oliver, V. Computer Networks: Principles, Technologies, and Protocols for Network Design, Wiley and Sons, Indianapolis, IN, 2006.

Peterson, L. and Davie, B. Computer Networks: A Systems Approach, 3rd Edition, Morgan Kaufmann, Boston, MA, 2003.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science and Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A385	CS A385	3	(3+0)

6. Complete Course Title
Computer Graphics

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☐ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☐ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions
- ☒ Other Course Content Guide (please specify)

9. Repeat Status No # of Repeats n/a Max Credits n/a

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1. BS Natural Sciences (selective)	123	12/1/12	Kenrick Mock
2. BSE Computer Science and Engineering (selective)	245	12/1/12	Kenrick Mock
3. BS Natural Sciences	123	12/10/12	Khrys Duddleston

Initiator Name (typed): Sam Siewert Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 12/1/2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12/1/2012

14. General Education Requirement
Mark appropriate box:
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Introduction to computer graphics. Topics include polygon and ray trace rendering of objects in scenes, render languages and Application Programming Interfaces (APIs), theory for generation of pixel values in a render buffer with consideration of color, lighting, shading, texture, surfaces, hidden surfaces, and materials, and the viewpoint, method of projection, and mathematics for rendering and viewing objects.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
(CSCE A311 and MATH A201) with minimum grade of C.	n/a	n/a

16d. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
n/a

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide.

Initiator (faculty only)	Date	☐ Approved ☐ Disapproved	Dean/Director of School/College — Date
Sam Siewert Initiator (TYPE NAME)			
☐ Approved ☐ Disapproved	Department Chairperson — Date	☐ Approved ☐ Disapproved	Undergraduate/Graduate Academic Board Chairperson — Date
☐ Approved ☐ Disapproved	Curriculum Committee Chairperson — Date	☐ Approved ☐ Disapproved	Provost or Designee — Date

UNIVERSITY OF ALASKA ANCHORAGE
COURSE CONTENT GUIDE

I. Initiation Date: December 2012

II. Course Information

A.	College/School:	School of Engineering
B.	Course Title:	Computer Graphics
C.	Course Subject/Number:	CSCE A385
D.	Credit Hours:	3.0 Credits
E.	Contact Time:	3+0 Contact Time
F.	Grading Information:	A-F
G.	Course Description:	Introduction to computer graphics. Topics include polygon and ray trace rendering of objects in scenes, render languages and Application Programming Interfaces (APIs), theory for generation of pixel values in a render buffer with consideration of color, lighting, shading, texture, surfaces, hidden surfaces, and materials, and the viewpoint, method of projection, and mathematics for rendering and viewing objects.
H.	Fees:	Yes, standard SOE fee
I.	Course Prerequisites:	(CSCE A311 and MATH 201) with minimum grade of C.
J.	Registration Restrictions:	None

III. Evaluation

Grades are based on written examination, class assignments, and projects.

IV. Course Level Justification

This course allows students to apply programming skills and mathematics to focus on an important component of the computational platform – the human interface. It furthermore is compute-intensive and requires application of fundamental algorithms and data structures learned in lower division courses.

V. Outline

A. Lecture
1. Graphics Concepts
    a. Brief history
    b. Purpose
    c. Future challenges
2. Basic Mathematics Review
    a. Vector matrix basics
    b. Polygonal trigonometry
    c. Viewing and projections
    d. Interpolation – linear, bi-linear, tri-linear
3. Raster Images and Color
    a. Pixel encoding
    b. Color perception, photometry and radiometry
    c. Frame resolution, aspect ratio, coordinates, and compression

d. Moving pictures and compression

4. Ray Tracing
    a. Orthographic and perspective projection
    b. Viewing rays
    c. Render plane and object intersection
    d. Ray tracing rendering and shading interfaces
    e. Lighting, shading, and reflection
    f. Transparency and refraction
    g. Solid geometry specification
    h. Depth of field
5. Linear Algebra and Transformation Vector/Matrix Review
    a. Determinates
    b. Matrices
    c. Eigenvalues and diagonalization
    d. 2D and 3D transformations
    e. Matrix inversion and coordinate transformation
6. Viewing
    a. Viewing transformation
    b. Projective transformation
    c. Perspective projection
    d. field-of-view
7. Rendering
    a. Rastering
    b. Hidden surface removal
    c. Shading
    d. Texture
    e. Meshes
    f. Spatial data structures
8. Image Processing
    a. Convolution
    b. Image enhancement
    c. Mixing digital video and graphics
9. Surfaces and Modeling
    a. Curves
    b. Skeletal models
    c. Solid geometry
    d. Warping

B. Example Projects using Pixie or any Renderman Ray tracing tool and the Open Graphics Language (OpenGL) or any Polygon rendering environment
    1. Raster images and sequences with Motion Pictures Experts Group (MPEG) and Portable BitMap (PBM), Portable GreyMap (PGM), and Portable PixMap (PPM)
    2. Ray tracing rendering and generation of Computer Graphics (CG) movie
    3. Polygon rendering of simple cubes with hidden surface removal

4. Ray trace rendering with advanced lighting, reflection, refraction, and shadows
5. Image processing to enhance digital images and integrate with CG imagery
6. Interactive viewing angle and projection interactive rendering
7. Polygon rendering of smooth curved surfaces

VI. Instructional Goals and Student Learning Outcomes

A. Instructional Goals. The instructor will:
1. Instill and develop student understanding of the principles of polygon and ray trace rendering.
2. Explain basic interaction with render/shading interfaces as well as fundamental mathematics to render form simple points, lines and polygon surfaces.
3. Instruct students on the use and extension of a prevalent rendering tools and environments such as RenderMan using Pixie and OpenGL.

B. Student Learning Outcomes. Upon completion of this course, students will be able to:	**Assessment Methods**
1. Explain the operation of graphics processing units, rendering interfaces, and mathematics of rendering.	Exams, quizzes, assignments, projects
2. Demonstrate methodologies used in the design of ray trace rendering systems.	Exams, quizzes, assignments, projects
3. Demonstrate methodologies used in the design of polygon rendering systems.	Exams, quizzes, assignments, projects
4. Develop the necessary code to complete the course projects.	Exams, quizzes, assignments, projects
5. Implement course projects, test their operation, and report their findings to the instructor and colleagues.	Projects
6. Demonstrate recognition of the engineering tradeoffs necessary in the design of production computer generated imagery and interactive 3D graphics.	Exams, quizzes, assignments, projects

VII. Suggested Text

Hughes, J., van Dam, A., McGuire, M., Sklar, D., Foley, J., Feiner, S., and Akeley, K. Computer Graphics: Principles and Practice, 3rd Edition, Addison Wesley, Boston, MA, 2013.

Shirley, P. and Marschner, S. Fundamentals of Computer Graphics, 3rd Edition, CRC Press, Boca Raton, FL, 2009.

VIII. Bibliography and Resources

Angel, E. Interactive Computer Graphics: A Top-Down Approach Using OpenGL, 4th Edition, Addison Wesley, Boston, MA, 2006.

Apodaca, A and Gritz, L. Advanced RenderMan: Creating CGI for Motion Pictures, Morgan-Kaufman, San Francisco, CA, 1999.
Foley, J.D. and Van Dam, A. Introduction to Computer Graphics, Addison Wesley, Boston, MA, 1994
Upstil, S. The RenderMan Companion: A Programmer's Guide to Realistic Computer Graphics, Addison-Wesley, Boston, MA, 1990.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science and Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A395	CS A395	3	(0+9)

6. Complete Course Title
Internship in Computing

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☐ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Course Number
- ☒ Contact Hours
- ☒ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions
- ☒ Other Course Content Guide (please specify)

9. Repeat Status Yes # of Repeats 2 Max Credits 9

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1. CS BA and BS	241-242	11/26/12	Kenrick Mock
2. CS A495		12/10/12	Kenrick Mock
3.			

Initiator Name (typed): Kenrick Mock Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 12/10/2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12/10/2012

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Application of computer science or computer engineering skills in a professional work setting. Special Note: May be taken up to three times, but only 3 credits may be applied toward CS or CSE major requirements.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
CSCE A211 with a minimum grade of C.	n/a	n/a

16d. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
Instructor approval

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide. The contact hours changed to lab is more accurate than the previous designation as 3 hours of lecture. This is not a lecture-based course. The prerequisites enforce some introductory programming experience for the intern.

Initiator (faculty only) Date
Kenrick Mock
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved
Department Chairperson Date

☐ Approved
☐ Disapproved
Curriculum Committee Chairperson Date

☐ Approved
☐ Disapproved
Dean/Director of School/College Date

☐ Approved
☐ Disapproved
Undergraduate/Graduate Academic Board Chairperson Date

☐ Approved
☐ Disapproved
Provost or Designee Date

Course Content Guide
University of Alaska Anchorage
School of Engineering
Department of Computer Science and Engineering

I. **Revision Date**: December 1, 2012

II. **Course Information**

A. **College**: School of Engineering
B. **Course Subject/Number**: CSCE A395
C. **Credits**: 3
D. **Contact Hours**: (0+9) 0 contact lecture hours plus 135 hours outside work (9 hours outside work x 15 weeks = 135) for a total of 135 hours
E. **Course Title**: Internship in Computing
F. **Repeat Status**: Yes, up to 9 credits
G. **Grading Basis**: P/NP
H. **Course Description**: Application of computer science or computer engineering skills in a professional work setting. Special Note: May be taken up to three times, but only 3 credits may be applied toward CS or CSE major requirements.
I. **Course Prerequisites**: CSCE A211 with minimum grade of C.
J. **Fees**: Yes, standard SOE fee
K. **Registration Restrictions**: Instructor approval

III. **Course Level Justification**

The student is required to have completed the introductory programming sequence prior to enrolling in this course to ensure that the student can apply basic programming skills for the organization. Students are responsible for gaining employment in the organization.

IV. **Instructional Goals and Student Learning Outcomes**

A.	**Instructional Goals.** The instructor will:
1.	Provide students with professional work experience in the field of computing.

B. **Student Learning Outcomes**. Students will be able to:	**Assessment method**
1. Apply acquired computing skills in a professional work setting consistent with the background of the student	Project implementation, Employer Evaluation
2. Professionally communicate the requirements, design, and implementation of their computing project	Oral presentation and written report

V. **Guidelines for Evaluation**

A. Project implementation
B. Employer evaluation
C. Oral presentation
D. Written report

VI. **Topical Course Outline**

A. Understand the Computing Needs of the Organization
    1. Understand the goals and objectives
    2. Understand the personnel and organization
    3. Recognize effective and accurate computing practice
    4. Understand the standards and practices commonly used by the organization
B. Apply Computing Skills to a Professional Work Setting
    1. Tailor computing to meet the objectives and follow the standards of the organization and the discipline
    2. Produce desired work products
C. Develop a Relationship with the Organization
    1. Communicate effectively on the job site
    2. Determine tasks that are needed and that may not have been foreseen by the organization
    3. Seek and incorporate critical analysis into work
D. Maintain Appropriate Materials for Evaluation
    1. Keep log and portfolio of work
    2. Communicate with faculty liaison and job supervisor on a regular basis
    3. Work independently within the collaborative framework of the internship
E. Deliver Final Written Report and Oral Presentation

VII. **Suggested Texts**

An appropriate text will be selected based on the nature of the internship.

VIII. **Bibliography**

Blanchard, B. S. System Engineering Management. John Wiley and Sons, Hoboken, NJ, 2008.

Eisner, H. Essentials of Project and Systems Engineering Management. John Wiley and Sons, Hoboken, NJ, 2002.

McConnell, S. Professional Software Development: Shorter Schedules, Better Projects, Superior Products, Enhanced Careers. Addison Wesley, Boston, MA, 2004.

Rubin, K.S. Essential Scrum: A Practical Guide to the Most Popular Agile Process. Addison Wesley Professional, Ann Arbor, MI, 2012.

Sims, C. and Johnson, H.L. The Elements of Scrum. Dymaxicon, Foster City, CA, 2011.

Sommerville, I. Software Engineering, 9th Edition, Addison Wesley, Boston, MA, 2010.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science and Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A401	CS A401	3	(3+0)

6. Complete Course Title
Software Engineering

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☐ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions
- ☒ Other Course Content Guide (please specify)

9. Repeat Status No # of Repeats n/a Max Credits n/a

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1. See attached spreadsheet			
2.			
3.			

Initiator Name (typed): Kenrick Mock Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 12/10/2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12/10/2012

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Extends the ideas of software design and development from the introductory programming sequence to encompass the problems encountered in large-scale programs. Topics include software lifecycle models for developing large systems, advanced issues in object-oriented programming, design patterns, software development tools, project management principles, and principles of interface design.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
CSCE A311 with minimum grade of C.	n/a	n/a

16d. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
n/a

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide.

Initiator (faculty only) Date
Kenrick Mock
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved
Department Chairperson Date

☐ Approved
☐ Disapproved
Curriculum Committee Chairperson Date

☐ Approved
☐ Disapproved
Dean/Director of School/College Date

☐ Approved
☐ Disapproved
Undergraduate/Graduate Academic Board Chairperson Date

☐ Approved
☐ Disapproved
Provost or Designee Date

Course Being Changed:	**CS A401**				
	Type of Impact (course or program)				
Impacted Program or Course	**Course Impacts** ***examples:*** prerequisite, corequisite, recommended	**Program Impacts** ***examples:*** requirement, selective, program credit total	***Catalog Page***	***Type/Date of Notification***	***Chair/Coordinator Contacted*** (not listerve)
BA Computer Science		Program requirement	241	12/1/12	Kenrick Mock
BS, Computer Science		Program requirement	242	12/1/12	Kenrick Mock
Minor Computer Science		Program requirement	243	12/1/12	Kenrick Mock
CS A470	Prerequisite		381	12/1/12	Kenrick Mock
CS A671	Prerequisite	Advanced Software Engineering	381	12/1/12	Kenrick Mock
BSE, Computer Systems Engineering		Program requirement	245	12/1/12	Kenrick Mock
BSE, Computer Systems Engineering Minor		Program requirement	250	12/1/12	Kenrick Mock

Course Content Guide
University of Alaska Anchorage
School of Engineering
Department of Computer Science and Engineering

I. **Revision Date**: December 1, 2012

II. **Course Information**

A. **College**: School of Engineering
B. **Course Subject/Number**: CSCE A401
C. **Credits**: 3
D. **Contact Hours**: (3+0) 45 contact lecture hours (3 contact lecture hours/week x 15 weeks = 45) plus 90 hours outside work (6 hours outside work x 15 weeks = 90) for a total of 135 hours
E. **Course Title**: Software Engineering
F. **Repeat Status**: No
G. **Grading Basis**: A-F
H. **Course Description**: Extends the ideas of software design and development from the introductory programming sequence to encompass the problems encountered in large-scale programs. Topics include software lifecycle models for developing large systems, advanced issues in object-oriented programming, design patterns, software development tools, project management principles, and principles of interface design.
I. **Course Prerequisites**: CSCE A311 with minimum grade of C.
J. **Fees**: Yes, standard SOE fee

III. **Course Level Justification**

Students must synthesize concepts from 300 level courses to design and develop large-scale programs. This course is typically taught nationwide at the upper division level.

IV. **Instructional Goals and Student Learning Outcomes**

A.	**Instructional Goals.** The instructor will:
1.	Introduce students to the theoretical principles of software engineering
2.	Demonstrate how to integrate software engineering lifecycle models to the development of a software system
3.	Provide students with an understanding of software quality
4.	Introduce concepts in effective user interface design
5.	Demonstrate software engineering tools
6.	Introduce common software architectures
7.	Introduce ethical uses of data and information in the development of software systems

B. **Student Learning Outcomes**. Students will be able to:	**Assessment method**
1. Apply software engineering principles to design software and user interfaces	Project, Assignments, Exams
2. Utilize a software development lifecycle to design and construct a significant piece of software	Project, Assignments, Exams
3. Identify the basic techniques that result in efficient and effective ways of building large software systems	Assignments, Exams
4. Use modern software engineering tools	Project
5. Assess in a systematic fashion the quality of the interfaces in a range of software systems	Project, Assignments, Exams
6. Communicate the design and implementation of a software system	Project written report and oral presentation
7. Identify ethical issues in the development of software systems	Assignments, Exams

V. **Guidelines for Evaluation**

A. Project (written report, oral presentation)
B. Assignments
C. Exams

VI. **Topical Course Outline**

A. Software Lifecycle Models
B. Requirements Engineering
C. Agile Development
    1. Theoretical underpinnings
    2. User stories
    3. Project estimation
    4. Iterations
D. Software Testing
E. Software Development Tools
    1. Version control
    2. Test frameworks
    3. Integrated Development Environments (IDE) and tools
F. Graphical User Interface Design
    1. Norman's principles of system design
    2. Interface design heuristics
G. Software Architectures
    1. The Unified Modeling Language (UML)
    2. Design patterns
H. Ethical issues
    1. Professional codes of ethics
    2. Case studies

VII. Suggested Texts

Gustafson, D. Schaum's Outline of Software Engineering. McGraw-Hill, New York, NY, 2002.

Rasmussen, J. The Agile Samurai: How Agile Masters Deliver Great Software, Pragmatic Programmer, 2011. eBook: http://pragprog.com/book/jtrap/the-agile-samurai

Sommerville, I. Software Engineering, 9th Edition, Addison Wesley, Boston, MA, 2010.

VIII. Bibliography

McConnell, S. Rapid Development: Taming Wild Software Schedules, Microsoft Press, Redmond, WA, 1996.

McConnell, S. Professional Software Development: Shorter Schedules, Better Projects, Superior Products, Enhanced Careers. Addison Wesley, Boston, MA, 2004.

Pressman, R. Software Engineering: A Practitioner's Approach, 7th Edition, McGraw-Hill, New York, NY, 2009.

Rubin, K.S. Essential Scrum: A Practical Guide to the Most Popular Agile Process. Addison Wesley Professional, Ann Arbor, MI, 2012.

Sims, C. and Johnson, H.L. The Elements of Scrum. Dymaxicon, Foster City, CA, 2011.

van Vliet, H. Software Engineering: Principles and Practice, 3rd Edition, John Wiley and Sons, Hoboken, NJ, 2008.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science & Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A411	CS A405	3	(3+0)

6. Complete Course Title
Artificial Intelligence

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☐ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☒ Other Course Content Guide (please specify)
- ☒ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☒ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status No # of Repeats n/a Max Credits n/a

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1. See attached spreadsheet		12-10-2012	
2.			
3.			

Initiator Name (typed): Frank Moore Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 12/10/2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12/10/2012

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Introduction to the basic concepts of Artificial Intelligence (AI). Topics include intelligent agents; heuristic, local, and adversarial search; first-order logic and knowledge representation; and machine learning.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
CSCE A311 with minimum grade of C.	n/a	n/a

16d. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
n/a

17. ☒ Mark if course has fees Yes, standard SOE fee.

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide.

Initiator (faculty only) Date

Frank Moore
Initiator (TYPE NAME)

☐ Approved ☐ Disapproved Department Chairperson Date

☐ Approved ☐ Disapproved Curriculum Committee Chairperson Date

☐ Approved ☐ Disapproved Dean/Director of School/College Date

☐ Approved ☐ Disapproved Undergraduate/Graduate Academic Board Chairperson Date

☐ Approved ☐ Disapproved Provost or Designee Date

Course Being Changed:	**CS A405**				
	Type of Impact (course or program)				
Impacted Program or Course	**Course Impacts** ***examples:*** prerequisite, corequisite, recommended	**Program Impacts** ***examples:*** requirement, selective, program credit total	***Catalog Page***	***Type/Date of Notification***	***Chair/Coordinator Contacted*** (not listerve)
BS, Computer Systems Engineering		Selective	245	12/10/12	Kenrick Mock
Minor, Computer Systems Engineering		Selective	246	12/10/12	Kenrick Mock
BS Natural Sciences		Selective	123	12/10/12	Khrys Duddleston
BA/BS, Computer Science		Selective		12/10/12	Kenrick Mock

Course Content Guide
University of Alaska Anchorage
School of Engineering
Computer Science & Engineering Department

I. **Revision Date**: December 10, 2012

II. **Course Information**

A. **College**: School of Engineering
B. **Course Subject/Number**: CSCE A411
C. **Credits**: 3
D. **Contact Hours**: (3+0) 45 contact lecture hours (3 contact lecture hours/week x 15 weeks = 45) plus 90 hours outside work (6 hours outside lecture/week x 15 weeks = 90) for a total of 135 hours
E. **Course Title**: Artificial Intelligence
F. **Repeat Status**: No
G. **Grading Basis**: A-F
H. **Course Description**: Introduction to the basic concepts of Artificial Intelligence (AI). Topics include intelligent agents; heuristic, local, and adversarial search; first-order logic and knowledge representation; and machine learning.
I. **Course Prerequisites**: CSCE A311 with minimum grade of C.
J. **Fees**: Yes, standard SOE fee

III. **Course Level Justification**

In this course students will use concepts covered at the 300 level to design, implement, and analyze AI programs.

IV. **Instructional Goals and Student Learning Outcomes**

A.	**Instructional Goals.** The instructor will:
1.	Introduce students to classic artificial intelligence topics, including search, knowledge representation, propositional logic, predicate calculus, and game playing.
2.	Introduce modern artificial intelligence topics, including knowledge-based systems, machine learning, and genetic/evolutionary computation.
3.	Develop the students' abilities to design, implement, test, debug, document, and verify the correct operation of programs that illustrate AI topics.

B. **Student Learning Outcomes**. Students will be able to:	**Assessment method**
1. Apply AI-based techniques, tools, and languages to solve problems.	Assignments, Exams, Projects
2. Design, implement, test, debug, and verify the correct operation of AI programs.	Assignments, Exams, Projects

V. **Guidelines for Evaluation**

A. Assignments
B. Exams
C. Projects

VI. **Topical Course Outline**

1. Problems and Searching
    a. Problems, spaces and search
    b. Heuristic, local, and adversarial search
2. Knowledge Representation
    a. Issues
    b. Predicate calculus and propositional logic
    c. Uncertainty
    d. Statistical approaches
    e. Cognitive approaches
3. Machine Learning
    a. Bayesian approaches
    b. Nearest neighbor
    c. Neural networks
    d. Evolutionary computation
    e. Inductive learning
    f. Classifier systems
4. Application Areas
    a. Game playing
    b. Planning
    c. Natural language processing and text processing
    d. Expert systems

VII. **Suggested Texts**

Jones, M. T. Artificial Intelligence, A Systems Approach. Infinity Science Press, Hingham, MA, 2008.

Russell, S.J. and Norvig, P. Artificial Intelligence: A Modern Approach, 3rd Edition, Pearson Education, Inc., Upper Saddle River, NJ, 2010.

VIII. **Bibliography**

Luger, G.F. and Stubblefield, W.A. Artificial Intelligence: Structures and Strategies for Complex Problem Solving, 5th Edition, Addison Wesley, Boston, MA, 2005.

Millington, I. Artificial Intelligence for Games, 2nd Edition, Morgan Kaufmann, Burlington, MA, 2009.

Negnevitsky, M. Artificial Intelligence: A Guide to Intelligent Systems, 2nd Edition, Addison Wesley, Boston, MA, 2004.

Padhy, N. Artificial Intelligence and Intelligent Systems. Oxford University Press, New York, NY, 2005.

Poole, D., and Mackworth, A. Artificial Intelligence: Foundations of Computational Agents. Cambridge University Press, New York, NY, 2010.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science & Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A412	CS A407	3	(3+0)

6. Complete Course Title
Evolutionary Computing

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☐ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Other Course Content Guide (please specify)
- ☒ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status No # of Repeats n/a Max Credits n/a

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1. See attached spreadsheet		12-10-2012	
2.			
3.			

Initiator Name (typed): Frank Moore Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 12/10/2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12/10/2012

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Introduces students to subjects in the broad field of evolutionary computing, including genetic algorithms, evolution strategies, evolutionary programming, and genetic programming. Emphasis will be on the design, implementation, testing, debugging, and verification of correct programs.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
CSCE A311 with minimum grade of C.	n/a	n/a

16d. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
n/a

17. ☒ Mark if course has fees Yes,standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide.

Initiator (faculty only) Date
Frank Moore
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved
Department Chairperson Date

☐ Approved
☐ Disapproved
Curriculum Committee Chairperson Date

☐ Approved
☐ Disapproved
Dean/Director of School/College Date

☐ Approved
☐ Disapproved
Undergraduate/Graduate Academic Board Chairperson Date

☐ Approved
☐ Disapproved
Provost or Designee Date

Course Being Changed: CS A407					
	Type of Impact (course or program)				
Impacted Program or Course	**Course Impacts** ***examples:*** prerequisite, corequisite, recommended	**Program Impacts** ***examples:*** requirement, selective, program credit total	***Catalog Page***	***Type/Date of Notification***	***Chair/Coordinator Contacted*** (not listerve)
BS, Computer Systems Engineering		Selective	245	12/10/12	Kenrick Mock
BS Natural Sciences		Selective	123	12/10/12	Khrys Duddleston
BA/BS Computer Science		Selective		12/10/12	Kenrick Mock

Course Content Guide
University of Alaska Anchorage
School of Engineering
Computer Science & Engineering Department

I. **Revision Date**: December 10, 2012

II. **Course Information**

A. **College**: School of Engineering
B. **Course Subject/Number**: CSCE A412
C. **Credits**: 3
D. **Contact Hours**: (3+0) 45 contact lecture hours (3 contact lecture hours/week x 15 weeks = 45) plus 90 hours outside work (6 hours outside lecture/week x 15 weeks = 90) for a total of 135 hours
E. **Course Title**: Evolutionary Computing
F. **Repeat Status**: No
G. **Grading Basis**: A-F
H. **Course Description**: Introduces students to subjects in the broad field of evolutionary computing, including genetic algorithms, evolution strategies, evolutionary programming, and genetic programming. Emphasis will be on the design, implementation, testing, debugging, and verification of correct programs.
I. **Course Prerequisites**: CSCE A311 with minimum grade of C.
J. **Fees**: Yes, standard SOE fee

III. **Course Level Justification**

In this course students will use concepts covered at the 300 level to design, implement, and analyze evolutionary programs.

IV. **Instructional Goals and Student Learning Outcomes**

A.	**Instructional Goals.** The instructor will:
1.	Introduce students to the theory and practice of evolutionary computation.
2.	Impart an appreciation and understanding of how evolutionary techniques can be used to solve, or approximately solve, a wide variety of difficult optimization problems that cannot be solved in a reasonable amount of computing time using traditional methodologies.

B. **Student Learning Outcomes**. Students will be able to:	**Assessment method**
1. Describe similarities and differences between biological evolution and evolutionary computing.	Exams
2. Utilize a variety of evolutionary computing techniques, including genetic algorithms, evolution strategies, evolutionary programming, and genetic programming.	Projects
3. Work with a team member to successfully implement program that employ these evolutionary computing techniques to solve classic non-deterministic polynomial (NP-hard) optimization problems.	Projects
4. Analyze the results of several program runs for each project and effectively describe relevant conclusions in a written report.	Reports
5. Design, implement, test, and debug a moderately complex software project.	Major Project
6. Present project results in a public forum.	Presentation

V. **Guidelines for Evaluation**

A. Exams
B. Major Project
C. Projects
D. Reports
E. Presentations

VI. **Topical Course Outline**

1. Introduction
    a. The evolutionary computing metaphor
    b. Inspiration from biology
    c. Evolutionary computing: why?
2. What is an Evolutionary Algorithm (EA)?
    a. Components of EAs
    b. Applications
    c. Global optimization
3. Genetic Algorithms (GAs)
    a. Representation of individuals in GAs
    b. Mutation and recombination in GAs
    c. GA population models
    d. Parent and survivor selection in GAs
    e. Example applications
    f. Premature convergence and stagnation
4. Evolution Strategies (ES)

a. Representation in ES
b. Mutation and recombination in ES
c. Parent and survivor selection in ES
d. Self-adaptation
e. Applications of ES

5. Genetic Programming (GP)
    a. Representation
    b. Mutation and recombination in GP
    c. Selection in GP
    d. Bloat
    e. Applications of GP
6. Advanced Topics
    a. Classifier systems
    b. Parameter control in EAs
    c. Theory
        i. The schema theorem
        ii. The no free lunch theorem
    d. Co-evolution

VII. Suggested Texts

Beyer, H. G. The Theory of Evolution Strategies. Springer-Verlag, New York, NY, 2001.

Eiben, A. E. and Smith, J. E. Introduction to Evolutionary Computing (corrected 2nd printing), Springer-Verlag, New York, NY, 2007.

VIII. Bibliography

Fogel, D. B. Evolutionary Computation. IEEE Press, Piscataway, NJ, 1995.

Koza, J. R. et al. 2003. Genetic Programming IV: Routine Human-Competitive Machine Intelligence. Kluwer Academic Publishers, Norwell, MA, 2003.

Michalewicz, Z. Genetic Algorithms + Data Structures = Evolution Programs, 3rd Edition, Springer-Verlag, New York, NY, 1996.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science and Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A431	CS A431	3	(3+0)

6. Complete Course Title
Compilers

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☒ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☒ Other Course Content Guide (please specify)
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status No # of Repeats n/a Max Credits n/a

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1. BSE CSE, Selective		12/1/12	Kenrick Mock
2. BA/BS CS, Elective		12/1/12	Kenrick Mock
3.			

Initiator Name (typed): Jeffrey Miller Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 2012-12-15
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 2012-12-15

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Programming language translation from a high-level object-oriented language to assembly code. Lexical analysis, semantic analysis, and code generation. Finite state automata, flow graphs, directed graphs, parsers, parse trees, and regular expressions. Optimizations to improve code efficiency when executed as a low level language.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
[(CSCE A331 or CSCE A351) and CSCE A248] with minimum grade of C.	n/a	n/a

16d. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
n/a

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide.

Initiator (faculty only)	Date	☐ Approved ☐ Disapproved Dean/Director of School/College	Date
Jeffrey Miller Initiator (TYPE NAME)			
☐ Approved ☐ Disapproved Department Chairperson	Date	☐ Approved ☐ Disapproved Undergraduate/Graduate Academic Board Chairperson	Date
☐ Approved ☐ Disapproved Curriculum Committee Chairperson	Date	☐ Approved ☐ Disapproved Provost or Designee	Date

Course Content Guide
University of Alaska Anchorage
School of Engineering
Department of Computer Science and Engineering

I. **Revision Date**: November 13, 2012

II. **Course Information**

A. **College**: School of Engineering
B. **Course Subject/Number**: CSCE A431
C. **Credits**: 3
D. **Contact Hours**: (3+0) 45 contact lecture hours (3 contact lecture hours/week x 15 weeks = 45) plus 90 hours outside work (6 hours outside lecture/week x 15 weeks = 90) for a total of 135 hours
E. **Course Title**: Compilers
F. **Repeat Status**: No
G. **Grading Basis**: A-F
H. **Course Description**: Programming language translation from a high-level object-oriented language to assembly code. Lexical analysis, semantic analysis, and code generation. Finite state automata, flow graphs, directed graphs, parsers, parse trees, and regular expressions. Optimizations to improve code efficiency when executed as a low level language.
I. **Course Prerequisites**: [(CSCE A331 or CSCE A351) and CSCE A248] with minimum grade of C.
J. **Fees**: Yes, standard SOE fee

III. **Course Level Justification**

In this course students will use concepts covered at the 300 level to design, implement, and analyze compilers.

IV. **Instructional Goals and Student Learning Outcomes**

A.	**Instructional Goals.** The instructor will:
1.	Provide an understanding of lexical analysis of computer programs
2.	Provide an understanding of the differences between context-sensitive and context-free languages
3.	Provide an understanding of semantic language parsing methods
4.	Instill the importance of optimizing programs for added efficiency of programs

B. **Student Learning Outcomes**. Students will be able to:	**Assessment method**
1. Write a lexical analyzer in a high level language that will handle a given set of language tokens	Assignments, Exams, Project
2. Write a parser in a high level language that will generate intermediate code	Assignments, Exams, Project
3. Write a code generator in a high level language that will produce assembly code for a given machine architecture	Assignments, Exams, Project

V. **Guidelines for Evaluation**

A. Assignments
B. Exams
C. Project

VI. **Topical Course Outline**

1. Introduction, Structure of a Compiler
2. Syntax-Directed Translator
3. Lexical Analysis
4. Strings, Tokens, and Languages
5. Finite Automata, Nondeterministic Finite State Automata, Deterministic Finite State Automata
6. Regular Expressions and Grammars
7. Syntax Analysis
8. Parse Trees, Ambiguity, Context-Free Grammars
9. Top-Down, Bottom-Up, Left to Right Leftmost and Rightmost Parsers
10. Intermediate Code Generators, Three-Address Code
11. Type Checking, Control Flow
12. Run-Time Environments, Stacks, Heaps, Garbage Collection
13. Code Generator, Flow Graphs
14. Basic Blocks, Optimization of Basic Blocks
15. Machine-Independent Optimizations
16. Instruction-Level Parallelism

VII. **Suggested Texts**

Aho, A., Lam, M., Sethi, R., Ullman, J. Compilers: Principles, Techniques, and Tools, 2nd Edition. Pearson-Addison Wesley, Boston, MA, 2007.

Cooper, K., Torczon, L. Engineering a Compiler, 2nd Edition, Elsevier, Burlington MA, 2012.

VIII. **Bibliography**

Appel, A. Modern Compiler Implementation in Java. Cambridge University Press. Cambridge, MA 2002.

Mak, R. Writing Compilers and Interpreters: A Software Engineering Approach. Wiley and Sons, Hoboken NJ, 2009.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	CSCE

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A442	CSE A442	3	(3+0)

6. Complete Course Title
VLSI Circuit Design

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☐ Title
- ☐ Grading Basis
- ☐ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions
- ☒ Other Course Content Guide (please specify)

9. Repeat Status No # of Repeats Max Credits

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with

Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Date of Coordination*	*Chair/Coordinator Contacted*
1. See attached table		
2.		
3.		

Initiator Name (typed): Randy Moulic Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 12-10-12
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12-10-12

14. General Education Requirement
Mark appropriate box:
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Analysis and design of digital Very Large Scale Integration (VLSI) circuits including area restrictions, delay minimization, and power minimization. Simulation of VLSI logic in software. Complementary Metal-Oxide Semiconductor (CMOS) design rules, physical design, power consumption, clocking strategies, and transistor theory. Engineering VLSI simulation project at the end of the course.

16a. Course Prerequisite(s) *(list prefix and number or test code and score)*
(CSCE A342 and EE A204) with minimum grade of C.

16b. Co-requisite(s) *(concurrent enrollment required)*
N/A

16c. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16d. Registration Restriction(s) *(non-codable)*
N/A

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Update course content guide, prefix, and prerequisites.

Initiator (faculty only) Date
Randy Moulic
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved
Department Chair Date

☐ Approved
☐ Disapproved
College/School Curriculum Committee Chair Date

☐ Approved
☐ Disapproved
Dean/Director of School/College Date

☐ Approved
☐ Disapproved
Undergraduate/Graduate Academic Board Chair Date

☐ Approved
☐ Disapproved
Provost or Designee Date

Courses Being Changed: CSE A442

Impacted Program or Course	*Type of Impact (course or program)*		*Catalog Page*	*Type/Date of Notification*	*Chair/Coordinator Contacted* (not listerve)
	Course Impacts *examples:* prerequisite, corequisite, recommended	**Program Impacts** *examples:* requirement, selective, program credit total			
BSE, Computer Systems Engineering		Program requirement	245	12/20/12	Kenrick Mock
BSE, Minor Computer Systems Engineering		Program requirement	246	12/20/12	Kenrick Mock

Course Content Guide
University of Alaska Anchorage
School of Engineering
Department of Computer Science and Engineering

I. **Revision Date**: November 29, 2012

II. **Course Information**

A. **College**: School of Engineering
B. **Course Subject/Number**: CSCE A442
C. **Credits**: 3
D. **Contact Hours**: 3 + 0
E. **Course Title**: VLSI Circuit Design
F. **Repeat Status**: No
G. **Grading Basis**: A-F
H. **Course Description**: Analysis and design of digital Very Large Scale Integration (VLSI) circuits including area restrictions, delay minimization, and power minimization. Simulation of VLSI logic in software. Complementary Metal-Oxide Semiconductor (CMOS) design rules, physical design, power consumption, clocking strategies, and transistor theory. Engineering VLSI simulation project at the end of the course.
I. **Course Prerequisites**: (CSCE A342 and EE A204) with minimum grade of C.
J. **Fees**: Yes, standard SOE fee
K. **Cross-listed**: N/A

III. **Course Level Justification**

The course builds on a previous 300-level course in digital design.

IV. **Instructional Goals and Student Learning Outcomes**

A. **Instructional Goals.** The instructor will:
1. Explain the current state of CMOS and VLSI work in industry.
2. Provide students with the rules for VLSI design.
3. Show students how silicon is used in chip layout and design.
4. Show by example using simulation tools to test VLSI design before manufacturing chips.

5. Prepare students for a large engineering application using VLSI.

B. **Student Learning Outcomes**. Upon completion of this course, students will be able to:	**Assessment method**
1. Demonstrate the steps involved in fabrication of CMOS VLSI circuits.	Assignments, Quizzes, Exams, Projects
2. Apply basic Metal Oxide Semiconductor (MOS) current and voltage equations.	Assignments, Quizzes, Exams, Projects
3. Use circuit equations to calculate rise/fall times and delays in MOS circuits.	Assignments, Quizzes, Exams, Projects
4. Develop a methodology for VLSI cell design.	Assignments, Quizzes, Exams, Projects
5. Design a complex VLSI circuit using material learned in class.	Assignments, Projects
6. Demonstrate the steps involved in fabrication of CMOS VLSI circuits.	Assignments, Quizzes, Exams, Projects

V. **Guidelines for Evaluation**

A. Assignments
B. Quizzes
C. Exams
D. Projects

VI. **Course Outline**

A. Metal-oxide-semiconductor (MOS) transistors
B. Complementary metal-oxide-semiconductor (CMOS) fabrication and layout
C. Current-voltage (I-V) and Capacitance-voltage (C-V) characteristics
D. Silicon processing
E. Very Large Scale Integration (VLSI) layout design rules
F. Delay estimation
G. Transistor sizing

H. Combinational circuit design
I. Circuit design of latches and flip flops
J. Datapath subsystems and Arithmetic and Logic Units (ALUs)
K. Array subsystems and memory
L. Input/Output and clocks
M. Hardware Definition Languages (HDLs) - Verilog, Very-high-speed integrated circuit (VHSIC) HDL, Verilog Hardware Description Language (VHDL)
N. VLSI engineering application and design

VII. **Suggested Texts**

Kaeslin, H. Digital Integrated Circuit Design: From VLSI Architectures to CMOS Fabrication, Cambridge University Press, Cambridge, UK, 2008.

Weste, N. and Harris, D. CMOS VLSI Design: A Circuits and Systems Perspective, 4th Edition, Addison Wesley, Boston, MA, 2010.

VIII. **Bibliography**

Lin, M. Introduction to VLSI Systems: A Logic, Circuit, and System Perspective. CRC Press, Boca Raton, FL, 2012.

Ramachandran, S. Digital VLSI Systems Design: A Design Manual for Implementation of Projects on FPGAs and ASICs Using Verilog, Springer, Dordrecht, NL, 2007.

Taur, Y. and Ning, T.H. Fundamentals of Modern VLSI Devices, Cambridge University Press, Cambridge, UK, 1998.

Uyemura, J.P. Introduction to VLSI Circuits and Systems, Wiley & Sons, New York, NY, 2001.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science and Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A445	CSE A445	4	(3+3)

6. Complete Course Title
Computer Design and Simulation

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☒ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions
- ☒ Other Course Content Guide (please specify)

9. Repeat Status No # of Repeats n/a Max Credits n/a

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1. BSE Computer Systems Engineering (major)	245	12/1/12	Kenrick Mock
2. BSE Electrical Engineering (selective)	246	12/1/12	Jens Munk
3. BSE Computer Systems Engineering (minor)	247	12/1/12	Kenrick Mock

Initiator Name (typed): Sam Siewert Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 12/1/2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12/1/2012

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Advanced study through simulation of computer organization including processor, memory and I/O system organization. Key elements include memory hierarchy and caching, computer arithmetic, instruction sets, addressing, interrupts, processor pipelines, I/O interconnection, and memory management including demand paging and Translation Lookaside Buffer (TLB) cache. Students learn metrics used to measure system performance and evaluate engineering tradeoffs made in design.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
(CSCE A248 and CSCE A311) with minimum grade of C.	n/a	n/a

16d. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
n/a

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Updated course content guide, prerequisites and title to better reflect course description.

Initiator (faculty only) Date
Sam Siewert
Initiator (TYPE NAME)

☐ Approved ☐ Disapproved Department Chairperson Date

☐ Approved ☐ Disapproved Curriculum Committee Chairperson Date

☐ Approved ☐ Disapproved Dean/Director of School/College Date

☐ Approved ☐ Disapproved Undergraduate/Graduate Academic Board Chairperson Date

☐ Approved ☐ Disapproved Provost or Designee Date

UNIVERSITY OF ALASKA ANCHORAGE
COURSE CONTENT GUIDE

I. Initiation Date: December 2012

II. Course Information

A. College/School: School of Engineering
B. Course Title: Computer Design and Simulation
C. Course Subject/Number: CSCE A445
D. Credit Hours: 4.0 Credits
E. Contact Time: 3+3 Contact Time
F. Grading Information: A-F
G. Course Description: This course presents the elements of computer design and computer architecture. Students will study processor, memory and I/O system organization. Key elements include memory hierarchy and cache, computer arithmetic, instruction sets, addressing, interrupts, processor pipelines, I/O interconnection, memory management systems including demand paging and Translation Look-aside Buffer (TLB) cache. Students learn metrics used to measure performance and evaluate engineering tradeoffs made in design.
H. Fees: Yes, standard SOE fee
I. Coordination: SOE and Faculty Listserv
J. Course Prerequisites: (CSCE A248 and CSCE A311) with minimum grade of C.
K. Registration Restrictions: None

III. Evaluation

Grades are based on written examination, class assignments, and projects.

IV. Course Level Justification

This course builds on knowledge of digital hardware, assembly language programming, computer organization, and high level computer programming provided at the 200 and 300 levels.

V. Outline

A. Lecture
1. Computer Evolution and Performance Metrics
2. The Computer System Elements
   a. Function and Connections
   b. Internal Memory Systems
   c. External Memory Systems
   d. Input/Output (I/O)
   e. Operating System Support
3. Central Processing Unit
   a. Computer Arithmetic
   b. Instruction Sets
   c. Addressing
   d. Processor Structure and Function

e. Reduced Instruction Set Computers (RISC)
f. Parallelism and Pipelining

4. Control Unit
   a. Control Unit Operation
   b. Micro-programmed Control (Vertical and Horizontal)
5. Memory System Organizations
   a. Caching
   b. Physical and Virtual Memory
   c. Demand Paging
   d. TLB's

B. Example Projects
1. Develop functions for the representation of data
2. Develop a loader used to load the simulated computers memory
3. Develop a skeletal computer simulation
4. Implement computer instructions and write a diagnostic program
5. Develop and add the I/O system to the simulation
6. Write and debug short assembly language programs and one project using the student's computer.

VI. Instructional Goals and Student Learning Outcomes

A. **Instructional Goals.** The instructor will:
1. Instill and develop student understanding of the principles of computer design and computer architecture.
2. Explain the engineering tradeoffs required for the design of modern computer systems.
3. Instruct students on the application of the computer design principles to the simulation of a RISC processor.

B. **Student Learning Outcomes.** Upon completion of this course, students will be able to:	**Assessment Methods**
1. Explain the operation of the building blocks of modern computer systems and use metrics to evaluate performance tradeoffs.	exams, quizzes, assignments, class projects
2. Demonstrate methodologies used in the design of computer systems.	exams, quizzes, assignments, class projects
3. Create appropriate connections using communication ports between computers.	exams, quizzes, assignments, class projects
4. Develop the necessary code to complete the course projects.	exams, quizzes, assignments, class projects
5. Implement course projects, test their operation, and report their findings to the instructor and colleagues.	class projects
6. Demonstrate recognition of the engineering	exams, quizzes, assignments, class

	tradeoffs necessary in the design of modern computer systems.	projects

VII. Suggested Texts

Hennessy, J. and Patterson, D. Computer Architecture, A Quantitative Approach, 5th Edition, Morgan Kaufmann, San Francisco, CA, 2012.

Stallings, W. Computer Organization and Architecture: Designing for Performance, 8th Edition, Prentice Hall, Upper Saddle River, NJ, 2010.

VIII. Bibliography and Resources

Comer, Douglas E., Essentials of Computer Architecture, Prentice Hall, Upper Saddle River, NJ, 2005.

Patterson, D.A. and Hennessy, J.L., Computer Organization and Design, Revised 4th Edition, Elsevier, Waltham, MA, 2012.

Ramachandran, U. and Leahy, W.D. An Integrated Approach to Architecture and Operating Systems, Addison-Wesley, Boston, MA, 2011.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science & Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A448	CSE A481	3	(3+0)

6. Complete Course Title
Computer Architecture

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☒ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☒ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions
- ☒ Other Course Content Guide, Department Code (please specify)

9. Repeat Status No # of Repeats Max Credits

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1. BSE CSE program requirement		12/10/2012	Kenrick Mock
2. BSE CSE minor		12/10/2012	Kenrick Mock
3.			

Initiator Name (typed): Randy Moulic

Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 12-10-12
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12-10-12

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
A quantitative approach to computer architecture and parallelism, which addresses both the software and hardware aspects of parallelism in modern computing systems. Specific emphasis will be placed on instruction-level, thread level, data-level, task-level, and request-level parallelism, and developing parallel application code in assembler and high-level languages for systems such as Graphics Processing Units (GPUs).

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
CSCE A248 with a minimum grade of C.	n/a	n/a

16d. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
n/a

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide. Title updated to more accurately reflect the course content with a corresponding prerequisite of the introductory computer organization course.

Initiator (faculty only) Date

Randy Moulic
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved Department Chairperson Date

☐ Approved
☐ Disapproved Curriculum Committee Chairperson Date

☐ Approved
☐ Disapproved Dean/Director of School/College Date

☐ Approved
☐ Disapproved Undergraduate/Graduate Academic Board Chairperson Date

☐ Approved
☐ Disapproved Provost or Designee Date

Course Content Guide
University of Alaska Anchorage
School of Engineering
Department of Computer Science and Engineering

I. **Revision Date**: December 10, 2012

II. **Course Information**

A. **College**: School of Engineering
B. **Course Subject/Number**: CSCE A448
C. **Credits**: 3
D. **Contact Hours**: 3 + 0
E. **Course Title**: Computer Architecture
F. **Repeat Status**: No
G. **Grading Basis**: A-F
H. **Course Description**: A quantitative approach to computer architecture and parallelism, which addresses both the software and hardware aspects of parallelism in modern computing systems. Specific emphasis will be placed on instruction-level, thread level, data-level, task-level, and request-level parallelism, and developing parallel application code in assembler and high-level languages for systems such as Graphics Processing Units (GPUs).
I. **Course Prerequisites**: CSCE A248 with minimum grade of C.
J. **Fees**: Yes, standard SOE fee
K. **Cross-listed**: N/A

III. **Course Level Justification**

This course is an advanced course that synthesizes concepts from computer architecture, programming, and algorithms to design and implement parallel computing hardware and software.

IV. **Instructional Goals and Student Learning Outcomes**

A. **Instructional Goals.** The instructor will:
1. Guide, and lead students by example in the understanding and use of parallel computation techniques and methodologies; recognizing and identifying Instruction Level Parallelism (ILP), data parallelism, thread level parallelism, and massive, request-level parallelism, and applying the appropriate parallel programming model.

2. Provide students with the necessary skills to write parallel programs in processor specific assembly languages, and parallel enabled high level languages, programming models such as the Open Computing Language (OpenCL), Compute Unified Device Architecture (CUDA), or Message Passing Interface (MPI).
3. Provide a cross-platform, parallel programming development environment and simulator for students to develop, write, test, and debug assembly code.
4. Emphasize both hardware and software aspects and parallelism, the interactions between them, and design optimizations for parallel hardware systems.
5. Expose students to current research challenges in the field, through class lectures and discussions, reading assignments, homework exercises.
6. Aid students in creating algorithms for solving parallel engineering problems, and preparing them for a large engineering application of writing the code executing in a CPU using software development and hybrid-GPU cluster.

B. **Student Learning Outcomes**. Upon completion of this course, students will be able to:	**Assessment method**
1. Demonstrate an understanding of fundamental principles of parallel system hardware and software architectures.	Assignments, Quizzes, Exams, Projects
2. Create practical applications of parallel system software and performance optimization.	Assignments, Quizzes, Exams, Projects
3. Identify, explain and map specific application needs for parallelism to the best-suited parallel system hardware and computing model or models.	Assignments, Quizzes, Exams, Projects
4. Write, debug, test and run parallel	Assignments, Quizzes,

assembly and high level, parallel enabled languages, exploiting multiple parallel programming models using computer system design software development tools and a hybrid - GPU server cluster.	Exams, Projects
5. Apply learning to design parallel hardware and software solutions.	Assignments, Quizzes, Exams, Projects

V. **Guidelines for Evaluation**

A. Assignments
B. Quizzes
C. Exams
D. Projects

VI. **Course Outline**

A. Quantitative Computer Design & Instruction Set Principles
B. Memory Hierarchy Design and Performance Optimizations
   1. Advanced optimizations for cache performance
   2. Memory technologies and system optimizations
   3. Virtual memory and virtual machines
C. Instruction-Level Parallelism (ILP)
   1. Instruction level parallelism concepts
   2. Compiler techniques for exposing ILP
   3. Branch prediction, data hazards, speculation
   4. ILP in multi issue architectures
D. Data-Level Parallelism in Vector, SIMD and GPU Architectures
   1. Vector co-processor architectures
   2. Single-instruction, multi-data (SIMD) extensions for technical, scientific and multimedia data.
   3. Graphics processing units
   4. Detecting and exploiting loop-level parallelism
   5. Personal computer, Smartphone, tablet GPUs for graphics and numerically intense computing applications.
   6. X86-Linux/Windows server-GPU clusters.
E. Thread-Level Parallelism
   1. Centralized, shared-memory architectures
   2. Performance of symmetric shared memory multiprocessors
   3. Distributed, shared memory systems
F. Massively parallel, Request-Level Parallelism
   1. Programming models and workloads for massively parallel warehouse-scale systems

2. Physical hardware infrastructure for warehouse servers
3. Improving system application performance using parallelism.
4. Limitations and capabilities of parallelism
5. Amdahl's law

VII. **Suggested Texts**

Hennessy, J. and Patterson, D. Computer Architecture, A Quantitative Approach, 5th Edition, Morgan Kaufmann, San Francisco, CA, 2012.

Tanenbaum, Andrew. Structured Computer Organization, 5th Edition, Prentice Hall, Upper Saddle River, NJ, 2005.

VIII. **Bibliography**

Null, L. and Lobur, J. Computer Organization and Architecture, 3rd Edition, Jones and Bartlett, Sudbury, MA, 2012.

Patterson, D. and Hennessy, J. Computer Organization and Design, The Hardware/Software Interface, Revised 4th Edition, Morgan Kaufmann, Waltham, MA, 2012.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science and Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A465	CSE A465	3	(3+0)

6. Complete Course Title
Computer and Network Security

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☒ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions
- ☒ Other Course Content Guide (please specify)

9. Repeat Status No # of Repeats n/a Max Credits n/a

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1. BSE CSE, requirement		12/1/12	Kenrick Mock
2. CSE Minor, selective		12/1/12	Kenrick Mock
3. BSE EE, selective		12/10/12	Jens Munk

Initiator Name (typed): Jeffrey Miller Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 12-10-12
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12-10-12

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Analysis of computer and network attack techniques and methods to defend against them including firewalls, virtual private networks; network intrusion detection; and denial of service. Course includes coverage of malware, packet sniffers, wireless networks, cellular networks, and wired networks.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
CSCE A365 with minimum grade of C.	n/a	n/a

16d. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
n/a

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide.

Initiator (faculty only) Date
Jeffrey Miller
Initiator (TYPE NAME)

☐ Approved ☐ Disapproved Department Chairperson Date

☐ Approved ☐ Disapproved Curriculum Committee Chairperson Date

☐ Approved ☐ Disapproved Dean/Director of School/College Date

☐ Approved ☐ Disapproved Undergraduate/Graduate Academic Board Chairperson Date

☐ Approved ☐ Disapproved Provost or Designee Date

Course Content Guide
University of Alaska Anchorage
School of Engineering
Department of Computer Science and Engineering

I. **Revision Date**: November 13, 2012

II. **Course Information**

A. **College**: School of Engineering
B. **Course Subject/Number**: CSCE A465
C. **Credits**: 3
D. **Contact Hours**: (3+0) 45 contact lecture hours (3 contact lecture hours/week x 15 weeks = 45) plus 90 hours outside work (6 hours outside lecture/week x 15 weeks = 90) for a total of 135 hours
E. **Course Title**: Computer and Network Security
F. **Repeat Status**: No
G. **Grading Basis**: A-F
H. **Course Description**: Analysis of computer and network attack techniques and methods to defend against them including firewalls, virtual private networks; network intrusion detection; and denial of service. Course includes coverage of malware, packet sniffers, wireless networks, cellular networks, and wired networks.
I. **Course Prerequisites**: CSCE A365 with minimum grade of C.
J. **Fees**: Yes, standard SOE fee

III. **Course Level Justification**

In this course students will use concepts covered at the 300 level to design, implement, and analyze the security of computer systems and networks.

IV. **Instructional Goals and Student Learning Outcomes**

A. **Instructional Goals.** The instructor will:
1. Provide an understanding of security problems encountered with computer network system.
2. Provide an understanding of the how to prevent network security breaches.
3. Provide a practical level of understanding of how to trace and identify network security threats.
4. Instill the importance of professionalism in the students and in their interaction with others.

B. **Student Learning Outcomes**. Students will be able to:	**Assessment method**
1. Identify potential security problems with computer networking systems.	Assignments, Exams, Project
2. Design security network systems resistant to attack.	Assignments, Exams, Project
3. Determine the source of network security threats.	Assignments, Exams, Project
4. Demonstrate professionalism in interactions with colleagues, faculty, and staff.	Assignments, Project

V. **Guidelines for Evaluation**

A. Assignments
B. Exams
C. Project

VI. **Topical Course Outline**

1. Introduction, Network Security Overview
2. Professionalism in Computer and Network Security
3. Types of Security Attacks and Services
4. Symmetric and Asymmetric Encryption
5. Recent Threats and Attacks
6. Kerberos
7. X.509
8. Pretty Good Privacy (PGP)
9. Secure/Multipurpose Internet Mail Extensions (S/MIME)
10. Internet Protocol Security
11. Secure Sockets Layer (SSL)
12. Transport Layer Security (TLS)
13. Simple Network Management Protocol (SNMP)
14. Wireless and Cellular Security
15. Denial of Service and Distributed Denial of Service (DoS/DDoS)
16. Firewalls
17. Database Security
18. Intrusion Detection and Identification
19. Obfuscation
20. Computer Forensics
21. Anonymity on the Internet (Digital Fingerprints)
22. Legal Implications to Security

VII. **Suggested Texts**

Kizza, J. Computer Network Security, Prentice Hall, Hoboken, NJ, 2010.
Stallings, W. and Brown, L. Computer Security: Principles and Practice, 2nd Edition, Prentice Hall, Hoboken, NJ, 2011.

VIII. **Bibliography**

Kurose, J. and Ross, K. Computer Networking: A Top-Down Approach, 4th Edition, Addison Wesley, Boston, MA, 2007.
Mir, N. Computer and Communication Networks, Prentice Hall, Upper Saddle River, NJ, 2006.
Panko, R. Corporate Computer and Network Security, 2nd Edition, Wiley and Sons, Boston, MA, 2011.
Peterson, L. and Davie, B. Computer Networks: A Systems Approach, 3rd Edition, Morgan Kaufmann, San Francisco, CA, 2003.
Tanenbaum, A. Computer Networks, 5th Edition, Prentice Hall, Hoboken, NJ, 2010.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science and Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A470	CS A470	3	(3+0)

6. Complete Course Title
Computer Science and Engineering Capstone Project
CSCE Capstone Project
Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☒ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions
- ☒ Other Course Content Guide (please specify)

9. Repeat Status No # of Repeats n/a Max Credits n/a

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with
☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1. BA, BS Computer Science	241-242	12/1/12	Kenrick Mock
2. GER Integrative Capstone Selective	87		
3.			

Initiator Name (typed): Kenrick Mock Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 12/10/2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12/10/2012

14. General Education Requirement
Mark appropriate box:
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☒ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Application of computer science and computer engineering concepts, principles, and practices to develop a research, applied software development, or computer engineering project. The student will analyze, design, document, implement, and deliver a presentation and written report of a research project or software/hardware system of moderate complexity under the supervision of the instructor and/or other faculty. Includes a discussion of ethical, professional, and contemporary issues in technology and the impact of computing technology in a global and societal context.

16a. Course Prerequisite(s) *(list prefix and number)*
{CSCE A365 and ENGL A212 and [(CSCE A351 and CSCE A401) or (CSCE A311 and CSCE A342 and CSCE A448)]} with minimum grade of C and (PHIL A305 with a minimum grade of C or concurrent enrollment)

16b. Test Score(s)
n/a

16c. Co-requisite(s) *(concurrent enrollment required)*
n/a

16d. Other Restriction(s)
☐ College ☐ Major ☒ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
Senior Standing and completion of GER Tier 1 (basic college-level skills) courses

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide. Description and title updated to allow research projects as the capstone project. Prerequisites updated to enforce that this course should be taken after the required core courses in the CS and CSE programs are completed.

Initiator (faculty only)	Date	☐ Approved ☐ Disapproved	Dean/Director of School/College — Date
Kenrick Mock Initiator (TYPE NAME)			
☐ Approved ☐ Disapproved	Department Chairperson — Date	☐ Approved ☐ Disapproved	Undergraduate/Graduate Academic Board Chairperson — Date
☐ Approved ☐ Disapproved	Curriculum Committee Chairperson — Date	☐ Approved ☐ Disapproved	Provost or Designee — Date

Course Content Guide
University of Alaska Anchorage
School of Engineering
Department of Computer Science and Engineering

I. **Revision Date**: December 20, 2012

II. **Course Information**

A. **College**: School of Engineering
B. **Course Subject/Number**: CSCE A470
C. **Credits**: 3
D. **Contact Hours**: (3+0) 45 contact lecture hours (3 contact lecture hours/week x 15 weeks = 45) plus 90 hours outside work (6 hours outside work x 15 weeks = 90) for a total of 135 hours
E. **Course Title**: Computer Science and Engineering Capstone Project
F. **Repeat Status**: No
G. **Grading Basis**: A-F
H. **Course Description**: Application of computer science and computer engineering concepts, principles, and practices to develop a research, applied software development, or computer engineering project. The student will analyze, design, document, implement, and deliver a presentation and written report of a research project or software/hardware system of moderate complexity under the supervision of the instructor and/or other faculty. Includes a discussion of ethical, professional, and contemporary issues in technology and the impact of computing technology in a global and societal context.
I. **Course Prerequisites**: {CSCE A365 and ENGL A212 and [(CSCE A351 and CSCE A401) or (CSCE A311 and CSCE A342 and CSCE A448)]} with minimum grade of C and (PHIL A305 with a minimum grade of C or concurrent enrollment)
J. **Fees**: Yes, standard SOE fee
K. **Course Attributes**: GER Integrative Capstone
L. **Registration Restrictions**: Senior Standing and completion of GER Tier 1 (basic college-level skills) courses

III. **Course Level Justification**

Students entering this course must have a strong background in core areas of computer science or computer systems engineering to successfully design and implement their own software or hardware system. This knowledge requires completion of a majority of junior-level CSCE courses. In addition, students must have a solid understanding of technical writing (ENGL A212) and communication skills.

IV. Instructional Goals and Student Learning Outcomes

A.	**Instructional Goals.** The instructor will:
1.	Present principles of project management and quality system design.
2.	Demonstrate the technology project lifecycle to address a real-world problem, including project selection, requirements analysis, design, implementation, writing a final report, and delivering a technical presentation.
3.	Present principles of user interface design.
4.	Present effective coding practices for maintainability and efficiency.
5.	Introduce ethical, professional, and legal issues in computer science
6.	Explain the impact of computing technology in a global and societal context.

B.	**Student Learning Outcomes**. Students will be able to:	**Assessment method**	**GER Integrative Capstone Goals**
1.	Demonstrate the ability to apply technical, managerial, communications, and interpersonal skills to a realistic project of moderate complexity.	Project, Assignments, Exams	Knowledge Integration, Effective Communication, Critical Thinking
2.	Synthesize and integrate multiple computing technologies (e.g. object-oriented programming, database design, computer architecture, graphics, etc.) to create a comprehensive hardware/software system or research project.	Project, Assignments, Exams	Knowledge Integration, Quantitative Perspective
3.	Write technical documents and deliver oral presentations to communicate their work.	Project, Assignments	Knowledge Integration, Effective Communication, Information Literacy
4.	Identify situations involving professional, ethical, or legal issues and formulate ways to address the situations.	Assignments	Knowledge Integration, Critical Thinking
5.	Identify the impact of computing technology to both local and global contexts.	Assignments, Project	Knowledge Integration, Critical Thinking

V. Guidelines for Evaluation

A. Project (written report, oral presentation)
B. Assignments
C. Exams

VI. **Topical Course Outline**

Many of the following activities are examined in the context of the student's project.

A. Project Lifecycle Models
    i. Waterfall
    ii. Prototyping
    iii. Agile development
    iv. Project management
B. Requirements Analysis and Design
    i. User-centered design
    ii. User Modeling Language (UML), automata, Entity-Relationship (ER) diagrams
C. Quality Assurance
    i. Testing
    ii. Debugging
    iii. Effective coding practice
D. Graphical User Interface Design
    i. Usability engineering
    ii. Graphical layout
    iii. Human Computer Interaction (HCI)
E. Presentation and Technical Writing Best-Practices
F. Technology and Society
    i. Intellectual Property (IP)
        1. Patents
        2. Trademarks
        3. Trade secrets
        4. Copyright
        5. Plagiarism
        6. Licenses
    ii. Legal issues
    iii. Local and global impact
    iv. Globalization
    v. Ethics
        1. Morals, ethics, laws
        2. Deontological and teleological theories
        3. Ethical decision making process
        4. Professional societies and codes of ethics
        5. Responsible conduct of research
    vi. Privacy and civil liberties
    vii. Computer crime
        1. Exploits
        2. Prevention

VII. Suggested Texts

Ford, R. and Coulston, C. Design for Electrical and Computer Engineers. McGraw Hill, New York, NY, 2007.

Johnson, J. GUI Bloopers 2.0: Dont's and Do's for Software Developers and Web Designers. Morgan Kaufmann, Boston, MA, 2007.

McConnell, S. Code Complete, 2nd Edition, Microsoft Press, Redmond, WA, 2004.

VIII. Bibliography

Beer, D. and McMurrey, D. A Guide to Writing as an Engineer. John Wiley and Sons, Hoboken, NJ, 2009.

Gustafson, D. Schaum's Outline of Software Engineering. McGraw-Hill, New York, NY, 2002.

Johnson, J. Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Rules. Morgan Kaufmann, Boston, MA 2010.

Lazar, J. Web Usability : A User-Centered Design Approach. Addison Wesley, Boston, MA, 2005.

McConnell, S. Rapid Development: Taming Wild Software Schedules, Microsoft Press, Redmond, WA, 1996.

McConnell, S. Professional Software Development: Shorter Schedules, Better Projects, Superior Products, Enhanced Careers. Addison Wesley, Boston, MA, 2004.

Pressman, R. Software Engineering: A Practitioner's Approach, 7th Edition, McGraw-Hill, New York, NY, 2009.

Rasmussen, J. The Agile Samurai: How Agile Masters Deliver Great Software, Pragmatic Programmer, 2011. eBook: http://pragprog.com/book/jtrap/the-agile-samurai

Rubin, K.S. Essential Scrum: A Practical Guide to the Most Popular Agile Process. Addison Wesley Professional, Ann Arbor, MI, 2012.

Sims, C. and Johnson, H.L. The Elements of Scrum. Dymaxicon, Foster City, CA, 2011.

Sommerville, I. Software Engineering, 9th Edition, Addison Wesley, Boston, MA, 2010.

van Vliet, H. Software Engineering: Principles and Practice, 3rd Edition, John Wiley and Sons, Hoboken, NJ, 2008.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science and Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A490	CS A490	3	(3+0)

6. Complete Course Title
Topics in Computer Science & Computer Systems Engineering
Topics in CS and CSE
Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☒ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions
- ☒ Other Course Content Guide (please specify)

9. Repeat Status Yes # of Repeats n/a Max Credits n/a

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with
☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.
Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1. BA and BS, Computer Science	241-242	12/1/12	Kenrick Mock
2. BSE Computer Systems Engr Selective	245	12/1/12	Kenrick Mock
3.			

Initiator Name (typed): Kenrick Mock Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 12/10/2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12/10/2012

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Advanced Topics in Computer Science or Computer Systems Engineering not taught in other CSCE course offerings. Special Note: May be repeated for credit with a change of subtitle/topic.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
n/a	n/a	n/a

16d. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
Instructor approval

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☒ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide.

Initiator (faculty only) Date
Kenrick Mock
Initiator (TYPE NAME)

☐ Approved ☐ Disapproved Department Chairperson Date

☐ Approved ☐ Disapproved Curriculum Committee Chairperson Date

☐ Approved ☐ Disapproved Dean/Director of School/College Date

☐ Approved ☐ Disapproved Undergraduate/Graduate Academic Board Chairperson Date

☐ Approved ☐ Disapproved Provost or Designee Date

Course Content Guide
University of Alaska Anchorage
School of Engineering
Department of Computer Science and Engineering

I. **Revision Date**: December 1, 2012

II. **Course Information**

A. **College**: School of Engineering
B. **Course Subject/Number**: CSCE A490
C. **Credits**: 3
D. **Contact Hours**: (3+0) 45 contact lecture hours (3 contact lecture hours/week x 15 weeks = 45) plus 90 hours outside work (6 hours outside work x 15 weeks = 90) for a total of 135 hours
E. **Course Title**: Topics in Computer Science and Computer Systems Engineering
F. **Repeat Status**: Yes
G. **Grading Basis**: A-F
H. **Course Description**: Advanced Topics in Computer Science and Engineering not taught in other CSCE course offerings.
I. **Course Prerequisites**: None
J. **Fees**: Yes, standard SOE fee
K. **Registration Restrictions**: Instructor approval
L. **Special Topics**: Yes, standard SOE fee

III. **Course Level Justification**

This course is typically taught nationwide at the senior level as the student is expected to have appropriate expertise and background for a senior-level topics course.

IV. **Instructional Goals and Student Learning Outcomes**

The instructional goals and student outcomes will vary depending upon the course taught. An example from "Computer Graphics and Machine Vision" follows.

A.	**Instructional Goals.** The instructor will:
1.	Instill and develop student understanding of both machine and computer vision
2.	Instruct students on the use of computer and machine vision algorithms

B. **Student Learning Outcomes**. Students will be able to:	**Assessment method**
1. Explain the implementation and use of machine and computer vision for automation and interaction	exams, quizzes, assignments, class projects
2. Demonstrate methodologies used in the design of machine vision systems	exams, quizzes, assignments, class projects
3. Demonstrate methodologies used in the design of machine vision systems	exams, quizzes, assignments, class projects
4. Develop the necessary code to complete the course projects	exams, quizzes, assignments, class projects
5. Implement course projects, test their operation, and report their findings to the instructor and colleagues	class projects
6. Demonstrate recognition of the engineering tradeoffs necessary in the design of production machine vision systems	exams, quizzes, assignments, class projects

V. **Guidelines for Evaluation**

Because this is a selected topics course, the exact focus of the course may vary depending on the topic addressed. However, in general, the course will involve a combination of:

A. Discussion
B. Lecture
C. Exams
D. Quizzes
E. Projects
F. Homework Assignments

VI. **Topical Course Outline**

The course outline will vary with the topic. A sample from "Computer Graphics and Machine Vision" follows.

A. Computer and Machine Vision History
B. Image Capture and Processing
C. Edge Detection
D. Shape Analysis and Detection
E. Extracting 3D Models from Scenes
F. Real-time Pattern Recognition
G. Computer Vision Fundamentals
H. Interactive Applications
I. MATLAB® and Open Computer Vision (OpenCV)

VII. **Suggested Texts**

The texts will vary with the topic. A sample from "Computer Graphics and Machine Vision" follows.

Davies, E.R., Computer and Machine Vision: Theory, Algorithms, Practicalities, Elsevier, San Francisco, CA, 2012.

VIII. **Bibliography**

The bibliography will vary with the topic. A sample from "Computer Graphics and Machine Vision" follows.

Prince, J.D.S. Computer Vision: Models, Learning, and Inference, Cambridge University Press, New York, NY, 2012.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science and Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A495	CS A495	3	(0+9)

6. Complete Course Title
Computing Internship Project

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☒ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Course Number
- ☒ Contact Hours
- ☒ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions
- ☒ Other Course Content Guide (please specify)

9. Repeat Status Yes # of Repeats 2 Max Credits 9

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1. CS BA and BS	241-242	11/26/12	Kenrick Mock
2.			
3.			

Initiator Name (typed): Kenrick Mock Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 12/10/2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12/10/2012

14. General Education Requirement
Mark appropriate box:
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Application of computer science or computer engineering skills in a professional work setting. The student will analyze, design, develop, and document a realistic computing project of moderate complexity under the supervision of a qualified professional who has agreed in advance to undertake this role. Special Note: May be taken up to three times, but only 3 credits may be applied toward CS or CSE major requirements.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
CSCE A311 with minimum grade of C.	n/a	n/a

16d. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
Instructor approval

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide. Purposefully no longer satisfies the CS (not GER) capstone requirement. Students must enroll in CSCE A470 to complete the CS capstone which includes ethics, SW Development, professional development, and user interface material. Students can still use a qualifying project with an employer as their capstone project in CSCE A470.

Initiator (faculty only)	Date	☐ Approved ☐ Disapproved	Dean/Director of School/College	Date
Kenrick Mock Initiator (TYPE NAME)				
☐ Approved ☐ Disapproved	Department Chairperson	Date	☐ Approved ☐ Disapproved	Undergraduate/Graduate Academic Board Chairperson	Date
☐ Approved ☐ Disapproved	Curriculum Committee Chairperson	Date	☐ Approved ☐ Disapproved	Provost or Designee	Date

Course Content Guide
University of Alaska Anchorage
School of Engineering
Department of Computer Science and Engineering

I. **Revision Date**: December 12, 2012

II. **Course Information**

A. **College**: School of Engineering
B. **Course Subject/Number**: CSCE A495
C. **Credits**: 3
D. **Contact Hours**: (0+9) 0 contact lecture hours plus 135 hours outside work (9 hours outside work x 15 weeks = 135) for a total of 135 hours
E. **Course Title**: Internship in Computing
F. **Repeat Status**: Yes, up to 9 credits
G. **Grading Basis**: P/NP
H. **Course Description**: Application of computer science or computer engineering skills in a professional work setting. The student will analyze, design, develop, and document a realistic computing project of moderate complexity under the supervision of a qualified professional who has agreed in advance to undertake this role. Special Note: May be taken up to three times, but only 3 credits may be applied toward CS or CSE major requirements.
I. **Course Prerequisites**: CSCE A311 with minimum grade of C.
J. **Fees**: Yes, standard SOE fee
K. **Registration Restrictions**: Instructor approval

III. **Course Level Justification**

This course is designed to give senior computer science or computer systems engineering major an opportunity to apply computing skills in a professional work setting. The student spends the semester at a job site with a field supervisor providing assignments and a faculty liaison oversees the scope and quality of the work. The student is required to have knowledge of data structures and algorithms before enrolling in the course to ensure programming competency. Students placed into this course must have a project that includes analysis, design, development, and documentation of a project of moderate complexity.

IV. **Instructional Goals and Student Learning Outcomes**

A.	**Instructional Goals.** The instructor will:
1.	Provide students with professional work experience in the field of computing.

B. **Student Learning Outcomes**. Students will be able to:	**Assessment method**
1. Apply acquired computing skills in a professional work setting consistent with the background of the student	Project implementation, Employer Evaluation
2. Professionally communicate the requirements, design, and implementation of their computing project	Oral presentation and written report
3. Synthesize and integrate systems analysis, systems design, system implementation, and documentation of a computing project	Project implementation, Employer Evaluation, oral presentation, written report

V. **Guidelines for Evaluation**

A. Project implementation
B. Employer evaluation
C. Oral presentation
D. Written report

VI. **Topical Course Outline**

A. Understand the Computing Needs of the Organization
    1. Understand the goals and objectives
    2. Understand the personnel and organization
    3. Recognize effective and accurate computing practice
    4. Understand the standards and practices commonly used by the organization
B. Apply Computing Skills to a Professional Work Setting
    1. Tailor computing to meet the objectives and follow the standards of the organization and the discipline
    2. Produce desired work products
C. Develop a Relationship with the Organization
    1. Communicate effectively on the job site
    2. Determine tasks that are needed and that may not have been foreseen by the organization
    3. Seek and incorporate critical analysis into work
D. Project Lifecycle
    1. Systems analysis and requirements
    2. Systems design
    3. Implementation
    4. Testing
    5. Documentation
    6. Maintenance
E. Maintain Appropriate Materials for Evaluation
    1. Keep log and portfolio of work
    2. Communicate with faculty liaison and job supervisor on a regular basis
    3. Work independently within the collaborative framework of the internship
F. Deliver Final Written Report and Oral Presentation

VII. **Suggested Texts**

An appropriate text will be selected based on the nature of the internship.

VIII. **Bibliography**

Blanchard, B. S. System Engineering Management. John Wiley and Sons, Hoboken, NJ, 2008.

Eisner, H. Essentials of Project and Systems Engineering Management. John Wiley and Sons, Hoboken, NJ, 2002.

McConnell, S. Professional Software Development: Shorter Schedules, Better Projects, Superior Products, Enhanced Careers. Addison Wesley, Boston, MA, 2004.

Rubin, K.S. Essential Scrum: A Practical Guide to the Most Popular Agile Process. Addison Wesley Professional, Ann Arbor, MI, 2012.

Sims, C. and Johnson, H.L. The Elements of Scrum. Dymaxicon, Foster City, CA, 2011.

Sommerville, I. Software Engineering, 9th Edition, Addison Wesley, Boston, MA, 2010.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
EN SOENGR	No Division Code	Computer Science & Engineering

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CSCE	A498	CS A498	1-3	(1-3+0)

6. Complete Course Title
Individual Research

Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☒ Prefix
- ☐ Credits
- ☐ Title
- ☐ Grading Basis
- ☐ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☐ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions
- ☒ Other Course Content Guide (please specify)

9. Repeat Status Yes # of Repeats 5 Max Credits 6

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: 99/9999

12. ☐ Cross Listed with

☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Catalog Page(s) Impacted*	*Date of Coordination*	*Chair/Coordinator Contacted*
1.			
2.			
3.			

Initiator Name (typed): Frank Moore Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 12-10-2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 12-10-2012

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Students will engage in an independent research project under the supervision of a faculty member. The result will be a paper or presentation prepared to publication standards. Special note: May be repeated up to a maximum of 6 credits.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
n/a	n/a	n/a

16d. Other Restriction(s)
☐ College ☐ Major ☒ Class ☐ Level

16e. Registration Restriction(s) *(non-codable)*
Upper division standing and instructor permission.

17. ☒ Mark if course has fees Yes, standard SOE fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Revision to establish a course common to both the Computer Science and Computer Systems Engineering programs and update the course content guide.

Initiator (faculty only) Date

Frank Moore
Initiator (TYPE NAME)

☐ Approved ☐ Disapproved Department Chairperson Date

☐ Approved ☐ Disapproved Curriculum Committee Chairperson Date

☐ Approved ☐ Disapproved Dean/Director of School/College Date

☐ Approved ☐ Disapproved Undergraduate/Graduate Academic Board Chairperson Date

☐ Approved ☐ Disapproved Provost or Designee Date

Course Content Guide
University of Alaska Anchorage
School of Engineering
Department of Computer Science and Engineering

I. **Revision Date**: December 10, 2012

II. **Course Information**

A. **College**: School of Engineering
B. **Course Subject/Number**: CSCE A498
C. **Credits**: 1-3
D. **Contact Hours**: (1-3 + 0)
E. **Course Title**: Individual Research
F. **Repeat Status**: Yes
G. **Grading Basis**: A-F
H. **Course Description**: Students will engage in an independent research project under the supervision of a faculty member. The result will be a paper or presentation prepared to publication standards. Special note: May be repeated up to a maximum of 6 credits.
I. **Course Prerequisites**: Upper division standing and instructor permission.
J. **Fees**: Yes, standard SOE fee
K. **Cross-listed**: No

III. **Course Level Justification**

The course requires understanding of fundamental concepts in computer science or computer engineering. Selected upper division courses may also be necessary depending upon the nature of the research.

IV. **Instructional Goals and Student Learning Outcomes**

A. **Instructional Goals.** The instructor will:
1. Present topics of current research to students.
2. Teach students about the nature of computing research.
3. Teach students about scientific research methods.
4. Provide students with the opportunity to perform original research in applied or theoretical computing.
5. Teach students how to present at a conference or publish in a journal.

B. **Student Learning Outcomes**. Students will be able to:	**Assessment method**
1. Discuss topics of current research.	Project Proposal, Project, Final Report

2. Utilize scientific literature and resources.	Project Proposal, Project, Final Report
3. Apply the scientific method by conducting original research in computing.	Project, Final Report
4. Utilize design, development, and analysis skills to conduct original research in computing.	Project, Final Report
5. Deliver a research presentation.	Presentation
6. Complete a technical paper prepared to publication standards.	Technical Paper

V. Guidelines for Evaluation

A. Project Proposal
B. Project
C. Final Report
D. Presentation
E. Technical Paper

VI. Topical Course Outline

This course involves independent research under the direction of a faculty supervisor. Topics researched will vary.

VII. Suggested Texts

None.

VIII. Bibliography

The bibliography will depend upon the selected research topic.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
MA Mat-SU	No Division Code	n/a

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
RE	A100		3	(3+0)

6. Complete Course Title
Introduction to Sustainable Energy
Intro Sustainable Energy
Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☐ Prefix
- ☐ Credits
- ☒ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Other (please specify)
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☐ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status No # of Repeats Max Credits

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: FALL /2013 To: /9999

12. ☐ Cross Listed with
☐ Stacked with _____ Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Date of Coordination*	*Chair/Coordinator Contacted*
1. Sustainable Energy Occupational Endorsement Certificate	02/11/2013	Mark Masteller
2.		
3.		

Initiator Name (typed): Mark Masteller Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 02/08/2013
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 02/14/2013

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Introduces students to the field of sustainable energy. Topics include current energy use, principles of energy conservation and efficiency, renewable energy resources, technologies, storage and hardware options, regulations, applicable codes, and career pathways.

16a. Course Prerequisite(s) *(list prefix and number or test code and score)*	16b. Co-requisite(s) *(concurrent enrollment required)*
None	n/a
16c. Other Restriction(s) ☐ College ☐ Major ☐ Class ☐ Level	16d. Registration Restriction(s) *(non-codable)* n/a
17. ☐ Mark if course has fees	18. ☐ Mark if course is a selected topic course

19. Justification for Action
Align core program course title with new certificate title that more accurately reflects program content including energy conservation/efficiency and renewable energy production.

Initiator (faculty only) Date Mark Masteller Initiator (TYPE NAME)	☐ Approved ☐ Disapproved Dean/Director of School/College Date
☐ Approved ☐ Disapproved Department Chair Date	☐ Approved ☐ Disapproved Undergraduate/Graduate Academic Board Chair Date
☐ Approved ☐ Disapproved College/School Curriculum Committee Chair Date	☐ Approved ☐ Disapproved Provost or Designee Date

UNIVERSITY OF ALASKA ANCHORAGE
COURSE CONTENT GUIDE

I. Initiation Date: February 2013

II. Course Information

A.	College:	Mat-Su College
B.	Course Prefix:	RE – Renewable Energy
C.	Course Number:	RE A100
D.	Credit Hours:	3.0 (3+0) Contact Time
E.	Course Title:	Introduction to Sustainable Energy
F.	Grading Basis:	A-F
G.	Implementation Date:	Fall 2013
H.	Cross Listing:	Not applicable
I.	Stacking:	Not applicable

J. Course Description:

Introduces students to the field of sustainable energy. Topics include current energy use, principles of energy conservation and efficiency, renewable energy resources, technologies, storage and hardware options, regulations, applicable codes, and career pathways.

K.	Course Attributes:	Not applicable
L.	Course Prerequisites/Other Restrictions	
	i. Prerequisites:	None
	ii. Registration Restrictions:	None
M.	Course/Lab Fees:	No

III. Course Level Justification

Introduces the field of knowledge related to current energy use, energy conservation/efficiency, and renewable energy production. Includes vocabulary, fundamental concepts, and skills required to pursue employment and further training in the sustainable energy field. No previous knowledge or experience is necessary.

IV. Instructional Goals and Student Learning Outcomes

A. The instructor will:

- Introduce the principles, technical requirements, and applications of solar, wind, hydro, geothermal and thermal energy, and energy storage
- Introduce the concepts and principles of energy conservation and efficiency
- Introduce standardized vocabulary and terminology
- Introduce the legislative framework surrounding small- and large-scale renewable energy systems, including local codes and laws governing the construction and operation of systems
- Introduce the different career pathways in the field of sustainable energy resources (planning, permits, design, construction, maintenance, and operations)

B. Defined Student Learning Outcomes. Student will be able to:

Student Learning Outcomes	Measures
Demonstrate understanding of the principles, technical requirements, and applications of solar, wind, hydro, geothermal and thermal energy, and energy storage	Quizzes, exams, class discussions, and written assignments
Identify the concepts and principles of energy conservation and efficiency	Quizzes, exams, class discussions, written assignments, and presentations
Use standardized vocabulary and terminology	Quizzes, exams, and reports
Demonstrate understanding of the legislative framework surrounding small- and large-scale renewable energy systems, including local codes and laws governing the construction and operation of systems	Exams, class discussions, and written assignments
Explore the different career pathways in the field of sustainable energy resources (planning, permits, design, construction, maintenance, and operations)	Exams, class discussions, and projects

V. Evaluation/Assessment Methods

Various assessment tools can be used at the instructor's discretion including quizzes, homework, in-class presentations, class participation, independent projects, and exams.

VI. Suggested Course Outline

A. Introduction to Sustainable Energy
   1. Types of renewable energy systems
   2. Energy applications (electricity and heat)
   3. Renewable energy resources
   4. Energy science basics

B. Energy Conservation and Efficiency
   1. Design considerations and audits
   2. Calculating energy losses, gains, and overall efficiency
   3. Building efficiency overview

C. Inverters and Rectifiers
   1. Principles of AC and DC electricity
   2. Inverter principles and application
   3. Principles of DC voltage regulation

D. Energy Storage
   1. Principles of energy storage
   2. Operation, configuration, and maintenance of battery systems
   3. Safety issues with batteries

E. Photovoltaic (PV) Electricity Generation
   1. Solar resource assessment
   2. Principles of PV technology
   3. PV module installation and operation
   4. System configuration and limitations

F. Wind Electricity Generation
    1. Resource assessment
    2. Turbine components and configuration
    3. Turbine rating
    4. System installation, operation, and limitations
G. Hydropower Electricity Generation
    1. Resource assessment
    2. Run-of-river and dam-based systems
    3. Turbine types
    4. Penstock design, transmission, and construction
    5. Diversion loads
    6. System operation, limitations, and configuration
H. Geothermal Energy
    1. Resource assessment – high temperature and low temperature
    2. Power plant configuration for high- and low-temperature sources
    3. Reinjection requirements
    4. System operation, limitations, and outlook
I. Heating with Renewable Energy
    1. Principles of heat transfer
    2. Principles of passive and active space and water heating
J. Legal Framework
    1. Overview of federal legislation
    2. Overview of state legislation
    3. Permit requirements for construction and operation
    4. Current initiatives
K. Employment Considerations
    1. Political, social, and economic considerations
    2. Overview of duties, skills, and responsibilities
    3. Legal aspects of the profession

VII. Suggested Text

Kemp, W. H. (2009). *The renewable energy handbook* (3rd ed.).Tamworth, Canada: Aztext.

MacKay, D. J. C. (2009). *Sustainable energy – without the hot air*. Cambridge, England: UIT Cambridge.

VIII. Bibliography and Resources

Boyle, G. (2012). *Renewable energy: Power for a sustainable future* (3rd ed.) New York, NY: Oxford University.

Chiras, D. (2011). *The homeowner's guide to renewable energy*. Gabriola Island, Canada: New Society.

Kemp, W. H. (2009). *The renewable energy handbook* (3rd ed.). Tamworth, Canada: Aztext.

Komor, P. (2004). *Renewable energy policy*. Lincoln, NE: iUniverse.

MacKay, D. J. C. (2009). *Sustainable energy – without the hot air*. Cambridge, England: UIT Cambridge.

United State Department of Energy. (n.d.). Retrieved from http://www.energy.gov

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
MA Mat-SU	No Division Code	n/a

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
RE	A102		3	(3+0)

6. Complete Course Title
Applied Physics for Sustainable Energy
Appl Physics Sustain Energy
Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☐ Prefix
- ☐ Credits
- ☒ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Other (please specify)
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☐ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status No # of Repeats Max Credits

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: FALL /2013 To: /9999

12. ☐ Cross Listed with
☐ Stacked with
Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Date of Coordination*	*Chair/Coordinator Contacted*
1. Sustainable Energy Occupational Endorsement Certificate	02/11/2013	Mark Masteller
2.		
3.		

Initiator Name (typed): Mark Masteller Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 02/08/2013
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 02/14/2013

14. General Education Requirement
Mark appropriate box:
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Introductory course for students considering a career in sustainable energy. Includes the physical principles for energy efficiency and various renewable energy technologies including solar, wind, hydropower, and geothermal. Demonstrates how the principles of physics relate to the design, basic operation, advantages, and limitations of sustainable energy projects.

16a. Course Prerequisite(s) *(list prefix and number or test code and score)*
RE A100 or concurrent enrollment

16b. Co-requisite(s) *(concurrent enrollment required)*

16c. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16d. Registration Restriction(s) *(non-codable)*
Placement into MATH A055 or higher

17. ☐ Mark if course has fees

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Align course title with revised certificate title that more accurately reflects program content including energy conservation/efficiency and renewable energy production.

Initiator (faculty only) Date
Mark Masteller
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved
Department Chair Date

☐ Approved
☐ Disapproved
College/School Curriculum Committee Chair Date

☐ Approved
☐ Disapproved
Dean/Director of School/College Date

☐ Approved
☐ Disapproved
Undergraduate/Graduate Academic Board Chair Date

☐ Approved
☐ Disapproved
Provost or Designee Date

UNIVERSITY OF ALASKA ANCHORAGE
COURSE CONTENT GUIDE

I. Initiation Date: February 2013

II. Course Information

A. College: Mat-Su College
B. Course Prefix: RE – Renewable Energy
C. Course Number: RE A102
D. Credit Hours: 3.0 (3+0) Contact Time
E. Course Title: Applied Physics for Sustainable Energy
F. Grading Basis: A-F
G. Implementation Date: Fall 2013
H. Cross Listing: Not applicable
I. Stacking: Not applicable
J. Course Description:

Introductory course for students considering a career in sustainable energy. Includes the physical principles for energy efficiency and various renewable energy technologies including solar, wind, hydropower, and geothermal. Demonstrates how the principles of physics relate to the design, basic operation, advantages, and limitations of sustainable energy projects.

K. Course Attributes: Not applicable
L. Course Prerequisites/Other Restrictions
   i. Prerequisites: RE A100 or concurrent enrollment
   ii. Registration Restrictions: Placement into MATH A055 or higher
M. Course/Lab Fees: No

III. Course Level Justification

Introduces the vocabulary, physical laws, and underlying concepts of systems required in the sustainable energy field.

IV. Instructional Goals and Student Learning Outcomes

A. The instructor will:

- Introduce applicable terminology relating to the physical laws of sustainable energy
- Introduce the basic laws of physics that apply to sustainable energy systems
- Introduce the mechanical and electrical principles required to understand sustainable energy systems
- Explain the laws of physics as applied to the production and control of electrical energy systems

B. Defined Student Learning Outcomes. Student will be able to:

Student Learning Outcomes	Measures
Define terminology relating to the physical laws of sustainable energy	Quizzes, class discussions, and exams
Identify the basic laws of physics that apply to sustainable energy	Quizzes, class discussions, written assignments, and exams
Describe the mechanical and electrical principles required to understand sustainable energy systems	Quizzes, class discussions, and written assignments
Explain the laws of physics as applied to the production and control of electrical energy systems	Quizzes, class discussions, written assignments, and exams

V. Evaluation/Assessment Methods

Various assessment tools can be used at the instructor's discretion including quizzes, homework, in-class presentations, class participation, independent projects, and exams.

VI. Suggested Course Outline

A. Matter and Molecules
   1. Bohr's Law
   2. Physical properties
   3. Mass and weight
   4. Heat vs. temperature
      a. Molecular movement
      b. Applications to thermal storage
   5. Changes of state

B. Newton's Laws
   1. The First Law of Motion
   2. The Second Law of Motion
   3. The Third Law of Motion
   4. Applications to sustainable energy

C. Forms of Energy Used in Sustainable Energy Technologies
   1. Chemical
      a. Combustion
      b. Batteries
      c. Biochemical
   2. Mechanical
   3. Thermal
   4. Radiant
   5. Electrical

D. Thermodynamics of Sustainable Energy
   1. Law of Conservation of Energy
   2. Energy conversions
   3. Conversion efficiencies
   4. Perfect-Gas Law
   5. Examples of thermodynamic processes in sustainable energy

E. Basic Electricity Concepts
   1. Electron movement
   2. Bohr's Theory of Atomic Structure
   3. Energy forms causing electron movement
   4. Complete circuits
   5. Series and parallel circuits
   6. Conductors, semi-conductors, and insulators
   7. Voltage, current, resistance, and power
   8. Ohm's Law and The Power Law
   9. DC and AC

F. Use of Magnetism in Sustainable Energy
   1. Natural and artificial magnets
   2. Magnetic polarity
   3. Electromagnets
   4. Left Hand Rule for a conductor
   5. Left Hand Rule for a coil
   6. Sustainable energy applications for electromagnetic devices

G. Magnetoelectric Effect
   1. Electrical generation by magnetism
   2. Electrical waveforms
   3. Left Hand Rule for a generator
   4. Generators vs. alternators
   5. Transformers

H. Photovoltaic (PV)
   1. PN junctions
   2. PV cell construction
   3. The PV array

I. Electrical Safety
   1. Factors affecting current flow through the body
   2. Effects of current flow through the body
   3. Hazardous working conditions and equipment safety in sustainable energy technologies
   4. Grounding
   5. Emergency response for electrical injury

J. Phase Shift and Power Factor
   1. Capacitive circuits
   2. Inductive circuits
   3. Power factor correction

VII. Suggested Text

De Pree, G. (2004). *Physics made simple*. New York, NY: Broadway.

VIII. Bibliography and Resources

Boyle, G. (2012). *Renewable energy: Power for a sustainable future* (3rd ed.). New York, NY: Oxford University.

Craddock, D. (2008). *Renewable energy made easy: Free energy from solar, wind, hydropower, and other alternative energy sources*. Ocala, FL: Atlantic.

Da Rosa, A. V. (2009). *Fundamentals of renewable energy processes* (2nd ed.). Amsterdam, Netherlands: Elsevier Academic.

De Pree, G. (2004). *Physics made simple*. New York, NY: Broadway.

Gussow, M., & Gussow, M. (2007). *Schaum's outline of basic electricity*. New York, NY: McGraw-Hill.

Hafemeister, D. W. (2008). *Physics of sustainable energy: Using energy efficiently and producing it renewably*. Melville, NY: American Institute of Physics.

Kreith, F., & Goswami, D. Y. (2007). *Handbook of energy efficiency and renewable energy*. Boca Raton, FL: CRC.

Kruger, P. (2006). *Alternative energy resources: The quest for sustainable energy*. Hoboken, NJ: John.

Lichtenberg, D. B. (2007). *The universe and the atom*. Singapore: World Scientific.

National Energy Policy Development Group. (2001). *Reliable, affordable, and environmentally sound energy for America's future*. Washington, DC: Author.

Paksoy, H. O. (2007). *Thermal energy storage for sustainable energy consumption: Fundamentals, case studies and design*. NATO science series. Dordrecht, Germany: Springer.

Quaschning, V. (2005). *Understanding renewable energy systems*. London, England: Earthscan.

Sørensen, B. (2011). *Renewable energy: Physics, engineering, environmental impacts, economics, and planning* (4th ed.). Burlington, MA: Academic Press.

Tiwari, G. N., & Ghosal, M. K. (2007). *Fundamentals of renewable energy sources*. Oxford, England: Alpha Science International.

Wengenmayr, R., & Bührke, T. (2008). *Renewable energy: Sustainable energy concepts for the future.* Weinheim, Germany: Wiley.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
MA Mat-SU	No Division Code	n/a

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
RE	A110	RE A194A	1	(1+0)

6. Complete Course Title
Introduction to Solar Photovoltaic Systems
Intro Solar PV Systems
Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☐ Prefix
- ☐ Credits
- ☐ Title
- ☐ Grading Basis
- ☐ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Other (please specify)
- ☒ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☐ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status No # of Repeats Max Credits

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: FALL /2013 To: /9999

12. ☐ Cross Listed with
☐ Stacked with
Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.
Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Date of Coordination*	*Chair/Coordinator Contacted*
1. Sustainable Energy Occupational Endorsement Certificate	02/11/2013	Mark Masteller
2.		
3.		

Initiator Name (typed): Mark Masteller Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 02/08/2013
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 01/31/2013

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Presents basics of design and installation of solar photovoltaic (PV) systems with an emphasis on residential-scale systems. Introduces physics related to solar energy, ways of harvesting solar energy, sizing a PV system, energy storage vs. grid-tie, system components, installation options, cost/benefit considerations, and safety.

16a. Course Prerequisite(s) *(list prefix and number or test code and score)*
None

16b. Co-requisite(s) *(concurrent enrollment required)*
n/a

16c. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16d. Registration Restriction(s) *(non-codable)*
n/a

17. ☐ Mark if course has fees

18. ☐ Mark if course is a selected topic course

19. Justification for Action
To change this course to permanent status.

Initiator (faculty only) Date
Mark Masteller
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved
Department Chair Date

☐ Approved
☐ Disapproved
College/School Curriculum Committee Chair Date

☐ Approved
☐ Disapproved
Dean/Director of School/College Date

☐ Approved
☐ Disapproved
Undergraduate/Graduate Academic Board Chair Date

☐ Approved
☐ Disapproved
Provost or Designee Date

UNIVERSITY OF ALASKA ANCHORAGE
COURSE CONTENT GUIDE

I. Initiation Date: January 2013

II. Course Information

A.	College:	Mat-Su College
B.	Course Prefix:	RE – Renewable Energy
C.	Course Number:	RE A110
D.	Credit Hours:	1.0 (1+0) Contact Time
E.	Course Title:	Introduction to Solar Photovoltaic Systems
F.	Grading Basis:	A-F
G.	Implementation Date:	Fall 2013
H.	Cross Listing:	Not applicable
I.	Stacking:	Not applicable

J. Course Description:

Presents basics of design and installation of solar photovoltaic (PV) systems with an emphasis on residential-scale systems. Introduces physics related to solar energy, ways of harvesting solar energy, sizing a PV system, energy storage vs. grid-tie, system components, installation options, cost/benefit considerations, and safety.

K.	Course Attributes:	Not applicable
L.	Course Prerequisites/Other Restrictions	
	i. Prerequisites:	None
	ii. Registration Restrictions:	None
M.	Course/Lab Fees:	No

III. Course Level Justification

Provides basic knowledge of solar photovoltaic systems.

IV. Instructional Goals and Student Learning Outcomes

A. Instructional Goals.

This course introduces vocabulary, fundamental concepts, and skills related to the design, installation, and operation of residential-scale solar photovoltaic systems. The instructor will:

- Present an overview of residential-scale solar PV systems, including Alaskan case studies, and explain their components and functions
- Provide opportunities for students to demonstrate and defend how they would make decisions regarding development, design, and installation of solar PV systems given financial restraints and other practical considerations
- Introduce operation, maintenance, and safety considerations of residential solar PV systems

B. Defined Student Learning Outcomes. Student will be able to:

Student Learning Outcomes	Measures
Describe the components and their functions of stand-alone and grid-tied photovoltaic systems	Quizzes, class participation, exams
Compare the benefits and costs of PV systems for use in specific locations	Quizzes, class participation, homework
Explain the relationship of energy efficiency measures and PV system development	Quizzes, class participation, exams
Describe the general design and installation considerations important when considering a residential PV system	Demonstrations, quizzes
Discuss PV system operation, maintenance, and safety considerations	Quizzes, class participation, exams

V. Evaluation/Assessment Methods

Various assessment tools can be used at the instructor's discretion including quizzes, homework, in-class presentations, class participation, independent projects, and exams.

VI. Suggested Course Outline

This course can be delivered in a variety of ways but will typically be delivered as a 5-week course in concert with other 1-credit courses offered in the Occupational Endorsement program. It can also be delivered as a weekend intensive course to accommodate both traditional and non-traditional students and to allow for off-site delivery.

A. Overview of Photovoltaics (PV)
   1. History of the development and use of photovoltaics
   2. Current and emerging opportunities in PV
   3. Advantages/disadvantages of PV technology
   4. PV system types and general components

B. Photovoltaic Electric Principles
   1. Terminology
   2. Electric circuits – series and parallel circuits in power sources and loads

C. The Solar Resource
   1. Solar radiation fundamentals
   2. Site analysis for PV

D. Electric Load Analysis
   1. Energy efficiency and cost/benefit considerations
   2. Electric load requirements
   3. Load estimate calculation and special considerations

E. PV Modules
   1. PV principles
   2. Module types and performance
   3. PV arrays
   4. Mounting systems for modules and arrays

F. Battery Systems
    1. Battery types, operation, and specifications
    2. Battery maintenance and safety
    3. Battery sizing considerations and wiring configurations
G. PV Controls and Inverters
    1. Controller types and features; considerations for specifying a controller
    2. Inverter operating principles, features, and types
    3. Inverter selection
H. PV System Wiring
    1. Wire sizing and overcurrent protection
    2. Disconnects and grounding
I. Sizing PV Systems
    1. Basic sizing considerations, design penalties, and cost/benefit considerations
    2. Sizing worksheet and sample exercise
J. Integrating PV with Utility Systems
    1. System sizing and economics
    2. Net-metering and local interconnection policies
K. PV System Applications and Building Integration
    1. Lighting, water pumping, refrigeration
    2. Hybrid systems with generators
    3. Building-integrated PV options and considerations
L. System Installation, Operation, Maintenance, and Safety
    1. Preparation for installation: site, tools, and materials
    2. Installation of PV array, controller, and inverter
    3. PV system wiring
    4. Maintenance of PV components and appliances; troubleshooting common problems
    5. Hazards, basic safety, site considerations, and safety equipment

VII. Suggested Text

Boxwell, M. (2012). *Solar electricity handbook* (2012). Warwickshire, UK: Greenstream.

VIII. Bibliography and Resources

Boyle, G. (2012). *Renewable energy: power for a sustainable future, 3rd ed*. New York, NY: Oxford University Press.

Chiras, D. (2011). *The homeowner's guide to renewable energy*. Gabriola Island, Canada: New Society.

Kemp, W. H. (2009). *The renewable energy handbook* (3rd ed.). Tamworth, Canada: Aztext Press.

Solar Energy International. (2004). *Photovoltaics: Design and installation manual*. Gabriola Island, Canada: New Society.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
MA Mat-SU	No Division Code	n/a

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
RE	A120	RE A194B	1	(1+0)

6. Complete Course Title
Introduction to Solar Thermal Hot Water Systems
Intro Solar Hot Water Systems
Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☐ Prefix
- ☐ Credits
- ☐ Title
- ☐ Grading Basis
- ☐ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Other (please specify)
- ☒ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☐ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status No # of Repeats Max Credits

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: FALL /2013 To: /9999

12. ☐ Cross Listed with
☐ Stacked with
Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.
Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Date of Coordination*	*Chair/Coordinator Contacted*
1. Sustainable Energy Occupational Endorsement Certificate	02/11/2013	Mark Masteller
2.		
3.		

Initiator Name (typed): Mark Masteller Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 02/08/2013
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 01/31/2013

14. General Education Requirement
Mark appropriate box:
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Presents basics of design and installation of solar thermal hot water systems with emphasis on residential-scale systems. Introduces physics related to solar thermal energy, ways of harvesting solar energy, sizing solar thermal systems, and uses in domestic hot water and space heat applications. Includes energy storage, system components, installation techniques, cost/benefit considerations, and safety.

16a. Course Prerequisite(s) *(list prefix and number or test code and score)*	16b. Co-requisite(s) *(concurrent enrollment required)*
None	n/a
16c. Other Restriction(s) ☐ College ☐ Major ☐ Class ☐ Level	16d. Registration Restriction(s) *(non-codable)* n/a
17. ☐ Mark if course has fees	18. ☐ Mark if course is a selected topic course

19. Justification for Action
To change this course to permanent status.

Initiator (faculty only) Date
Mark Masteller
Initiator (TYPE NAME)

☐ Approved ☐ Disapproved Department Chair Date

☐ Approved ☐ Disapproved College/School Curriculum Committee Chair Date

☐ Approved ☐ Disapproved Dean/Director of School/College Date

☐ Approved ☐ Disapproved Undergraduate/Graduate Academic Board Chair Date

☐ Approved ☐ Disapproved Provost or Designee Date

UNIVERSITY OF ALASKA ANCHORAGE
COURSE CONTENT GUIDE

I. Initiation Date: January 2013

II. Course Information

A. College: Mat-Su College
B. Course Prefix: RE – Renewable Energy
C. Course Number: RE A120
D. Credit Hours: 1.0 (1+0) Contact Time
E. Course Title: Introduction to Solar Hot Water Systems
F. Grading Basis: A-F
G. Implementation Date: FALL 2013
H. Cross Listing: Not applicable
I. Stacking: Not applicable
J. Course Description:

Presents basics of design and installation of solar hot water systems with emphasis on residential-scale systems. Introduces physics related to solar thermal energy, ways of harvesting solar energy, sizing solar hot water systems, and uses in domestic hot water and space heat applications. Includes energy storage, system components, installation techniques, cost/benefit considerations, and safety.

K. Course Attributes: Not Applicable
L. Course Prerequisites/Other Restrictions:
i. Prerequisites: None
ii. Registration Restrictions: None
M. Course/Lab Fees: No

III. Course Level Justification

Provides basic knowledge of solar hot water systems.

IV. Instructional Goals and Student Learning Outcomes

A. Instructional Goals.

Introduces students to the vocabulary, fundamental concepts, and skills related to the design, installation, and operation of residential-scale solar hot water systems. The instructor will:

- Present an overview of residential-scale solar hot water systems, including Alaskan case studies, and explain their components and functions
- Provide opportunities for students to demonstrate and defend how they would make decisions regarding development, design, and installation of solar hot water systems given financial restraints and other practical considerations
- Introduce operation, maintenance, and safety considerations of residential solar hot water systems

B. Defined Student Learning Outcomes. Student will be able to:

Student Learning Outcomes	Measures
Describe the components and their functions in common solar hot water (SHW) systems	Quizzes, class participation, exams
Compare the benefits and costs of SHW systems for use in specific locations	Quizzes, class participation, homework
Explain the relationship of energy efficiency measures and SHW system development	Quizzes, class participation, exams
Describe the general design and installation considerations for residential-scale SHW systems	Class participation, exams
Discuss SHW system operation, maintenance, and safety considerations	Quizzes, class participation, exams

V. Evaluation/Assessment Methods

Various assessment tools can be used at the instructor's discretion including quizzes, homework, in-class presentations, class participation, independent projects, and exams.

VI. Suggested Course Outline

This course can be delivered in a variety of ways but will typically be delivered as a 5-week course in concert with other 1-credit courses offered in the Occupational Endorsement program. It can also be delivered as a weekend intensive course to accommodate both traditional and non-traditional students and allow for off-site delivery.

A. Overview and History of Solar Hot Water (SHW) Heating
B. Economics of SHW
    1. Life cycle cost: comparing systems
    2. General cost/benefit considerations related to efficiency and SHW systems
C. Types of SHW Collectors
    1. Flat plate, evacuated tube, and other collectors
    2. Comparison of collectors
D. Other System Components
    1. Storage tanks
    2. Heat exchangers
    3. Pumps, piping, and pipe insulation
    4. Solar fluids
    5. Other components
E. Types of SHW Systems
    1. Pressurized antifreeze systems
    2. Drainback systems
    3. Integral collector storage systems
    4. Thermosiphon systems
    5. Open-loop and draindown systems
    6. Refrigerant solar water heaters
F. Solar Space Heating Systems
    1. Liquid-type solar heating systems

a. With storage
b. Without storage

2. Heat delivery methods
3. High-mass systems
4. Air-type solar heating systems

G. Selecting the Site
H. Sizing the System
1. Solar water heating system
2. Solar space heating system
3. Air heating systems
4. Other system components

I. System Installation, Operation, and Maintenance
1. Solar collectors and heat exchangers: handling and mounting
2. System plumbing and testing
3. Routine system operation and maintenance
4. Controls and power sources

J. Safety
1. Site safety
2. Hazard recognition
3. Basic codes

VII. Suggested Text

Ramlow, B., & Nusz, B. (2010). *Mother Earth News Book for Wiser Living: Solar water heating – revised and expanded edition: A comprehensive guide to solar water and space heating systems* (Expanded ed.). Gabriola Island, Canada: New Society.

VIII. Bibliography and Resources

Boyle, G. (2012). *Renewable energy: power for a sustainable future, 3rd ed*. New York, NY: Oxford University Press.

Chiras, D. (2011). *The homeowner's guide to renewable energy*. Gabriola Island, Canada: New Society.

Kemp, W. H. (2009). *The renewable energy handbook* (3rd ed.). Tamworth, Canada: Aztext Press.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
MA Mat-SU	No Division Code	n/a

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
RE	A130	RE A194C	1	(1+0)

6. Complete Course Title
Introduction to Small Wind Systems
Intro Small Wind Systems
Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☐ Prefix
- ☐ Credits
- ☐ Title
- ☐ Grading Basis
- ☐ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Other (please specify)
- ☒ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☐ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status No # of Repeats Max Credits

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: FALL /2013 To: /9999

12. ☐ Cross Listed with
☐ Stacked with
Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.
Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Date of Coordination*	*Chair/Coordinator Contacted*
1. Sustainable Energy Occupational Endorsement Certificate	02/11/2013	Mark Masteller
2.		
3.		

Initiator Name (typed): Mark Masteller Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 02/08/2013
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 01/31/2013

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Presents basics of the design, installation, and operation of small wind systems with an emphasis on residential-scale systems. Introduces physics related to wind energy, ways of harvesting and using wind energy, turbine and site selection, energy storage vs. grid-tie considerations, system components, installation techniques, cost/benefit considerations, and safety.

16a. Course Prerequisite(s) *(list prefix and number or test code and score)*
None

16b. Co-requisite(s) *(concurrent enrollment required)*
n/a

16c. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16d. Registration Restriction(s) *(non-codable)*
n/a

17. ☐ Mark if course has fees

18. ☐ Mark if course is a selected topic course

19. Justification for Action
To change this course to permanent status.

Initiator (faculty only) Date
Mark Masteller
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved
Department Chair Date

☐ Approved
☐ Disapproved
College/School Curriculum Committee Chair Date

☐ Approved
☐ Disapproved
Dean/Director of School/College Date

☐ Approved
☐ Disapproved
Undergraduate/Graduate Academic Board Chair Date

☐ Approved
☐ Disapproved
Provost or Designee Date

UNIVERSITY OF ALASKA ANCHORAGE
COURSE CONTENT GUIDE

I. Initiation Date: January 2013

II. Course Information

A.	College:	Mat-Su College
B.	Course Prefix:	RE – Renewable Energy
C.	Course Number:	RE A130
D.	Credit Hours:	1.0 (1+0) Contact Time
E.	Course Title:	Introduction to Small Wind Systems
F.	Grading Basis:	A-F
G.	Implementation Date:	Fall 2013
H.	Cross Listing:	Not applicable
I.	Stacking:	Not applicable

J. Course Description:

Presents basics of the design, installation, and operation of small wind systems with an emphasis on residential-scale systems. Introduces physics related to wind energy, ways of harvesting and using wind energy, turbine and site selection, energy storage vs. grid-tie considerations, system components, installation techniques, cost/benefit considerations, and safety.

K.	Course Attributes:	Not Applicable
L.	Course Prerequisites/Other Restrictions	
	i. Prerequisites:	None
	ii. Registration Restrictions:	None
M.	Course/Lab Fees:	None

III. Course Level Justification

Provides basic knowledge of residential-scale wind energy systems.

IV. Instructional Goals and Student Learning Outcomes

A. Instructional Goals.

Introduces students to the vocabulary, fundamental concepts, and skills related to the design, installation, and operation of residential-scale wind energy systems. The instructor will:

- Present an overview of residential-scale wind systems, including Alaskan case studies, and explain their components and functions
- Provide opportunities for students to demonstrate and defend how they would make decisions regarding development, design, and installation of small wind systems given financial restraints and other practical considerations
- Introduce operation, maintenance, and safety considerations of residential wind systems

B. Defined Student Learning Outcomes. Student will be able to:

Student Learning Outcomes	Measures
Describe small wind energy system components and their functions	Quizzes, class participation, exams
Compare the benefits and costs of small wind systems for use in specific locations	Quizzes, class participation, homework
Explain the relationship of energy efficiency measures and wind system development	Quizzes, class participation, exams
Describe general design, installation considerations, and procedures when setting up a small wind system	Class participation, individual projects, exams
Discuss wind system operation, maintenance, and safety	Quizzes, class participation, exams

V. Evaluation/Assessment Methods

Various assessment tools can be used at the instructor's discretion including quizzes, homework, in-class presentations, class participation, independent projects, and exams.

VI. Suggested Course Outline

This course can be delivered in a variety of ways but will typically be delivered as a 5-week course in concert with other 1-credit courses offered in the Occupational Endorsement program. It can also be delivered as a weekend intensive course to accommodate both traditional and non-traditional students and allow for off-site delivery.

A. Overview of Wind Energy
   1. History and recent trends
   2. Relationship to fossil fuel use and climate change

B. Basic Technology
   1. Rotor orientation
   2. Blade configuration and materials
   3. Overspeed control
   4. Generators and drive trains
   5. Turbine types: horizontal- and vertical-axis turbines
   6. Classes of turbines: micro, mini, residential, small- and large-commercial
   7. Towers

C. Wind Energy Basics
   1. Power in wind
   2. Swept area
   3. Wind speed distribution: measuring the wind resource

D. Economic Considerations
   1. Cost of energy and payback
   2. Other cost/benefit considerations

E. Estimating Turbine Performance
   1. Swept area method
   2. Power curve method
   3. Using manufacturers' estimates

F. Siting Turbines
    1. Tower placement and height
    2. Mounting on buildings
    3. Urban installations
    4. Noise and impacts to wildlife
    5. Zoning and community considerations
G. Off-grid Applications
    1. Cabins, recreational vehicles, fences, and telecommunications
    2. Pumping water with wind
    3. Hybrid systems
H. Integrating Wind with Utility Systems
    1. Interconnection equipment: generators and inverters
    2. Power quality
    3. Net metering
    4. Distributed generation
I. System Installation and Maintenance
    1. Tools and parts
    2. Foundations and anchors
    3. Guyed, free-standing, and tilt-up towers
    4. Maintenance and equipment life
J. Safety and Code Considerations
    1. Tower safety
    2. Electrical hazards

VII. Suggested Text

Gipe, P. (2009). *Wind energy basics* (2nd ed.). White River Junction, VT: Chelsea Green.

Gipe, P. (2004). *Wind power: Renewable energy for home, farm and business*. White River Junction, VT: Chelsea Green.

VIII. Bibliography and Resources

Boyle, G. (2012). *Renewable energy: power for a sustainable future, 3rd ed*. New York, NY: Oxford University Press.

Chiras, D. (2011). *The homeowner's guide to renewable energy*. Gabriola Island, Canada: New Society.

Kemp, W. H. (2009). *The renewable energy handbook* (3rd ed.). Tamworth, Canada: Aztext Press.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
MA Mat-SU	No Division Code	n/a

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
RE	A140	RE A194D	1	(1+0)

6. Complete Course Title
Home Energy Basics
Home Energy Basics
Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☐ Prefix
- ☐ Credits
- ☐ Title
- ☐ Grading Basis
- ☐ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Other (please specify)
- ☒ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☐ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status No # of Repeats Max Credits

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: FALL /2013 To: /9999

12. ☐ Cross Listed with
☐ Stacked with
Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Date of Coordination*	*Chair/Coordinator Contacted*
1. Sustainable Energy Occupational Endorsement Certificate	02/11/2013	Mark Masteller
2.		
3.		

Initiator Name (typed): Mark Masteller Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 02/08/2013
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 02/05/2013

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Presents an overview of space heating and electricity use and production for Alaskan homes and small businesses. Includes fundamentals of building energy flows, energy efficiency, and methods for decreasing fossil fuel consumption. Introduces the relationship between efficiency measures and renewable energy systems.

16a. Course Prerequisite(s) *(list prefix and number or test code and score)*
None

16b. Co-requisite(s) *(concurrent enrollment required)*
n/a

16c. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16d. Registration Restriction(s) *(non-codable)*
n/a

17. ☐ Mark if course has fees

18. ☐ Mark if course is a selected topic course

19. Justification for Action
To change this course to permanent status.

Initiator (faculty only) Date
Mark Masteller
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved
Department Chair Date

☐ Approved
☐ Disapproved
College/School Curriculum Committee Chair Date

☐ Approved
☐ Disapproved
Dean/Director of School/College Date

☐ Approved
☐ Disapproved
Undergraduate/Graduate Academic Board Chair Date

☐ Approved
☐ Disapproved
Provost or Designee Date

UNIVERSITY OF ALASKA ANCHORAGE
COURSE CONTENT GUIDE

I. Initiation Date: February 2013

II. Course Information

A. College: Mat-Su College
B. Course Prefix: RE – Renewable Energy
C. Course Number: RE A140
D. Credit Hours: 1.0 (1 + 0) Contact Time
E. Course Title: Home Energy Basics
F. Grading Basis: A-F
G. Implementation Date: Fall 2013
H. Cross Listing: Not applicable
I. Stacking: Not applicable
J. Course Description:

Presents an overview of space heating and electricity use and production for Alaskan homes and small businesses. Includes fundamentals of building energy flows, energy efficiency, and methods for decreasing fossil fuel consumption. Introduces the relationship between efficiency measures and renewable energy systems.

K. Course Attributes: Not Applicable
L. Course Prerequisites/Other Restrictions
   i. Prerequisites: None
   ii. Registration Restrictions: None
M. Course/Lab Fees: None

III. Course Level Justification

Introduces fundamental concepts of energy use in homes and small buildings.

IV. Instructional Goals and Student Learning Outcomes

A. Instructional Goals.

This course is designed to introduce students to the ways energy is used in a home or small office building, and to help students make well-informed decisions regarding energy use, energy production, and the costs related to energy flows. The instructor will:

- Present an overview of the basic concepts of energy flows
- Identify and explain the building envelope components and appliances important in energy flows
- Demonstrate ways to monitor energy use, and discuss various tools and methods commonly used to measure energy use
- Provide opportunities for students to use tools commonly utilized to measure electricity consumption
- Present an overview of common ways to reduce energy use

- Introduce methods to prioritize decision-making on energy-related decisions and to evaluate effectiveness of various actions

B. Defined Student Learning Outcomes. Student will be able to:

Student Learning Outcomes	Measures
Recognize basic science concepts related to energy flows	Class participation, exams
Identify types of basic energy monitoring tools and demonstrate their use	Class participation, exercises with common monitoring devices
Discuss energy improvement options with respect to both space heating and electricity	Homework, class participation, exams
Describe the relative priority of deploying energy efficiency measures and renewable energy systems	Class participation, exams
Discuss general costs and benefits of reducing fossil energy use	Class participation, exams
Perform basic life cycle assessment calculations relative to energy use scenarios and decisions	Class participation, exercises, exams

V. Evaluation/Assessment Methods

Various assessment tools can be used at the instructor's discretion, including quizzes, homework, in-class presentations, class participation, and exams.

VI. Suggested Course Outline

This course can be delivered in a variety of ways, but it will typically be delivered as a weekend intensive course to accommodate both traditional and non-traditional students and allow for off-site delivery. It can also be delivered as a 5-week course in concert with other 1-credit courses offered in the program.

A. Introduction
   1. Energy flows in typical homes and small buildings
   2. Ways to affect energy flows
B. Basic Physics Related to Electricity and Heat
   1. Laws of Thermodynamics
   2. Conduction, convection, radiation
   3. Energy conversion
C. Basic Building Science
   1. Air flow, moisture, condensation
   2. Building envelope components
   3. Insulation and air sealing/infiltration
   4. Ventilation and indoor air quality
D. Energy Monitoring Tools
   1. Understanding energy bills
   2. Electricity use meter
   3. Occupant behavior and plug loads

E. Building Retrofits
    1. Lighting and appliances
    2. Infiltration/air sealing
    3. Insulation, doors, windows
    4. Indoor air quality and ventilation equipment
F. Cost/Benefit Assessments of Energy Efficiency Actions
    1. Trends in fossil energy costs
    2. Lifecycle costs of energy management decisions
G. Assessing Renewable Energy Options
    1. Role of energy efficiency/conservation measures in assessment
    2. Practical use of renewable energy for heat and electricity
    3. Passive and active renewable energy systems
    4. Local clean energy alternatives
    5. Utility grid interconnection considerations
H. Hands-on Work with Table-top Renewable Energy Demonstration Models
    1. Components of various systems
    2. Solar photovoltaic, wind, micro-hydro, and solar thermal systems

VII. Suggested Text

Alaska Energy Authority/Alaska Housing Finance Corporation. (2011). *Energy savers tips for Alaska* (2nd ed.). Anchorage, AK: Author.

Amann, J. T. (2007). *Consumer guide to home energy savings* (9th ed.). Gabriola Island, Canada: New Society.

U.S. Department of Energy/Energy Efficiency and Renewable Energy. (2011). *Energy savers: Tips on saving money and energy at home*. Washington, DC: Author.

VIII. Bibliography and Resources

Chiras, D. (2011). *The homeowner's guide to renewable energy*. Gabriola Island, Canada: New Society Publishers.

Kemp, W. H. (2009). *The renewable energy handbook* (3rd ed.). Tamworth, Canada: Aztext Press.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
MA Mat-SU	No Division Code	n/a

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
RE	A203	N/A	3	(3+0)

6. Complete Course Title
Sustainable Energy Project Development
Sustainable Energy Proj Dev
Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☐ Prefix
- ☐ Credits
- ☒ Title
- ☐ Grading Basis
- ☒ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Other (please specify)
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☒ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status No # of Repeats Max Credits

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: Fall/2013 To: /9999

12. ☐ Cross Listed with
☐ Stacked with
Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Date of Coordination*	*Chair/Coordinator Contacted*
1. Sustainable Energy Occupational Endorsement Certificate	02/14/2013	Mark Masteller
2.		
3.		

Initiator Name (typed): Mark Masteller Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 2-8-2013
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 02/14/2013

14. General Education Requirement
Mark appropriate box:
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Synthesizes facets of project development and management within the context of sustainable energy projects.

16a. Course Prerequisite(s) *(list prefix and number or test code and score)*
RE A100

16b. Co-requisite(s) *(concurrent enrollment required)*

16c. Other Restriction(s)
☐ College ☐ Major ☐ Class ☐ Level

16d. Registration Restriction(s) *(non-codable)*
n/a

17. ☐ Mark if course has fees

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Align core program course title with new certificate title that more accurately reflects program content including energy conservation/efficiency and renewable energy production.

Initiator (faculty only) Date
Mark Masteller
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved
Department Chair Date

☐ Approved
☐ Disapproved
College/School Curriculum Committee Chair Date

☐ Approved
☐ Disapproved
Dean/Director of School/College Date

☐ Approved
☐ Disapproved
Undergraduate/Graduate Academic Board Chair Date

☐ Approved
☐ Disapproved
Provost or Designee Date

UNIVERSITY OF ALASKA ANCHORAGE
COURSE CONTENT GUIDE

I. Initiation Date: February 2013

II. Course Information

A. College: Mat-Su College
B. Course Prefix: RE – Renewable Energy
C. Course Number: RE A203
D. Credit Hours: 3.0 (3+0) Contact Time
E. Course Title: Sustainable Energy Project Development
F. Grading Basis: A-F
G. Implementation Date: Fall 2013
H. Cross Listing: Not applicable
I. Stacking: Not applicable
J. Course Description:

Synthesizes facets of project development and management within the context of sustainable energy projects.

K. Course Attributes: Not applicable
L. Course Prerequisites/Other Restrictions
   i. Prerequisites: RE A100
   ii. Registration Restrictions: None
M. Course/Lab Fees: No

III. Course Level Justification

Builds upon introductory knowledge, skills, and vocabulary from foundation courses to develop advanced skills required to pursue employment and further training in the field of sustainable energy.

IV. Instructional Goals and Student Learning Outcomes

A. Instructional Goals.

The instructor will:

- Introduce the processes of planning and developing sustainable energy projects
- Introduce challenges associated with sustainable energy project implementation
- Demonstrate industry-accepted tools available to project planners

B. Defined Student Learning Outcomes. Student will be able to:

Student Learning Outcomes	Measures
Demonstrate the processes of planning and developing sustainable energy projects	Projects and exams
Identify challenges and solutions associated with sustainable energy project implementation	Projects and exams
Identify and compare industry-accepted software tools available to project planners	Projects, exams, and class discussions

V. Evaluation/Assessment Methods

Various assessment tools can be used at the instructor's discretion including quizzes, homework, in-class presentations, class participation, independent projects, and exams.

VI. Suggested Course Outline

A. Introduction to Sustainable Energy Project Management
   1. Project Initiation
      a. Needs assessment
      b. Conceptual design
      c. Economic viability
      d. Technical feasibility
      e. Stakeholder analysis
   2. Planning and Design
      a. Budget
      b. Schedule
      c. Project management plan
      d. Software introduction
   3. Project Execution
      a. Procurement
      b. Deliverables
      c. Monitoring, controlling, corrective, and preventive actions
   4. Project Closure

B. Community and Project Selection
   1. Identify community or project of interest
   2. Identify project partners

C. Resource Assessment
   1. Needs assessment
   2. Community assessment
   3. Data collection
   4. Resource analysis
   5. Identify information gaps

D. Modeling
   1. Using data to evaluate potential of various resources
   2. Modeling tools

E. Feasibility Study
   1. Economic feasibility of all available resources
   2. Technical feasibility of all available resources
   3. Resource feasibility
   4. Operational feasibility
   5. Risk assessment
   6. Define project management structure
   7. Recommendations for further development

F. Planning and Design
   1. Grant writing
   2. Budget
   3. Schedule
   4. Project management plan
   5. Permitting process

VII. Suggested Text

Horine, G. (2012). *Project management absolute beginner's guide* (3rd ed.). Upper Saddle River, NJ: Que.

Mantel, S. J., Meredith, J. R., Shafer, S. M., & Sutton, M. M. (2010). *Project management in practice* (4th ed.) Hoboken, NJ: Wiley.

VIII. Bibliography and Resources

Boxwell, M. (2012). *Solar electricity handbook - 2013 edition: A simple practical guide to solar energy - designing and installing photovoltaic solar electric systems*. Warwickshire, UK: Greenstream.

Boyle, G. (2012). *Renewable energy: Power for a sustainable future* (3rd ed.). New York, NY: Oxford University.

California Energy Commission. (2000). *Guide to preparing feasibility studies for energy efficiency projects*. Sacramento, CA: California Energy Commission. Retrieved from http://www.energy.ca.gov/reports/2000-03-20_400-00-002.PDF

Chiras, D. (2011). *The homeowner's guide to renewable energy*. Gabriola Island, Canada: New Society.

Kemp, W. H. (2009). *The renewable energy handbook* (3rd ed.). Tamworth, Canada: Aztext.

Komor, P. (2004). *Renewable energy policy*. Lincoln, NE: iUniverse.

MacKay, D. J. C. (2009). *Sustainable energy – without the hot air*. Cambridge, England: UIT Cambridge.

Schmidt, T. (2009). *Strategic project management made simple*. Hoboken, NJ: Wiley.

Solar Energy International. (2012). *Solar electric handbook: Photovoltaic fundamentals and applications*. Boston, MA: Pearson.

Tester, J. W., Drake, E. M., Driscoll, M., Golay, M. W., & Peters, W. A. (2005). *Sustainable energy: Choosing among options*. Cambridge, MA: MIT.

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College	1b. Division	1c. Department
MA Mat-SU	No Division Code	n/a

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
RE	A210	RE A294A	3	(3+0)

6. Complete Course Title
Cold Climate Construction
Cold Climate Construction
Abbreviated Title for Transcript (30 character)

7. Type of Course ☒ Academic ☐ Preparatory/Development ☐ Non-credit ☐ CEU ☐ Professional Development

8. Type of Action: ☐ Add *or* ☒ Change *or* ☐ Delete

If a change, mark appropriate boxes:

- ☐ Prefix
- ☐ Credits
- ☐ Title
- ☐ Grading Basis
- ☐ Course Description
- ☐ Test Score Prerequisites
- ☐ Other Restrictions
  - ☐ Class ☐ Level
  - ☐ College ☐ Major
- ☐ Other (please specify)
- ☒ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☐ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status No # of Repeats Max Credits

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

11. Implementation Date semester/year
From: FALL /2013 To: /9999

12. ☐ Cross Listed with
☐ Stacked with
Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

Impacted Program/Course	*Date of Coordination*	*Chair/Coordinator Contacted*
1. Sustainable Energy Occupational Endorsement Certificate	02/11/2013	Mark Masteller
2.		
3.		

Initiator Name (typed): Mark Masteller Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 02/08/2013
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 02/05/2013

14. General Education Requirement *Mark appropriate box:*
☐ Oral Communication ☐ Written Communication ☐ Quantitative Skills ☐ Humanities
☐ Fine Arts ☐ Social Sciences ☐ Natural Sciences ☐ Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*
Covers design, construction, and basic building science related to understanding, planning, and constructing or retrofitting a durable home in a difficult climate.

16a. Course Prerequisite(s) *(list prefix and number or test code and score)*	16b. Co-requisite(s) *(concurrent enrollment required)*
None	n/a
16c. Other Restriction(s) ☐ College ☐ Major ☐ Class ☐ Level	16d. Registration Restriction(s) *(non-codable)* n/a
17. ☐ Mark if course has fees	18. ☐ Mark if course is a selected topic course

19. Justification for Action
To change this course to permanent status.

Initiator (faculty only) Date
Mark Masteller
Initiator (TYPE NAME)

☐ Approved ☐ Disapproved Department Chair Date

☐ Approved ☐ Disapproved College/School Curriculum Committee Chair Date

☐ Approved ☐ Disapproved Dean/Director of School/College Date

☐ Approved ☐ Disapproved Undergraduate/Graduate Academic Board Chair Date

☐ Approved ☐ Disapproved Provost or Designee Date

UNIVERSITY OF ALASKA ANCHORAGE
COURSE CONTENT GUIDE

I. Initiation Date: February 2013

II. Course Information

A.	College:	Mat-Su College
B.	Course Prefix:	RE – Renewable Energy
C.	Course Number:	RE A210
D.	Credit Hours:	3.0 (3 + 0) Contact Time
E.	Course Title:	Cold Climate Construction
F.	Grading Basis:	A-F
G.	Implementation Date:	Fall 2013
H.	Cross Listing:	Not applicable
I.	Stacking:	Not applicable

J. Course Description:

Covers design, construction, and basic building science related to understanding, planning, and constructing or retrofitting a durable home in a difficult climate. Special Note: Upon satisfactory completion, this course meets the prerequisite for the State of Alaska Contractor Residential Endorsement and provides 16 continuing education credits by the State of Alaska, Division of Occupational Licensing for General Contractors with Residential Endorsement.

K.	Course Attributes:	Not Applicable
L.	Course Prerequisites/Other Restrictions	
	i. Prerequisites:	None
	ii. Registration Restrictions:	None
M.	Course/Lab Fees:	Yes

III. Course Level Justification

Builds upon basic construction experience to explore vocabulary, concepts, and skills related to energy efficiency and durability for residential design and construction in cold climates.

IV. Instructional Goals and Student Learning Outcomes

A. Instructional Goals.

Builds on basic construction experience to provide an understanding of the concepts and techniques used in cold climates to improve the energy-efficiency, safety, and durability of Alaskan homes. Emphasizes the "house as a system" of interconnected components that work together to lower energy costs and provide durability and comfort. Uses Alaskan case studies and other information to illustrate concepts. The instructor will:

- Present an overview of building envelope components and cold-climate construction techniques related to controlling energy and moisture flows
- Relate cold-climate construction techniques to indoor air quality, safe building and appliance ventilation, and building durability

- Compare and contrast use of cold-climate construction techniques in new construction and retrofit projects
- Demonstrate energy use models and provide opportunities for students to calculate residential energy demands

B. Defined Student Learning Outcomes. Student will be able to:

Student Learning Outcomes	Measures
Describe energy and moisture flows in homes and associate the causes of these flows with impacts on energy use, building durability, and safety	Journal, quizzes, homework, class participation, exams
Identify building envelope components and the roles these components play in energy use and moisture flows	Journal, quizzes, class participation, homework, exams
Explain the importance of proper home and appliance ventilation, indoor air quality, and safety	Quizzes, class participation, exams
Explain residential construction techniques relative to climatic conditions found in Alaska for both new construction and retrofit projects	Journal, quizzes, class participation, homework, exams
Compute residential electric power, space heat, and domestic hot water demands	Journal, energy-use modeling, quiz, exam

V. Evaluation/Assessment Methods

Various assessment tools can be used at the instructor's discretion including attendance, quizzes, homework, journal development, class participation, independent projects, and exams.

VI. Suggested Course Outline

This course may be delivered as a standard 15-week course or as an intensive course in a shorter time frame to accommodate both traditional and non-traditional students and allow for off-site delivery.

A. Energy Flow and Physics
   1. Principles of heat flow in materials: performance and comfort
   2. Types of heat flow: conduction, convection, and radiation
   3. Reasons for heat flow: stack, wind, flue, and ventilation effects
   4. Understanding temperature, relative humidity, and comfort
   5. Efficiencies: British Thermal Units and forms of energy
   6. Fuel cost comparison formulas
   7. Calculating heating degree days, design temperature, and design heat loss

B. Energy and Building Durability
   1. Construction characteristics of residential structures
   2. Building components and their functions
   3. Climates, exposures, system qualities, and performance expectations
   4. Identifying building wear parts
   5. Understanding moisture flow and sources: design considerations

6. Air leaks in building components
7. Above grade, below grade, and occupant-generated moisture sources
8. Dew point, condensing surfaces, and materials

C. Building Construction: Foundations
1. Foundation basics: types used in Alaska
2. Soil conditions and foundations
3. Types of foundation damage
4. Moisture control: materials, ventilation strategies, and condensation control
5. Heat loss and appropriate interior or exterior insulation materials
6. Control of radon and other soil gases

D. Building Construction: Walls
1. Basic concepts
2. Wall types and components
3. Wall transitions at floors and ceilings
4. Effects of framing components and heat loss
5. Advanced framing techniques
6. Elements of airtight wall construction

E. Building Construction: Roofs and Attics
1. Design elements of hot and cold roofs
2. Moisture accumulation and ventilation approaches
3. Ceiling penetrations: electrical, plumbing, interior partitions, and attic hatches
4. Ice dams
5. Insulation R-values and appropriate insulation levels
6. Materials and strategies for insulating various roof assemblies
7. Trusses and uplift
8. Self-healing membranes and the unplanned dominant pressure boundary

F. Insulating Materials
1. Moisture and heat flow characteristics of insulation products
2. Conduction, convection, and radiation effects of insulations
3. Fiberglass and cellulose insulation: batt, rigid, loose, blown, and dense-packed
4. Foam insulation: spray or rigid
5. Tolerances: moisture, durability, UV radiation, and animals

G. Cladding, Flashings, and Weather Barriers
1. Protection from wind and rain
2. Air and weather barriers: knowing the difference
3. Installation and durability of air and weather barriers
4. Weather barriers, flashings, and gravity
5. Drainage, drying, or both
6. Ventilation cladding techniques

H. Windows and Doors
1. Windows that leak
2. Window styles and options
3. Heat loss and solar gain through windows
4. Improving window thermal and condensation performance
5. Gas fills, coatings, edge-effect, frame effect, and spacer technology
6. Design, orientation, and installation details for windows and doors

7. Installation of windows and doors with integration into drainage planes
8. Air sealing for rough openings

I. Ventilation and Indoor Air Quality
1. Principles of good ventilation
2. Calculation of ventilation requirements
3. Attached spaces and unplanned airflows
4. Ventilation codes
5. Effective ventilation systems and design considerations
6. System operation and maintenance issues
7. Source control

J. Residential Energy Use Modeling
1. General use of energy models
2. AkWarm: Alaska Housing Finance Corporation energy analysis software

K. Heating and Domestic Hot Water
1. Calculation of heat loss
2. Attributes/comparison of fuel sources and heating systems
3. Keeping heating systems simple, reliable, safe, and well-maintained
4. Sizing heating and domestic hot water requirements
5. Integration of domestic hot water and space heating
6. Control options

L. Retrofitting Buildings
1. Retrofit planning: cost-effectiveness and avoid causing more damage
2. Retrofitting from the interior or exterior
3. Solving air leakage problems: the house as a system

M. Commissioning
1. Combustion safety and worst-case depressurization
2. Appliance ventilation and exhaust requirements
3. Occupant education: energy consumption and building operation
4. Lighting, appliances, plug loads, utility bills, and service cycles
5. Routine inspection and maintenance

VII. Suggested Text

Seifert, R. (Ed.). (2008). *Alaska residential building manual* (7th ed.). Fairbanks, AK: Cooperative Extension Service, University of Alaska Fairbanks.

VIII. Bibliography and Resources

Building Science Corporation. (1999-2013). Retrieved from www.buildingscience.com

Journal of Light Construction. (2011). *The JLC guide to energy efficiency: Best practices for builders and remodelers*. Williston, VT: Author.

Krigger, J., & Dorsi, C. (2004). *Residential energy: Cost savings and comfort for existing buildings* (4th ed.). Helena, MT: Saturn Resource Management.

Lstiburek, J. (2004). *Building guide to cold climates*. Wesford, MA: Building Science Corporation Press.

Straube, J., & Burnett, E. (2005). *Building science for building enclosures*. Westford, MA: Building Science Corporation Press.

U.S. Department of Energy. (n.d.). Resources from the Energy Efficiency and Renewable Energy Building Technologies program. Retrieved from http://www1.eere.energy.gov/library

Program/Prefix Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Program of Study or Prefix

1a. School or College	1b. Department
MA Mat-SU	N/A

2. Complete Program Title/Prefix
Sustainable Energy

3. Type of Program

Choose one from the appropriate drop down menu: Undergraduate: Occupational Endorsement Certificate or Graduate: CHOOSE ONE

This program is a Gainful Employment Program: ☒ Yes or ☐ No

4. Type of Action:

PROGRAM	PREFIX
☐ Add	☐ Add
☒ Change	☐ Change
☐ Delete	☐ Inactivate

5. Implementation Date (semester/year)
From: FALL/2013 To: /9999

6a. Coordination with Affected Units Department, School, or College: MSC RH Department

Initiator Name (typed): Mark Masteller
Initiator Signed Initials: _____ Date:_____

6b. Coordination Email submitted to Faculty Listserv (uaa-faculty@lists.uaa.alaska.edu) Date: 02/08/2013

6c. Coordination with Library Liaison Date: 02/05/2013

7. Title and Program Description - Please attach the following:

☐ Cover Memo ☒ Catalog Copy in Word using the track changes function

8. Justification for Action

Change the program title and content to align with industry standards, encompassing energy efficiency and renewable energy production. The Sustainable Energy program will emphasize the role of energy conservation and efficiency components (demand-side actions) in concert with reneweble energy production (supply-side actions) in education and training related to clean energy systems.

Initiator (faculty only) Date	☐ Approved ☐ Disapproved Dean/Director of School/College Date
Mark Masteller Initiator (TYPE NAME)	
☐ Approved ☐ Disapproved Department Chair Date	☐ Approved ☐ Disapproved Undergraduate/Graduate Academic Board Chair Date
☐ Approved ☐ Disapproved College/School Curriculum Committee Chair Date	☐ Approved ☐ Disapproved Provost or Designee Date

SUSTAINABLE ENERGY

Matanuska-Susitna College
8295 East College Drive (P.O. Box 2889)
Palmer, AK (907) 745-9774
http://matsu.alaska.edu/office/student-services/degree-programs/sustainable-energy

The Sustainable Energy program is offered through Matanuska-Susitna College.

Occupational Endorsement Certificate, Sustainable Energy

The Sustainable Energy Occupational Endorsement Certificate program provides education and training in energy efficiency and renewable energy and addresses many contemporary energy issues. The program provides the fundamental concepts, basic academic preparation, and skills necessary for students to pursue either employment or further training as sustainable energy technicians in the energy, construction, utility, and maintenance industries. It can also serve as a stepping stone into science-, engineering-, and architecture-related certificate, associate, or baccalaureate programs.

Students are introduced to the physical principles of various energy conservation and renewable energy technologies. Coursework incorporates the appropriate skills and knowledge necessary for students to become effective employees. Students will also be able to apply course content to personal projects, such as home retrofits and off-grid cabins.

Student Learning Outcomes

Upon completion of the occupational endorsement certificate, students will demonstrate:

- Knowledge of energy efficiency and sustainable energy resources and technologies
- Introductory understanding of basic physics and power management as applied to energy efficiency and sustainable energy
- Entry-level skills for energy efficiency/renewable energy project development and management

Admission Requirements

See Occupational Endorsement Certificate Admission Requirements in Chapter 7, Academic Standards and Regulations.

Advising

Students are urged to meet with a faculty advisor prior to enrollment in Sustainable Energy classes.

Academic Progress

In order to receive the Sustainable Energy Occupational Endorsement Certificate, students must achieve a grade of C or better in all courses required for the occupational endorsement certificate.

Graduation Requirements

The Sustainable Energy Occupation Endorsement Certificate requires a minimum of 16 credits. The program is structured as 9 credits of foundation knowledge and a minimum of 7 credits of electives that allow students (in consultation with their advisor) to specialize in several emphasis areas related to sustainable energy, or to customize their program.

Core Requirements (9 credits)
RE A100 Principles of Sustainable Energy (3)
RE A203 Sustainable Energy Project Development (3)

MATH A105 Intermediate Algebra (3)

Electives (minimum of 7 credits)
RE A102 Applied Physics for Renewable Energy (3)
RE A110 Intro to Solar Photovoltaic Systems (1)
RE A120 Intro to Solar Thermal Systems (1)
RE A130 Intro to Small Wind Systems (1)
RE A140 Home Energy Basics (1)
RE A210 Cold Climate Construction (3)
RH A105 Electrical Circuits for Refrigeration & Heating I (3)
RH A211 Customer Relations and Job Etiquette (1)

FACULTY

Mark Masteller, Assistant Professor, mamasteller@matsu.alaska.edu

SUSTAINABLE ~~RENEWABLE~~ ENERGY

Matanuska-Susitna College
8295 East College Drive (P.O. Box 2889)
Palmer, AK (907) 745-9774
http://matsu.alaska.edu/office/student-services/degree-programs/sustainable~~renewable~~-energy

The Sustainable~~Renewable~~ Energy program is offered through Matanuska-Susitna College.

Occupational Endorsement Certificate, Sustainable~~Renewable~~ Energy

The Sustainable Energy Occupational Endorsement Certificate program provides education and training in energy efficiency and renewable energy, and addresses ~~many of the energy issues that influence Alaskans~~many contemporary energy issues. The program provides the fundamental concepts, basic academic preparation, and skills necessary for students to pursue either employment or ~~gain~~ further training as sustainable energy technicians in the energy, construction, utility, and maintenance industries. It can also serve as a stepping stone into science-, engineering-, and architecture-related certificate, associate, or baccalaureate programs.

Students are introduced to the physical principles of various energy conservation and renewable energy technologies. Coursework incorporates the appropriate skills and knowledge necessary for students to become effective employees, ~~and/or~~Students will also be able to apply ~~knowledge~~course content ~~into their personal lives~~personal projects, such as home retrofits and off-grid cabins.

~~In the Renewable Energy Occupational Endorsement Certificate program, students learn the fundamental concepts and skills necessary to pursue employment or gain further training as renewable energy technicians. Students are introduced to the physical principles of various renewable energies including solar, wind, hydro, and geothermal power sources. Terminology, energy conservation, and safety are emphasized throughout the program. Coursework incorporates the appropriate skills and knowledge necessary for students to become effective employees in the energy, utility, and maintenance industries. Career pathways may include operating large- and small-scale renewable power production facilities; designing, installing, and maintaining renewable energy systems; or assisting homeowners and businesses with energy efficiency. A required practicum provides applied experience in a workplace setting.~~

Student Learning Outcomes

Upon completion of the occupational endorsement certificate, students will demonstrate:

- Knowledge of energy efficiency and ~~renewable~~ sustainable energy resources and technologies
- ~~Basic technical skills for diesel engine repair~~
- Introductory understanding of basic physics and power management as applied to energy efficiency and ~~renewable~~ sustainable energy
- ~~Familiarity with OSHA General Industry standards and safety~~
- Entry-level skills for energy efficiency/renewable energy project development and management.

Admission Requirements

See Occupational Endorsement Certificate Admission Requirements in Chapter 7, Academic Standards and Regulations.

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Advising

Students are urged to meet with a faculty advisor prior to enrollment in Sustainable Energy classes.

Academic Progress

In order to receive the Sustainable~~Renewable~~ Energy Occupational Endorsement Certificate, students must achieve a grade of C or better in all courses required for the occupational endorsement certificate.

Graduation Requirements

The Sustainable Energy Occupation Endorsement Certificate requires a minimum of 16 credits. The program is structured as 9 credits of foundation knowledge and a minimum of 7 credits of electives that allow students (in consultation with their advisor) to specialize in several emphasis areas related to sustainable energy, or to customize their program.

Core Requirements (9 credits)
RE A100 Principles of Sustainable Energy (3)
RE ~~A203 Sustainable~~A203 Sustainable Energy Project Development (3)
MATH A105 -Intermediate Algebra (3)

Electives (minimum of 7 credits)
RE A102 Applied Physics for Renewable Energy (3)
RE A~~194A~~110 Intro to Solar Photovoltaic Systems (1)
RE A~~194B~~120 Intro to Solar Thermal Systems – (1)
RE A~~A194C~~130 Intro to Small Wind Systems (1)
RE A~~194D~~140 Home Energy Basics (1)
RE A~~294A~~210 Cold Climate Construction (3)
RH A105 Electrical Circuits for Refrigeration & Heating I (3)
RH A211 Customer Relations and Job Etiquette (1)

~~Complete the following required courses (23 credits):~~

~~RE A100~~	~~Introduction to Renewable Energy~~	~~3~~
~~RE A101~~	~~Industrial Safety for Renewable Energy~~	~~2~~
~~RE A102~~	~~Applied Physics for Renewable Energy~~	~~3~~
~~RE A106~~	~~Introduction to Diesel Engines~~	~~3~~
~~RE A200~~	~~Power Generation Systems~~	~~3~~
~~RE A201~~	~~Power System Management~~	~~3~~
~~RE A203~~	~~Renewable Energy Project Development~~	~~3~~
~~RE A295~~	~~Renewable Energy Practicum~~	~~3~~

FACULTY

Mark Mastell~~ea~~r, Assistant Professor, mamasteller@matsu.alaska.edu
~~*Diane Jardel Mielke, Coordinator/Instructor, dljardel@uaa.alaska.edu Assistant Professor, dmmielke@matsu.alaska.edu*~~

~~================================~~
~~INTERNAL NOTE FOR DRAFT REVIEW~~
~~*Do I need to list classes that are still "on the books" but which will be unused pending program expansion and/or might be discontinued? (RE A101, A106, A200, A201, A295).*~~
~~*Can I list courses that are currently "trial" (the 194 and 294 classes) with their hoped-for new course numbers?*~~

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~~*Need to clarify whether Math105 is simply required for OE or a pre-requisite for any class (A100 or A102). It has NOT been a required pre-requisite to date – how does this impact folks currently in the program who are hoping to have it open soon so they can get the OE?? (Only one person impacted that I know of – others have had 105/Int. Algebra.)*~~

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Memorandum

To: SoE Curriculum Committee

From: Bill Hazelton, Chair, Geomatics Department **Date**: 7th November, 2012.

Subject: Bachelor of Science, Geomatics

Attached please find a PAR, Catalog Materials, and various CARs and CCGs for courses that will be changed to include minor changes in the Bachelor of Science, Geomatics.

The changes in the program are to allow students to take the GEO A490 and GIS A490 courses more than once, and to modify the prerequisites of the GEO A365 course. In addition some minor changes have been made in the catalog, to update the ABET program details, correct small typos, and to adjust the elective courses in the program.

At their meeting on 6th November, 2012, the faculty of the Geomatics Department approved the modification to the program and courses so that they could be moved through the system for implementation in Fall, 2013.

Program/Prefix Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Program of Study or Prefix

1a. School or College	1b. Department
EN SOENGR	Geomatics

2. Complete Program Title/Prefix
Bachelor of Science, Geomatics

3. Type of Program

Choose one from the appropriate drop down menu: Undergraduate: Bachelor of Science or Graduate: CHOOSE ONE

This program is a Gainful Employment Program: ☐ Yes or ☐ No

4. Type of Action:

PROGRAM	PREFIX
☐ Add	☐ Add
☒ Change	☐ Change
☐ Delete	☐ Inactivate

5. Implementation Date (semester/year)
From: Fall/2013 To: /9999

6a. Coordination with Affected Units Department, School, or College:

Initiator Name (typed): N.W.J. Hazelton Initiator Signed Initials: _____ Date:_____

6b. Coordination Email submitted to Faculty Listserv (uaa-faculty@lists.uaa.alaska.edu) Date: 10/15/2012

6c. Coordination with Library Liaison Date: 10/15/2012

7. Title and Program Description - Please attach the following:

☒ Cover Memo ☒ Catalog Copy in Word using the track changes function

8. Justification for Action
Minor changes in Catalog entry to adjust electives, to include changes in ABET contact details, and to correct small typos.

Initiator (faculty only) Date
N.W.J. Hazelton
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved
Department Chair Date

☐ Approved
☐ Disapproved
College/School Curriculum Committee Chair Date

☐ Approved
☐ Disapproved
Dean/Director of School/College Date

☐ Approved
☐ Disapproved
Undergraduate/Graduate Academic Board Chair Date

☐ Approved
☐ Disapproved
Provost or Designee Date

<<Geomatics catalog copy, starting on page 247>>

GEOMATICS

Engineering Building (ENGR), Room 330, (907) 786-1972 www.uaa.alaska.edu/geomatics/

The Department of Geomatics offers a two-year Associate of Applied Science in Geomatics, a four-year Bachelor of Science in Geomatics, a minor in Geographic Information Systems (GIS), and an Undergraduate Certificate in Geographic Information Systems (GIS). Students seeking the baccalaureate degree may graduate in one of two emphasis areas: Surveying or GIS. Students seeking continuing education for technical or professional enhancement or a concentrated area of study in GIS should consider either the minor in GIS or the Undergraduate Certificate in GIS. The Geomatics program is science-based and includes:

- Land surveying using global positioning systems and conventional techniques
- Automated mapping
- Computational analysis and adjustment
- Geodesy
- Principles of boundary law
- Geographic Information Systems (GIS)
- Digital photogrammetry
- Remote sensing and image analysis.

The wide diversity in the profession creates a similar diversity of employment opportunities. The Undergraduate Certificate in GIS educates students with a broad base of concepts and theory, provides them with hands-on training in real world problems that are relevant to Alaska's environment, and allows them to explore several thematic areas in GIS applications, such as facilities management, transportation, marine environments, and natural resources.

The minor in GIS is designed for students seeking to enhance their knowledge of GIS and remote sensing to complement a major baccalaureate degree in a variety of disciplines including science, art, business management and engineering. GIS, as a part of geospatial science and information technologies, is widely used in many industries important to Alaska (e.g., oil, gas), governance and administration (municipalities and the state), statewide and federal agencies and departments (transportation, natural resources, land management, parks and recreation, etc.), research (sustainability, biodiversity, ecology, geology, anthropology, socioeconomics, etc.), homeland security, military applications and non-profit organizations.

The Associate of Applied Science in Geomatics prepares students for technician-level employment as land survey technicians or as automated mapping technicians. Those working as survey technicians frequently work outdoors, travel to various job locations, and enjoy an independent lifestyle. Automated mapping technicians work with the latest cartographic techniques and equipment and easily transfer skills learned in geomatics courses to other disciplines.

The Bachelor of Science prepares students for a wide variety of professional level opportunities. Since Alaska poses unique geomatics challenges, the curriculum emphasizes northern principles and practices. UAA graduates are highly employable in the Alaska marketplace and worldwide. Employment opportunities are found in private industry, government, and municipal agencies. Geomatics graduates working at the professional level enjoy responsibility and a choice of indoor and outdoor employment with many opportunities for advancement and diversification.

The new high-tech fields open employment in GIS, photogrammetry, remote sensing, land surveying, automated mapping, land design and planning, survey engineering, and resource management positions. In Alaska, geomatics professionals work on state and Native land claims, mining claims, fishing leases, petroleum reserves, forest selections, transportation corridors, private developments, and government and military projects. In Alaska and elsewhere, geomatics professionals work in land surveying, land development and design, mapping and tax assessment, the defense industry, environmental engineering assessment and management, public safety and welfare, medicine, transportation, agriculture, business, and natural sciences.

Professional predictors indicate that employment opportunities will be strong for the various geomatics specialties in Alaska and the Pacific Rim well into the 21st century. While enrolled in the program, students are eligible for cooperative employment programs with government agencies and with private industry during the summer and for intern programs during the school year.

The Department of Geomatics accommodates a wide variety of student objectives from entry level to professional preparation and encourages the nontraditional student to return for training in current practices and principles.

Students seeking professional licensing as registered land surveyors and those who are interested in specializing in surveying or geographic information systems should enroll in the Bachelor of Science program. For the most effective planning, bachelor's degree candidates should declare their intent by the second semester of their geomatics studies.

Accreditation

The Bachelor of Science, Geomatics program at UAA is accredited by the Applied Science Accreditation Commission (ASAC) of ABET, http://www.abet.org.

Program Educational Objectives and Program Outcomes

Program Educational Objectives

The UAA Bachelor of Science, Geomatics program has the following Program Educational Objectives.

Within five years of graduation, graduates of the Geomatics program will have achieved the following.

1. Graduates who are pursuing careers in the surveying area will have attempted the AELS Board's Fundamentals of Surveying examination, and their overall pass rate will be at least 80%.
2. At least 60% of graduates who are pursuing careers in non-surveying areas will have attempted equivalent professional certification or registration, e.g., CP, GISP, as appropriate for their career path.
3. At least 60% of graduates will be members of professional organizations relevant to their career of choice.
4. At least 80% of graduates will have found employment in the fields within the geomatics disciplines, including: surveying of various types, mapping and cartography, GIS/LIS, remote sensing, geodesy, photogrammetry or hydrographic surveying.
5. At least 80% of graduates will have completed at least one professional development course or session, or completed one higher education course.
6. At least 50% of graduates will have taught at least one workshop or training session, made one conference presentation, or published one article relevant to their career.

Student Learning Outcomes

In keeping with the program educational objectives, it is expected that graduates of the UAA Geomatics program will have:

1. An ability to apply knowledge of mathematics, statistics, and general physics;
2. An ability to collect, analyze and interpret data in all of the recognized surveying and mapping areas;
3. An ability to identify, formulate, and design a geomatics system, component or process to meet desired needs;
4. An ability to function on multidisciplinary as well as on interdisciplinary teams;
5. An ability to think critically and to solve geomatics problems creatively and constructively;
6. An understanding of professional and ethical responsibility;
7. An ability to communicate effectively;
8. The broad education necessary to understand the impact of geomatics solutions in a global and societal context;
9. A recognition of the need for, and ability to engage in, lifelong learning;
10. A knowledge of contemporary issues in professional practice;
11. An ability to use the techniques, skills and modern geomatics tools necessary for geomatics practice; and
12. An ability to apply knowledge in all six areas of surveying and mapping:
    i. Field surveying and methods;
    ii. Photogrammetric mapping, image interpretation and remote sensing;
    iii. Surveying calculation and data adjustment;
    iv. Geodetic coordinates and astronomy;
    v. Cartographic representation, projections, and map production;
    vi. Computer-based multipurpose cadastre, geographic information systems.

Mission Statement

The Department of Geomatics' mission is to contribute to the wider body of knowledge in the geospatial sciences, and to disseminate this to society. By advancing our theoretical, professional, technical and educational capabilities, we will develop and maintain a community dedicated to the highest standards of scholarship. Within a student-centered environment, we are committed

to the theoretical, professional and technical advancement of all our students, so that they may contribute to the advancement of their profession, their society, and their world, throughout their lives.

Honors in Geomatics

Undergraduate students may be recognized for exceptional performance by earning Departmental Honors in Geomatics. In order to receive honors in Geomatics, a student must meet each of the following requirements:

1. Complete all requirements for a BS in Geomatics.
2. Be an active member for at least one year of both a national and an on-campus student chapter of a professional geomatics society that addresses issues relevant to the geomatics profession.
3. Have a GPA of 3.50 or higher in their Geomatics and Geographic Information System courses of their catalog year. Have a GPA of 3.30 or higher for their overall cumulative GPA.
4. Pass the Fundamentals of Surveying Examination prior to the completion of the first semester of their senior year.
5. Document a minimum of eight weeks work experience while a student at the University of Alaska in a geomatics or geomatics related position.

Advising

All undergraduate students are encouraged to meet with their academic advisor each semester for the purpose of reviewing their academic progress and planning future courses. It is particularly important for students to meet with their advisor whenever academic difficulties arise. Students are encouraged to consult the faculty in the Department of Geomatics for assistance in designing their course of study to ensure that all prerequisites have been met and that university and major degree requirements are understood and followed.

Preparation

The university offers courses to help students without this preparation to meet the skill level required in the Geomatics program. Insufficient preparation will increase the number of semesters required to complete either degree. Students seeking the Undergraduate Certificate in Geographic Information Systems, the Associate of Applied Science or Bachelor of Science in Geomatics should prepare for entrance into the program by completing the following high school courses:

Mathematics	Algebra II
	Trigonometry
Science	Physics
English Composition	Skill level as demonstrated by ACT, SAT or approved placement test to qualify for enrollment in ENGL A111

Undergraduate Certificate, Geographic Information Systems (GIS) Admission Requirements

Satisfy the Admission to Certificate and Associate's Degree Programs Requirements in Chapter 7, Academic Standards and Regulations.

Course Requirements

Certain courses require prerequisites or faculty permission. Call (907) 786-1972 for further information.

Major Requirements

In order to receive an Undergraduate Certificate in GIS, students must achieve a grade of C or higher in all courses applied to the certificate.

1. Complete the following required courses (23 credits):

GEO A137	Principles of Mapping	3
GEO A167	Remote Sensing and Image Analysis	4
GEO A460	Geomatics Design Project	3
GIS A268	Elements of Geographic Information Systems (GIS)	4

GIS A366	Spatial Information Analysis and Modeling	3
GIS A367	GIS and Remote Sensing	3
GIS A458	Design and Management of Spatial Data	3

2. Complete 9 credits from the following elective courses: 9

GEO A354	City and Regional Planning (3)
GEO A490	Selected Advanced Topics in Geomatics (1-6)
GIS A295	Internship in Geographic Information Systems I (3)
	or
GIS A495	Internship in Geographic Information Systems II (3)
GIS A369	Land Information Systems (3)
GIS A370	GIS and Remote Sensing for Natural Resources (3)
GIS A371	GIS Applications I (3)
GIS A433	Coastal Mapping (3)
GIS A468	Integration of Geomatics Technologies (3)
GIS A471	GIS Applications II (4)
GIS A490	Selected Advanced Topics in GIS (1-6)

3. A maximum of 3 credits of Internship (GIS A295 or GIS A495) and 3 credits of Advanced Topics in Geomatics (GEO A490) or Advanced Topics in GIS (GIS A490) can be counted toward the Certificate in GIS. Faculty approval of the GEO A490 or GIS A490 topic is necessary for application of the course to the certificate program.

4. A total of 32 credits is required for the Certificate in GIS.

Associate of Applied Science, Geomatics

Admission Requirements

Satisfy the Admission to Undergraduate Certificate and Associate's Degree Programs Requirements in Chapter 7, Academic Standards and Regulations.

General University Requirements

Complete the Associate of Applied Science General Degree Requirements located at the beginning of this chapter. Some of the major requirements will also fulfill Associate of Applied Science degree general requirements. Students should coordinate choices carefully with their academic advisor in the Department of Geomatics.

Academic Progress

A student who is unable to earn a satisfactory grade in the major requirement courses during their initial enrollment may attempt to earn a satisfactory grade one additional time, on a space-available basis. 'Satisfactory grade' means a grade of C or better, as this is the usual requirement for pre-requisites in Geomatics courses (GEO and GIS). Failure to earn a grade of C or better on the second attempt may result in removal from the Geomatics program.

Major Requirements

1. Complete 4 credits in Physics: 4

PHYS A123	Basic Physics I (3)	
PHYS A123L	Basic Physics I Laboratory (1)	
	or	
PHYS A211	General Physics I (3)	
PHYS A211L	General Physics I Laboratory (1)	

2. Complete the following required courses (50 credits):

CSE A102	Introduction to Computer Systems	1
ENGL A212	Technical Writing	3
ENGR A161	Engineering Practices II	3
GEO A137	Principles of Mapping	3
GEO A146	Surveying Computations	3
GEO A155	Fundamentals of Surveying	3
GEO A157	Analytical and Digital Cartography	3
GEO A158	Geomatics Computer Fundamentals	1
GEO A167	Remote Sensing and Image Analysis	4
GEO A248	Digital Terrain Cartography	3
GEO A256	Municipal and Civil Geomatics	3
GEO A257	Elements of Photogrammetry	3
GEO A266	Advanced Surveying	3
GEO A267	Boundary Law I	4
GIS A268	Elements of Geographic Information Systems (GIS)	4
MATH A109	Precalculus †	6

3. Electives to total of 63 credits.

† MATH A107 College Algebra and MATH A108 Trigonometry (both courses) may be substituted for MATH A109 Precalculus.

Bachelor of Science, Geomatics

Admission Requirements

Complete the Admission to Baccalaureate Programs Requirements in Chapter 7, Academic Standards and Regulations.

Academic Progress

A student who is unable to earn a satisfactory grade in the major requirement courses during their initial enrollment may attempt to earn a satisfactory grade one additional time, on a space-available basis. 'Satisfactory grade' means a grade of C or better, as this is the usual requirement for pre-requisites in Geomatics courses (GEO and GIS). Failure to earn a grade of C or better on the second attempt may result in removal from the Geomatics program.

Graduation Requirements

A. General University Requirements

Complete the General University Requirements for all Baccalaureate Degrees at the beginning of this chapter.

B. General Education Requirements

Complete the General Education Requirements for Baccalaureate Degrees at the beginning of this chapter.

C. Major Requirements

1. Complete 4 credits in Physics from one of the following course pairs: 4

PHYS A123	Basic Physics I (3)	
PHYS A123L	Basic Physics I Laboratory (1)	
	or	
PHYS A211	General Physics I (3)	
PHYS A211L	General Physics I Laboratory (1)	

2. Complete the following (21 credits):

CSE A102	Introduction to Computer Systems	1
ENGL A212	Technical Writing	3
ENGR A161	Engineering Practices II	3
GEO A158	Geomatics Computer Fundamentals	1
MATH A109	Precalculus †	6
MATH A272	Applied Calculus ◊	3
STAT A253	Applied Statistics for the Sciences	4

† MATH A107 College Algebra and MATH A108 Trigonometry (both) may be substituted for MATH A109 Precalculus.
◊ MATH A200 Calculus I may be substituted for MATH A272 Applied Calculus.

3. Complete all of the following (71 credits):

BA/JUST A241	Business Law I	3
GEO A137	Principles of Mapping	3
GEO A146	Surveying Computations	3
GEO A155	Fundamentals of Surveying	3
GEO A157	Analytical and Digital Cartography	3
GEO A167	Remote Sensing and Image Analysis	4
GEO A248	Digital Terrain Cartography	3
GEO A256	Municipal and Civil Geomatics	3
GEO A257	Elements of Photogrammetry	3
GEO A266	Advanced Surveying	3
GEO A267	Boundary Law I	4
GEO A301	Geomatics Professional Development I	1
GEO A302	Geomatics Professional Development II	1
GEO A303	Geomatics Professional Development III	1
GEO A355	Land Development and Design	3
GEO A359	Geodesy and Map Projections	3

GEO A365	Geomatics Adjustment and Analysis	4
GEO A457	Boundary Law II	4
GEO A460	Geomatics Design Project	3
GEO A466	Geopositioning	3
GIS A268	Elements of Geographic Information Systems (GIS)	4
GIS A366	Spatial Information Analysis and Modeling	3
GIS A468	Integration of Geomatics Technologies	3
PHIL A305	Professional Ethics	3

4. Complete at least 11 credits in one of the emphasis areas.

Surveying Emphasis

a. Complete the following (4 credits):

GEO A433	Hydrographic Surveying	3
PEP A110	Remote First Aid (1)	1
	or	
PEP A112	First Aid and CPR for Professionals (1)	

b. Complete 7 credits from the following: 7

GEO A354	City and Regional Planning (3)
GEO A358	Programming for Digital Cartography (3)
GEO A459	Geodetic Geomatics (3)
GEO A467	Analytical and Digital Photogrammetry (3)
GEO A490	Selected Advanced Topics in Geomatics (1-6)
GIS A367	GIS and Remote Sensing (3)
GIS A369	Land Information Systems (3)
GIS A371	GIS Applications I (3)
GIS A433	Coastal Mapping (3)
GIS A458	Design and Management of Spatial Data (3)
GIS A471	GIS Applications II (4)
GIS A490	Selected Advanced Topics in GIS (1-6)

Geographic Information Systems (GIS) Emphasis

a. Complete the following (3 credits):

GIS A458	Design and Management of Spatial Data	3

b. Complete 8 credits from the following: 8

GEO A354	City and Regional Planning (3)
GEO A358	Programming for Digital Cartography (3)
GEO A467	Analytical and Digital Photogrammetry (3)
GEO A490	Selected Advanced Topics in Geomatics (1-6)
GIS A367	GIS and Remote Sensing (3)
GIS A369	Land Information Systems (3)
GIS A370	GIS and Remote Sensing for Natural Resources (3)
GIS A371	GIS Applications I (3)
GIS A433	Coastal Mapping (3)
GIS A471	GIS Applications II (4)
GIS A490	Selected Advanced Topics in GIS (1-6)
PEP A110	Remote First Aid (1)
	or
PEP A112	First Aid and CPR for Professionals (1)

5. A total of 131 credits is required for the degree, of which 42 must be upper division.

FACULTY

Don Davis Jr., Professor Emeritus
Gennady Gienko, Associate Professor, ggienko@uaa.alaska.edu
Bill Hazelton, Associate Professor/Chair, nwhazelton@uaa.alaska.edu
Jeffery Hollingsworth, Assistant Professor, jphollingsworth@uaa.alaska.edu

<< Geomatics catalog copy, ending page 250. >>

<<Geomatics catalog copy, starting on page 2479>>

GEOMATICS

Engineering Building (ENGR), Room 330213, (907) 786-1972 www.engr.uaa.alaska.edu/geomatics/

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- Land surveying using global positioning systems and conventional techniques
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- Principles of boundary law
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The wide diversity in the profession creates a similar diversity of employment opportunities. The Undergraduate Certificate in GIS educates students with a broad base of concepts and theory, provides them with hands-on training in real world problems that are relevant to Alaska's environment, and allows them to explore several thematic areas in GIS applications, such as facilities management, transportation, marine environments, and natural resources.

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Students seeking professional licensing as registered land surveyors and those who are interested in specializing in surveying or geographic information systems should enroll in the Bachelor of Science program. For the most effective planning, bachelor's degree candidates should declare their intent by the second semester of their geomatics studies.

Accreditation

The Bachelor of Science, Geomatics program at UAA is accredited by the Applied Science Accreditation Commission (ASAC) of ABET, ~~111 Market Place, Suite 1050, Baltimore, MD 21202~~http://www.abet.org.

Program Educational Objectives and Program Outcomes

Program Educational Objectives

The UAA Bachelor of Science, Geomatics program has the following Program Educational Objectives.

Within five years of graduation, graduates of the Geomatics program will have achieved the following.

1. Graduates who are pursuing careers in the surveying area will have attempted the AELS Board's Fundamentals of Surveying examination, and their overall pass rate will be at least 80%.
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5. At least 80% of graduates will have completed at least one professional development course or session, or completed one higher education course.
6. At least 50% of graduates will have taught at least one workshop or training session, made one conference presentation, or published one article relevant to their career.

Student Learning Outcomes

In keeping with the program educational objectives, it is expected that graduates of the UAA Geomatics program will have:

1. An ability to apply knowledge of mathematics, statistics, and general physics;
2. An ability to collect, analyze and interpret data in all of the recognized surveying and mapping areas;
3. An ability to identify, formulate, and design a geomatics system, component or process to meet desired needs;
4. An ability to function on multidisciplinary as well as on interdisciplinary teams;
5. An ability to think critically and to solve geomatics problems creatively and constructively;
6. An understanding of professional and ethical responsibility;
7. An ability to communicate effectively;
8. The broad education necessary to understand the impact of geomatics solutions in a global and societal context;
9. A recognition of the need for, and ability to engage in, lifelong learning;
10. A knowledge of contemporary issues in professional practice;
11. An ability to use the techniques, skills and modern geomatics tools necessary for geomatics practice; and
12. An ability to apply knowledge in all six areas of surveying and mapping:
    i. Field surveying and methods;
    ii. Photogrammetric mapping, image interpretation and remote sensing;
    iii. Surveying calculation and data adjustment;
    iv. Geodetic coordinates and astronomy;
    v. Cartographic representation, projections, and map production;
    vi. Computer-based multipurpose cadastre, geographic information systems.

Mission Statement

The Department of Geomatics' mission is to contribute to the wider body of knowledge in the geospatial sciences, and to disseminate this to society. By advancing our theoretical, professional, technical and educational capabilities, we will develop and maintain a community dedicated to the highest standards of scholarship. Within a student-centered environment, we are committed

to the theoretical, professional and technical advancement of all our students, so that they may contribute to the advancement of their profession, their society, and their world, throughout their lives.

Honors in Geomatics

Undergraduate students may be recognized for exceptional performance by earning Departmental Honors in Geomatics. In order to receive honors in Geomatics, a student must meet each of the following requirements:

1. Complete all requirements for a BS in Geomatics.
2. Be an active member for at least one year of both a national and an on-campus student chapter of a professional geomatics society that addresses issues relevant to the geomatics profession.
3. Have a GPA of 3.50 or higher in their Geomatics and Geographic Information System courses of their catalog year. Have a GPA of 3.30 or higher for their overall cumulative GPA.
4. Pass the Fundamentals of Surveying Examination prior to the completion of the first semester of their senior year.
5. Document a minimum of eight weeks work experience while a student at the University of Alaska in a geomatics or geomatics related position.

Advising

All undergraduate students are encouraged to meet with their academic advisor each semester for the purpose of reviewing their academic progress and planning future courses. It is particularly important for students to meet with their advisor whenever academic difficulties arise. Students are encouraged to consult the faculty in the Department of Geomatics for assistance in designing their course of study to ensure that all prerequisites have been met and that university and major degree requirements are understood and followed.

Preparation

The university offers courses to help students without this preparation to meet the skill level required in the Geomatics program. Insufficient preparation will increase the number of semesters required to complete either degree. Students seeking the Undergraduate Certificate in Geographic Information Systems, the Associate of Applied Science or Bachelor of Science in Geomatics should prepare for entrance into the program by completing the following high school courses:

Mathematics	Algebra II
	Trigonometry
Science	Physics
English Composition	Skill level as demonstrated by ACT, SAT or approved placement test to qualify for enrollment in ENGL A111

Undergraduate Certificate, Geographic Information Systems (GIS) Admission Requirements

Satisfy the Admission to Certificate and Associate's Degree Programs Requirements in Chapter 7, Academic Standards and Regulations.

Course Requirements

Certain courses require prerequisites or faculty permission. Call (907) 786-1972 for further information.

Major Requirements

In order to receive an Undergraduate Certificate in GIS, students must achieve a grade of C or higher in all courses applied to the certificate.

1. Complete the following required courses (23 credits):

GEO A137	Principles of Mapping	3
GEO A167	Remote Sensing and Image Analysis	4
GEO A460	Geomatics Design Project	3
GIS A268	Elements of Geographic Information Systems (GIS)	4

GIS A366	Spatial Information Analysis and Modeling	3
GIS A367	GIS and Remote Sensing	3
GIS A458	Design and Management of Spatial Data	3

2. Complete 9 credits from the following elective courses: 9

GEO A354	City and Regional Planning (3)
GEO A490	Selected Advanced Topics in Geomatics (1-6)
GIS A295	Internship in Geographic Information Systems I (3)
	or
GIS A495	Internship in Geographic Information Systems II (3)
GIS A369	Land Information Systems (3)
GIS A370	GIS and Remote Sensing for Natural Resources (3)
GIS A371	GIS Applications I (3)
GIS A433	Coastal Mapping (3)
GIS A468	Integration of Geomatics Technologies (3)
GIS A471	GIS Applications II (4)
GIS A490	Selected Advanced Topics in GIS (1-6)

3. A maximum of 3 credits of Internship (GIS A295 or GIS A495) and 3 credits of Advanced Topics in Geomatics (GEO A490) or Advanced Topics in GIS (GIS A490) can be counted toward the Certificate in GIS. Faculty approval of the GEO A490 or GIS A490 topic is necessary for application of the course to the certificate program.

4. A total of 32 credits is required for the Certificate in GIS.

Associate of Applied Science, Geomatics

Admission Requirements

Satisfy the Admission to Undergraduate Certificate and Associate's Degree Programs Requirements in Chapter 7, Academic Standards and Regulations.

General University Requirements

Complete the Associate of Applied Science General Degree Requirements located at the beginning of this chapter. Some of the major requirements will also fulfill Associate of Applied Science degree general requirements. Students should coordinate choices carefully with their academic advisor in the Department of Geomatics.

Academic Progress

A student who is unable to earn a satisfactory grade in the major requirement courses during their initial enrollment may attempt to earn a satisfactory grade one additional time, on a space-available basis. 'Satisfactory grade' means a grade of C or better, as this is the usual requirement for pre-requisites in Geomatics courses (GEO and GIS). Failure to earn a grade of C or better on the second attempt may result in removal from the Geomatics program.

Major Requirements

1. Complete 4 credits in Physics: 4

PHYS A123	Basic Physics I (3)	
PHYS A123L	Basic Physics I Laboratory (1)	
	or	
PHYS A211	General Physics I (3)	
PHYS A211L	General Physics I Laboratory (1)	

2. Complete the following required courses (50 credits):

CSE A102	Introduction to Computer Systems	1
ENGL A212	Technical Writing	3
ENGR A161	Engineering Practices II	3
GEO A137	Principles of Mapping	3
GEO A146	Surveying Computations	3
GEO A155	Fundamentals of Surveying	3
GEO A157	Analytical and Digital Cartography	3
GEO A158	Geomatics Computer Fundamentals	1
GEO A167	Remote Sensing and Image Analysis	4
GEO A248	Digital Terrain Cartography	3
GEO A256	Municipal and Civil Geomatics	3
GEO A257	Elements of Photogrammetry	3
GEO A266	Advanced Surveying	3
GEO A267	Boundary Law I	4
GIS A268	Elements of Geographic Information Systems (GIS)	4
MATH A109	Precalculus †	6

3. Electives to total of 63 credits.

† MATH A107 College Algebra and MATH A108 Trigonometry (both courses) may be substituted for MATH A109 Precalculus.

Bachelor of Science, Geomatics

Admission Requirements

Complete the Admission to Baccalaureate Programs Requirements in Chapter 7, Academic Standards and Regulations.

Academic Progress

A student who is unable to earn a satisfactory grade in the major requirement courses during their initial enrollment may attempt to earn a satisfactory grade one additional time, on a space-available basis. 'Satisfactory grade' means a grade of C or better, as this is the usual requirement for pre-requisites in Geomatics courses (GEO and GIS). Failure to earn a grade of C or better on the second attempt may result in removal from the Geomatics program.

Graduation Requirements

A. General University Requirements

Complete the General University Requirements for all Baccalaureate Degrees at the beginning of this chapter.

B. General Education Requirements

Complete the General Education Requirements for Baccalaureate Degrees at the beginning of this chapter.

C. Major Requirements

1. Complete 4 credits in Physics from one of the following course pairs: 4

PHYS A123	Basic Physics I (3)	
PHYS A123L	Basic Physics I Laboratory (1)	
	or	
PHYS A211	General Physics I (3)	
PHYS A211L	General Physics I Laboratory (1)	

2. Complete the following (21 credits):

CSE A102	Introduction to Computer Systems	1
ENGL A212	Technical Writing	3
ENGR A161	Engineering Practices II	3
GEO A158	Geomatics Computer Fundamentals	1
MATH A109	Precalculus †	6
MATH A272	Applied Calculus ◊	3
STAT A253	Applied Statistics for the Sciences	4

† MATH A107 College Algebra and MATH A108 Trigonometry (both) may be substituted for MATH A109 Precalculus.
◊ MATH A200 Calculus I may be substituted for MATH A272 Applied Calculus.

3. Complete all of the following (71 credits):

BA/JUST A241	Business Law I	3
GEO A137	Principles of Mapping	3
GEO A146	Surveying Computations	3
GEO A155	Fundamentals of Surveying	3
GEO A157	Analytical and Digital Cartography	3
GEO A167	Remote Sensing and Image Analysis	4
GEO A248	Digital Terrain Cartography	3
GEO A256	Municipal and Civil Geomatics	3
GEO A257	Elements of Photogrammetry	3
GEO A266	Advanced Surveying	3
GEO A267	Boundary Law I	4
GEO A301	Geomatics Professional Development I	1
GEO A302	Geomatics Professional Development II	1
GEO A303	Geomatics Professional Development III	1
GEO A355	Land Development and Design	3
GEO A359	Geodesy and Map Projections	3

GEO A365	Geomatics Adjustment and Analysis	4
GEO A457	Boundary Law II	4
GEO A460	Geomatics Design Project	3
GEO A466	Geopositioning	3
GIS A268	Elements of Geographic Information Systems (GIS)	4
GIS A366	Spatial Information Analysis and Modeling	3
GIS A468	Integration of Geomatics Technologies	3
PHIL A305	Professional Ethics	3

4. Complete at least 11 credits in one of the emphasis areas.

Surveying Emphasis

a. Complete the following (4 credits):

GEO A433	Hydrographic Surveying	3
PEP A110	Remote First Aid (1)	1
	or	
PEP A112	First Aid and CPR for Professionals (1)	

b. Complete 7 credits from the following: 7

GEO A354	City and Regional Planning (3)
GEO A358	Programming for Digital Cartography (3)
GEO A459	Geodetic Geomatics (3)
GEO A467	Analytical and Digital Photogrammetry (3)
GEO A490	Selected Advanced Topics in Geomatics (1-6)
GIS A367	GIS and Remote Sensing (3)
GIS A369	Land Information Systems (3)
GIS A371	GIS Applications I (3)
GIS A433	Coastal Mapping (3)
GIS A458	Design and Management of Spatial Data (3)
GIS A471	GIS Applications II (4)
GIS A490	Selected Advanced Topics in GIS (1-6)

Geographic Information Systems (GIS) Emphasis

a. Complete the following (3 credits):

GIS A458	Design and Management of Spatial Data	3

b. Complete 8 credits from the following: 8

GEO A354	City and Regional Planning (3)
GEO A358	Programming for Digital Cartography (3)
GEO A467	Analytical and Digital Photogrammetry (3)
GEO A490	Selected Advanced Topics in Geomatics (1-6)
GIS A367	GIS and Remote Sensing (3)
GIS A369	Land Information Systems (3)
GIS A370	GIS and Remote Sensing for Natural Resources (3)
GIS A371	GIS Applications I (3)
GIS A433	Coastal Mapping (3)
GIS A471	GIS Applications II (4)
GIS A490	Selected Advanced Topics in GIS (1-6)
PEP A110	Remote First Aid (1)
	or
PEP A112	First Aid and CPR for Professionals (1)

5. A total of 131 credits is required for the degree, of which 42 must be upper division.

FACULTY

Don Davis Jr., Professor Emeritus
~~Don Davis Jr., Professor/Chair, AFDD@uaa.alaska.edu~~
Gennady Gienko, Associate Professor, ~~AFGG@uaa.alaska.edu~~ ggienko@uaa.alaska.edu
Bill Hazelton, Associate Professor/Chair, ~~AFBH3@uaa.alaska.edu~~ nwhazelton@uaa.alaska.edu
Jeffery Hollingsworth, Assistant Professor, jphollingsworth@uaa.alaska.edu

<< Geomatics catalog copy, ending page 250. >>

Program/Prefix Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Program of Study or Prefix

1a. School or College	1b. Department
KP KPC	Business & Industry

2. Complete Program Title/Prefix
Associate of Applied Science, General Business

3. Type of Program

Choose one from the appropriate drop down menu: Undergraduate: Associate of Applied Science or Graduate: CHOOSE ONE

This program is a Gainful Employment Program: ☐ Yes or ☒ No

4. Type of Action:

PROGRAM	PREFIX
☐ Add	☐ Add
☒ Change	☐ Change
☐ Delete	☐ Inactivate

5. Implementation Date (semester/year)
From: F/2013 To: /9999

6a. Coordination with Affected Units
Department, School, or College: KPC
Initiator Name (typed): Steve Horn
Initiator Signed Initials: _____ Date:_____

6b. Coordination Email submitted to Faculty Listserv (uaa-faculty@lists.uaa.alaska.edu) Date: 2/1/2013

6c. Coordination with Library Liaison Date: 2/1/2013

7. Title and Program Description - Please attach the following:
☒ Cover Memo ☒ Catalog Copy in Word using the track changes function

8. Justification for Action
The justification for this action is attached to the cover memo.

Initiator (faculty only) Date
Steve Horn
Initiator (TYPE NAME)

☐ Approved
☐ Disapproved
Department Chair Date

☐ Approved
☐ Disapproved
College/School Curriculum Committee Chair Date

☐ Approved
☐ Disapproved
Dean/Director of School/College Date

☐ Approved
☐ Disapproved
Undergraduate/Graduate Academic Board Chair Date

☐ Approved
☐ Disapproved
Provost or Designee Date

Associate of Applied Science, General Business

Kenai Peninsula College (KPC)
156 College Road, Soldotna, Alaska, 99669, (907) 262-0300
www.kpc.alaska.edu

Kodiak College (KOC)
117 Benny Benson Drive, Kodiak, Alaska 99615, (907) 486-1210
www.koc.alaska.edu

Matanuska-Susitna College (MSC)
8295 East College Drive (P.O. Box 2889)
Palmer, Alaska 99645, (907) 745-9774
http://matsu.alaska.edu

This two-year degree program provides a solid business foundation and preparation for career advancement. Graduates will be able to practice relevant business skills, meet the diverse needs of a business to achieve organizational goals, start and manage their own small business, communicate effectively, and/or manage their business affairs with professionalism, integrity, and a spirit of inquiry.

The specific student learning outcomes that arise from the program objectives and are the most central for the assessment of the program's student learning outcomes are as follows.

1. Use critical thinking skills to solve problems and make decisions based on accepted business principles.
2. Understand the interrelationship of international and domestic business, societies, and governments.
3. Execute the four functions of management: planning, organizing, leading, controlling.
4. Apply effective communication skills in business settings.

Admission Requirements

Complete university admissions requirements for associate degrees found in Chapter 7, Academic Standards and Regulations.

General University Requirements

1. Complete the General University and the General Course Requirements for Associate of Applied Science Degrees located at the beginning of this chapter.
2. Complete the Associate of Applied Science General Course Requirements (15 credits) located at the beginning of this chapter. Of the courses needed to satisfy the General Course Requirements, one must be MATH A105 or higher.

Communication and General Course Requirements

Oral Communications Courses

Select 3 credits from the following:		3
COMM A111	Fundamentals of Oral Communication (3)	
COMM A235	Small Group Communication (3)	
COMM A237	Interpersonal Communication (3)	
COMM A241	Public Speaking (3)	

Written Communication Courses

Select 6 credits from the following:		6
ENGL A111	Methods of Written Communication *(required)* (3)	
ENGL A211	Academic Writing About Literature (3)	
ENGL A212	Technical Writing (3)	
ENGL A213	Writing in the Social and Natural Sciences (3)	

CIOS A260A Business Communications (3)

Humanities* Social Sciences, Mathematics, Natural Sciences

Select 6 credits from approved General Course Requirements: 6

MATH A105 Intermediate Algebra or higher level (required) (3)

and 3 more credits from an approved course

**Note: Any English courses used to satisfy humanities General Course Requirements must be different from the written communications requirement and have a course number higher than ENGL A111.*

Major Requirement Courses

1. Complete the following required courses:

ACCT A201	Principles of Financial Accounting	3
ACCT A202	Principles of Managerial Accounting	3
BA A151	Introduction to Business	3
BA A231	Fundamentals of Supervision	3
BA/JUST A241	Business Law I	3
BA A260	Marketing Practices	3
CIS A110	Computer Concepts in Business	3
ECON A201	Principles of Macroeconomics	3
ECON A202	Principles of Microeconomics	3
LOGP A 110	Logistics Information Systems & Customer Service	3

2. Major elective courses: 6 credits 6

   Advisor approved courses from the following programs:
   ACCT, BA, CIS, CS, ECON

3. Electives: 9 credits 9

4. A total of 60 credits is required for the degree.

FACULTY

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Steve Horn, Assistant Professor, slhorn@kpc.alaska.edu

Holly Bell, Assistant Professor, hbell11@matsu.alaska.edu

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Associate of Applied Science, General Business

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Matanuska-Susitna College (MSC)
8295 East College Drive (P.O. Box 2889)
Palmer, Alaska 99645, (907) 745-9774
http://matsu.alaska.edu

~~This flexible, two-year degree provides a solid business foundation and prepares students for career advancement. It readies graduates to apply principles and skills relating to accounting, management, marketing, finance, economics, and business law to businesses of all sizes. Graduates will be able to practice relevant business skills, meet diverse business needs to achieve organizational goals, start and manage their own small businesses, communicate effectively, and conduct their business affairs with professionalism, integrity, and a spirit of inquiry.~~

This two-year degree program provides a solid business foundation and preparation for career advancement. Graduates will be able to practice relevant business skills, meet the diverse needs of a business to achieve organizational goals, start and manage their own small business, communicate effectively, and/or manage their business affairs with professionalism, integrity, and a spirit of inquiry.

The specific student learning outcomes that arise from the program objectives and are the most central for the assessment of the program's student learning outcomes are as follows.

1. Use critical thinking skills to solve problems and make decisions based on accepted business principles.
2. Understand the interrelationship of international and domestic business, societies, and governments.
3. Execute the four functions of management: planning, organizing, leading, controlling.
4. ~~1.~~ Apply effective communication skills in business settings.

Comment [PJM1]: Do these really need to be capitalized?

Admission Requirements

Complete university admissions requirements for associate degrees found in Chapter 7, Academic Standards and Regulations.

General University Requirements

1. Complete the General University and the General Course Requirements for Associate of Applied Science Degrees located at the beginning of this chapter.
2. Complete the Associate of Applied Science General Course Requirements (15 credits) located at the beginning of this chapter. Of the courses needed to satisfy the General Course Requirements, one must be MATH A105 or higher.

Communication and General Course Requirements

Oral Communications Courses

Select 3 credits from the following:		3
COMM A111	Fundamentals of Oral Communication (3)	
COMM A235	Small Group Communication (3)	
COMM A237	Interpersonal Communication (3)	
COMM A241	Public Speaking (3)	

Written Communication Courses

Select 6 credits from the following:		6

ENGL A111	Methods of Written Communication *(required)* (3)	
ENGL A211	Academic Writing About Literature (3)	
ENGL A212	Technical Writing (3)	
ENGL A213	Writing in the Social and Natural Sciences (3)	
CIOS A260A	Business Communications (3)	

Humanities* Social Sciences, Mathematics, Natural Sciences

Select 6 credits from approved General Course Requirements: 6

MATH A105 Intermediate Algebra or higher level (required) (3)

and 3 more credits from an approved course

**Note: Any English courses used to satisfy humanities General Course Requirements must be different from the written communications requirement and have a course number higher than ENGL A111.*

Major Requirement Courses

1. Complete the following required courses:

~~ACCT A101~~	~~Principles of Financial Accounting I~~	~~3~~
~~ACCT A102~~	~~Principles of Financial Accounting II~~	~~3~~
*ACCT A201	Principles of Financial Accounting	3
ACCT A202	Principles of Managerial Accounting	3
BA A151	Introduction to Business	3
BA A231	Fundamentals of Supervision	3
BA/JUST A241	Business Law I	3
BA A260	Marketing Practices	3
~~BA A264~~	~~Personal Selling~~	~~3~~
CIS A110	Computer Concepts in Business	3
ECON A201	Principles of Macroeconomics	3
ECON A202	Principles of Microeconomics	3
LOGP A 110	Logistics Information Systems & Customer Service	3

**The ACCT A101 Principles of Financial Accounting I and ACCT A102 Principles of Financial Accounting II sequence may be used to satisfy the ACCT A201 requirement for this degree.*

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2. Major elective courses: 6 credits 6

   Advisor approved courses from the following programs:
   ACCT, BA, CIS, CS, ECON

3. Electives: 9 credits 9

4. A total of 60 credits is required for the degree.

FACULTY

Thomas Dalrymple, Assistant Professor, tdalrymp~~IFTAD~~@kpc~~uaa~~.alaska.edu

Kathrynn Hollis-Buchanan, Assistant Professor, khollis@kodiak.alaska.edu

~~*Ray Zagorski, Associate Professor, IFRZ@uaa.alaska.edu*~~

Steve Horn, Assistant Professor, slhorn@kpc.alaska.edu

Holly Bell, Assistant Professor, hbell11@matsu.alaska.edu

Diedre Berberich, Assistant Professor, dberberich@matsu.alaska.edu

Comment [PJM2]: Please update Also, What is Berberich's title?

Academic Affairs
UNIVERSITY of ALASKA ANCHORAGE

Date: February 8, 2013

To: Graduate Academic Board
Undergraduate Academic Board

From: Susan Kalina, Vice Provost for Undergraduate Academic Affairs
David Yesner, Associate Dean, Graduate School
Megan Carlson, Assistant Vice Provost and Accreditation Liaison Officer
Lora Volden, University Registrar

Re: Draft Academic Program Suspension and Deletion Policies and Cover Memo Template

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Currently, UAA has no formal policies on academic program suspension or deletions. Our offices need to be able to give guidance to programs considering suspensions or deletions. The attached draft policies are designed to provide this guidance and address accreditation and Board of Regents requirements.

Input from the Policy Advisory Committee, the academic deans, and community campus directors have been incorporated into this draft, and we are submitting it to the academic boards for consideration.

The policies are designed to apply to a variety of purposes for program suspension and deletion, such as addressing temporary circumstances, making major program revisions, or deleting programs which have been suspended for several years.

We look forward to receiving your feedback on the draft.

Academic Program Suspension and Deletion Policies

When planning to suspend or delete an academic program, a number of considerations must be addressed to comply with the policies of the University of Alaska (UA)[1] and the Northwest Commission on Colleges and Universities (NWCCU).[2] These considerations include, but are not limited to, the impact on students currently enrolled in the program, the impact on the community in which the program is offered, and the impact on other academic programs in the University of Alaska System.

Academic Program Suspension of Admissions

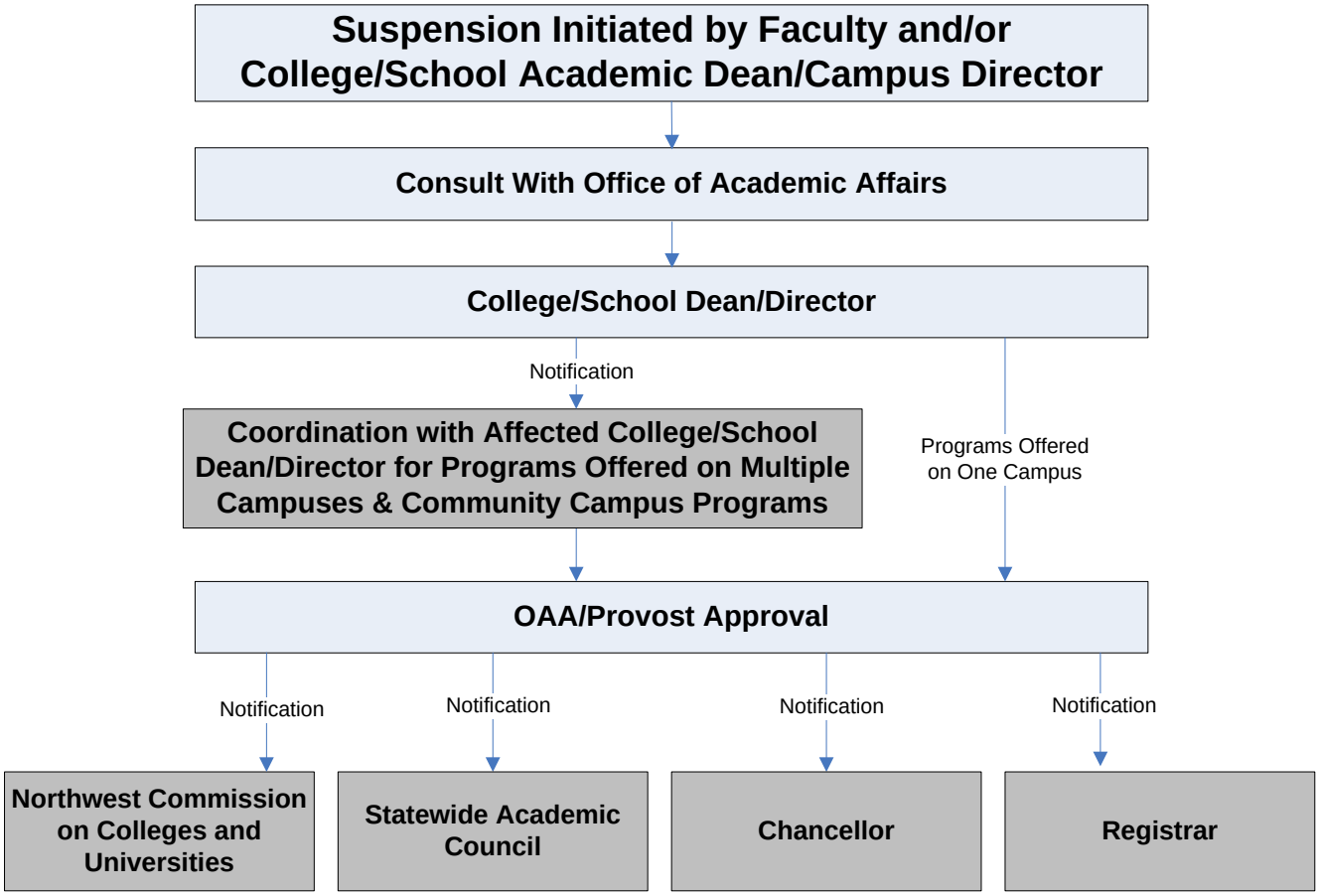
There are a variety of reasons why program faculty and academic deans/campus directors consider suspending admissions to an academic program. These may include, among others, temporary circumstances (e.g., insufficient faculty to meet substantial enrollment increases), planned major revisions to the program (e.g., deleting a track or changing the degree level), or potential program deletion (discussed in greater detail in the next section).

Steps for Program Suspension *(see Diagram 1)*

1. **Program Suspension:** Academic dean/campus director submits a memo to the provost requesting suspension of admission.[3] Requests for suspension should indicate the implementation date, reason for the suspension, planned duration, and identification of impacts on other UAA programs or departments. By the conclusion of the fifth year of suspension, programs must reinstate admission, request extension of suspension, or initiate the deletion process.
    a. For programs offered on a community campus, the applicable academic dean or campus director (as determined by the UAA Catalog chapter in which the program is published) should be notified prior to the suspension of the program. For programs offered on multiple campuses, each applicable dean or campus director should be notified prior to suspension of the program. [4]
2. **UA System and Accreditation Notification:** Following the approval of program suspension by the provost, Academic Affairs will notify the Statewide Academic Council (SAC) and Northwest Commission on Colleges and Universities (NWCCU). Program suspensions require *notification* to these bodies, not approval.
3. **Administrative Logistics:** The following are non-curricular considerations for program deletion.
    a. The provost has final approval authority for program suspensions. Once approved by the provost, the request is forwarded to the registrar to formally suspend admissions. The chancellor is notified of the action before notification goes to SAC and the NWCCU.
    b. Personnel implications will be addressed in accordance with applicable collective bargaining agreements and personnel policies and regulations. Program funds will be assigned to other department, college, or institutional priorities through established processes.

[1] Board of Regents and University Regulation Part X: Academic Policy Regulation http://www.alaska.edu/bor/policy/10-04.doc
[2] NWCCU Operational Policy A-2: Substantive Change
http://www.nwccu.org/Standards%20and%20Policies/Operational%20Policies/Policy%20A2/Operational%20Policy%20A2.htm
[3] Decisions to limit enrollment or admission to a program are administrative decisions that do not require completion of this approval process.
[4] In addition to addressing the potential impact of a program suspension on related academic units, this coordination provides an opportunity for the academic deans and campus directors to identify areas in which the units may work together to support the program planned for suspension.

Diagram 1: UAA Degree and Certificate Suspension Approval Process



Academic Program Deletion

Program deletions may be initiated for a number of reasons. These may include, among others, low enrollment, few graduates, or changing job markets. After a period of suspension, and in conjunction with evidence collected from within and outside the institution, a decision can be made to modify, eliminate, or supersede the existing program with one more relevant. Considerations should include the impact on students currently enrolled in the program, on directly related employment sectors, and on other related departments within the university.

Steps for Program Deletion *(see Diagram 2)*

1. **Program Suspension:** Following the process described in the Program Suspension Policy, the academic dean/campus director submits a memo to the provost requesting suspension of admissions into the program, to ensure that no new students are admitted into the program until the final determination is made. Requests for suspension should indicate the implementation date, reason for the suspension, planned duration, and identification of impacts on other UAA programs or departments. By the conclusion of the fifth year of suspension, the deletion process must be initiated.
    a. For programs offered on a community campus, the applicable academic dean or campus director (as determined by the UAA Catalog chapter in which the program is published) should be notified prior to the suspension of the program. For programs offered on multiple campuses, each applicable dean or campus director should be notified prior to suspension of the program. [5]
2. **Consultation with Academic Affairs:** To initiate the program deletion process, consultation with OAA must occur. This consultation will include a discussion of the process and an overview of the templates required for program deletion. *OAA may waive or modify this requirement where appropriate, such as a program which has been suspended for more than five years with no currently enrolled majors.*
    a. The process will address the rationale for the proposed deletion, the demand for the program, the impact and implications on academic departments in UAA and other Major Academic Units (MAUs), impacts on external stakeholders, the financial status of the program, and potential options to resolve the concerns which led to the proposed deletion.
    b. If the decision is to delete the program, programs must accommodate all currently admitted students with a completion plan that meets each student's catalog deadlines and requirements. This completion plan should outline the timeframe and priorities for resources to accommodate completion of students impacted by the proposed program deletion.
    c. Proposals to delete programs offered on multiple campuses or through collaborative arrangements between two or more academic units should be coordinated with the academic deans and campus directors of the relevant program as is appropriate to their situations.
3. **Development of Proposal to Delete or Modify Program:** This proposal should be developed using the established curriculum approval process.[6] If the department decides to modify the existing program, or to supersede it with a new program, the curriculum is developed as a *program change* so that deletion of the existing program and initiation of its replacement are approved simultaneously.
4. **UA System and Accreditation Approval:** Following the internal curriculum approval process, Academic Affairs will work with program faculty to submit program deletions for approval by the Statewide Academic Council (SAC), Board of Regents, and Northwest Commission on Colleges and Universities (NWCCU).
    a. *Note: Authority to approve deletion of Occupational Endorsement Certificates and Workforce Credentials is delegated to the chancellor, and does not require action by SAC or the Board of*

[5] In addition to addressing the potential impact of a program suspension on related academic units, this coordination provides an opportunity for the academic deans and campus directors to identify areas in which the units may work together to support the program planned for suspension.

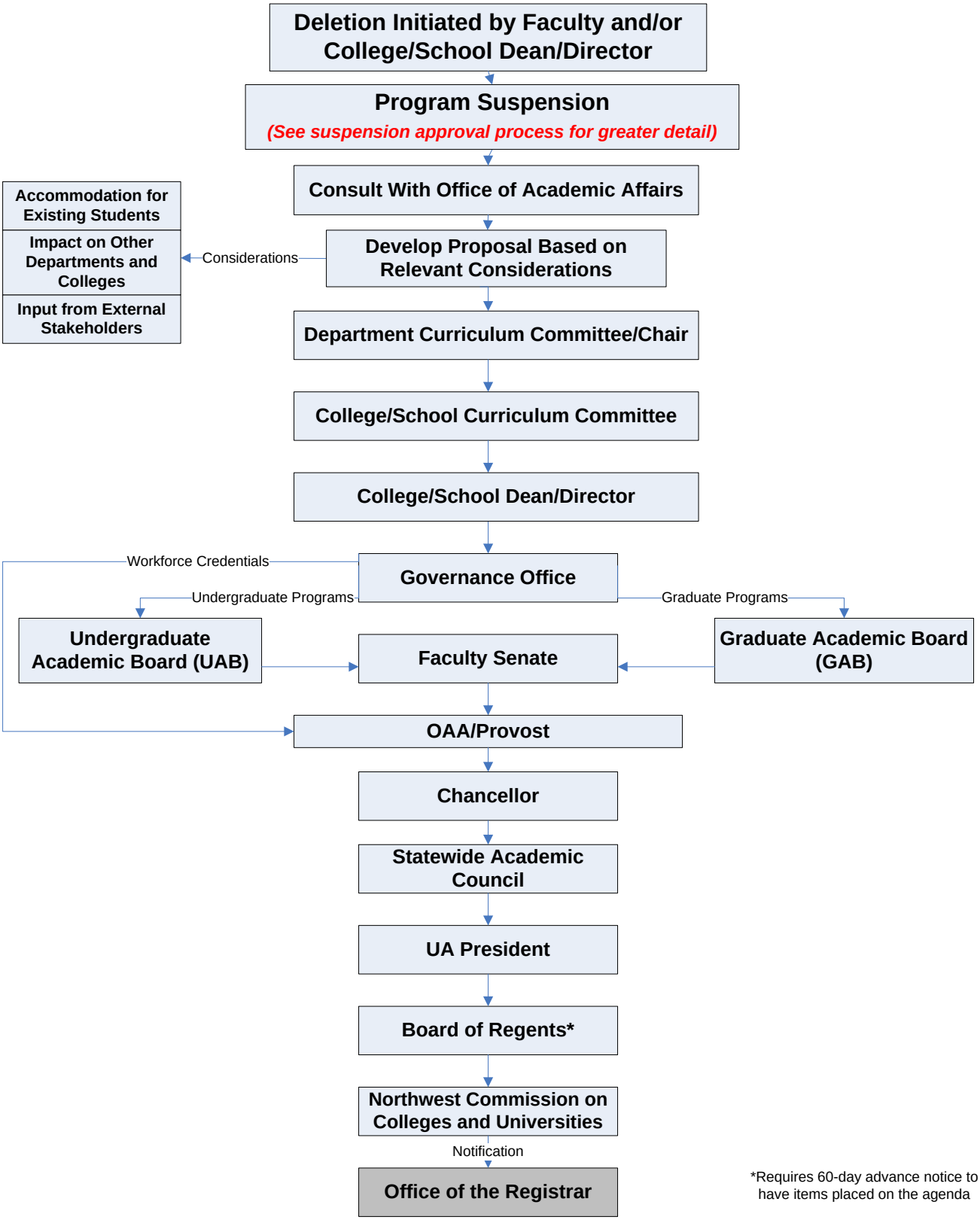
[6] See the Curriculum Handbook on the Governance site http://www.uaa.alaska.edu/governance/

Regents.[7] *These program deletions should be submitted to SAC for notification purposes and to the NWCCU for final approval.*

5. **Administrative Logistics:** The following are non-curricular considerations for program deletion.
    a. **Program Deletion from Banner:** When the program is deleted in Banner, students may no longer remain enrolled in the program, and the degree or certificate cannot be awarded. This administrative deletion will be postponed until there are no enrolled students in the major through graduation or expiration of admissions. Once approved by the NWCCU, the registrar will be notified to formally delete the program.
    b. **Personnel and Budget:** Personnel implications will be addressed in accordance with applicable collective bargaining agreements and personnel policies and regulations. Program funds will be assigned to other department, college, or institutional priorities through established processes.
    c. **Decisions Relative to Departments and Divisions:** This policy applies exclusively to academic programs. Decisions relative to departments and divisions will be managed within the college and institution through established processes.

[7] University Policy P10.04.020

Diagram 2: UAA Degree and Certificate Deletion Approval Process



Definitions

Academic Program: A specific degree, certificate, or minor approved by the Board of Regents (BOR) and/or the Northwest Commission on Colleges and Universities (NWCCU), such as a Bachelor of Arts in English. Program levels include occupational endorsement certificates, undergraduate certificates, associate degrees, baccalaureate degrees, post-baccalaureate certificates, graduate certificates, master's degrees, and doctoral degrees.

In some cases, a portion of an academic program (such as one of two tracks) may be suspended or deleted while other portions of the program remain available.

Program Suspension: While decisions relative to the program are made, admissions to the program are suspended. There are a variety of reasons for suspension. These may include, among others, temporary circumstances (e.g., insufficient faculty to meet substantial enrollment increases), planned major revisions to the program (e.g., deleting a track or changing the degree level), or potential program deletion. Program suspension requires notification to the Statewide Academic Council (SAC) and NWCCU.

Program Deletion: Program is scheduled for deletion, a teach-out process will be developed and communicated to majors, and the program will remain in the catalog until the teach-out process is complete. When program deletion is final, the program is no longer listed as an academic program, and no students may graduate or remain enrolled in the program. Program deletion requires approval by BOR and NWCCU.

Approval: The relevant decision making authority grants approval for the requested program action. The action cannot proceed until this approval has been received.

Notification: The relevant individual or body is notified of the approved program action. The body being notified does not have decision making authority over the action.

To: (Undergraduate or Graduate) Academic Board
From: Faculty Initiator, Department
Date:
Re: Proposed Deletion of (Program Name and Degree or Certificate Level)

Please briefly address each of the following items. Please mark "not applicable" for any items which do not apply to the program. This cover memo should be no longer than one page.

Program Background: How long has the program been offered? If admission is currently suspended, please indicate the length of the suspension.

Justification for Program Deletion: Why is this program deletion proposed? Some examples might include enrollment trends, employment data, or shifting priorities within the department, school, or college.

Impact on Other Programs: How will the deletion affect other UA programs? Please include the GERs, programs on other campuses, and programs whose requirements include courses offered within the program proposed for deletion. How have you coordinated with those departments?

Impact on Students:[1] How many students are currently enrolled (admitted to the program and taking classes)? How many students are currently admitted (admitted to the program but not currently taking classes)? How does the department plan to accommodate those students?

Impact on Stakeholders: Describe any input received from relevant stakeholders, such as industry advisory groups or communities served.

Plans for Program Deletion: What is the planned timeline for the deletion? Will the deleted program be replaced by a new or modified program?

This cover memo should accompany the Program Action Request (PAR) form submitted to curriculum bodies for program deletions. Catalog copy does not need to be submitted with program deletions.

This template is intended to meet the needs of the UAA curriculum bodies. Initiating faculty should contact Academic Affairs for assistance with the forms and approval processes for the Board of Regents and Northwest Commission on Colleges and Universities.

[1] Please contact the Office of the Registrar (786-1560) for assistance identifying these data.

Original GER Purge List for 2013-14 UAA Catalog with Initial Responses

SUBJECT PREFIX	COURSE NUMBER	BANNER COLLEGE CODE	COURSE TITLE	COURSE EFFECTIVE	LAST TERM OFFERED	Was this course carried over by request from the 2011-12 purge list?	Was this course carried over by request from the 2012-13 purge list?	COURSE IMPACTS	PROGRAM IMPACTS	COMMENTS
Scbcrse Subject Code	Scbcrse Crse Number	Scbcrse College Code	Scbcrse Title	Scbcrky Term Code Start	Sbbsect Term Code					
CIS	A326	CB	*Information Age Literacy	200803	N/A		yes		BS, Aviation Technology, Aviation Management Emphasis; BS, Aviation Technology, Air Traffic Control Emphasis	GER Integrative Capstone; **Retain** per Minnie Yen
HNRS	A490	HC	*Senior Honors Seminar	199703	200703	yes	yes		Honors Senior Project/Thesis Requirements (Honors Core)	GER Integrative Capstone; **Retain** per Ronald Spatz

Original Purge List for 2013-14 UAA Catalog with Initial Responses

SUBJECT PREFIX Scbcrse Subject Code	COURSE NUMBER Scbcrse Crse Number	BANNER COLLEGE CODE Scbcrse College Code	COURSE TITLE Scbcrse Title	COURSE EFFECTIVE Scbcrky Term Code Start	LAST TERM OFFERED Sobsect Term Code	Was this course carried over by request from the 2011-12 purge list?	Was this course carried over by request from the 2012-13 purge list?	COURSE IMPACTS	PROGRAM IMPACTS	COMMENTS
AET	A171	CT	Building Your Own Home	199702	200801					
AET	A290	CT	AET Selected Topic	199902	200801					selected topics course; **Retain** per Donn Ketner
AGRI	A240	CT	Greenhouse Oper & Mgmt	199702	200801					
AKNS	A420	AS	Alaska Native Education	199802	199902				Minor, Alaska Native Studies	
ANTH	A432	AS	Hunting & Gathering Societies	199702	200701		yes		BA, Anthropology; BS, Anthropology	**Retain** per David Yesner
ANTH	A499	AS	Senior Thesis in Anthropology	200701	N/A		yes		Honors, Anthropology	**Retain** per David Yesner
ANTH	A690	AS	Special Topics in Anthropology	200703	N/A					selected topics course; **Retain** per David Yesner
ART	A102	AS	Fiber & Basketry Activities	199702	200801					selected topics course; **Retain** per Deborah Tharp
ART	A361	AS	History of Graphic Design	199702	N/A	yes	yes		BA, Art; BFA, Art	**Retain** per Deborah Tharp
ART	A392	AS	Selected Topics in Art Educ	199702	200801					selected topics course; **Retain** per Deborah Tharp
ART	A456	AS	3-D Digital Animation	200603	N/A		yes			**Retain** per Deborah Tharp
BA	A653	CB	Multinational Financial Mgmt	199702	200702		yes			
BA	A692	CB	Investmt Seminar: Subtitle Var	200503	N/A		yes			selected topics course
BIOL	A150	AS	Intro to Marine Biology	199702	200301		yes			
BIOL	A327	AS	Parasitology	199702	199803	yes	yes			
BIOL	A461L	AS	Molecular Biology Laboratory	200501	N/A		yes		BA, Biological Sciences; BS, Biological Sciences; BS, Natural Sciences	**Retain** per Benjamin Harrison
CNT	A272	CT	Cisco Wireless Networking	200603	200703					
CNT	A281	CT	Certification Program	200103	200801					
COMM	A305	AS	Intercultural Communication	199803	200603		yes		Minor, Communication	**Retain** per Barbara Harville
CS	A431	EN	Compilers: Concepts/Techniques	199702	200601	yes	yes		BS, Engineering	**Retain** per Kenrick Mock
CS	A670	EN	Comp Sci for Software Engineer	199702	N/A	yes	yes			**Retain** per Kenrick Mock
CS	A671	EN	Advanced Software Engineering	199702	199703	yes	yes		BS, Engineering	**Retain** per Kenrick Mock
CS	A690	EN	Adv Topics in Computer Science	199702	200701		yes			selected topics course; **Retain** per Kenrick Mock
CWLA	A698	AS	Individual Research	199702	200801					
DNCE	A185	AS	Design for Dance	200401	200801			THR A347 (prereq)		
EDAE	A615	EA	Intro to Adult Education	200603	200703			EDAE A695 (prereq)		
EDAE	A639	EA	Instructional Tech Prod Eval	200703	N/A					
EDAE	A645	EA	The Teaching of Adults	199702	200801					
EDAE	A665	EA	Hist/Phil Adult Educatio	199702	200703			EDAE A695 (prereq)		
EDAE	A670	EA	Current Topics/Adult Ed	199702	200802					selected topics course
EDAE	A676	EA	Curric & Instructional Design	200603	200801					
EDAE	A695	EA	Practicum in Adult Education	199702	200801					
EDET	A626	EA	Technology in Teachng & Learng	200601	N/A		yes			**Retain** per Christin Theno
EDFN	A612	EA	Community Relations	200601	200703					**Retain** per Christin Theno
EDFN	A631	EA	Adv Educational Psych	200601	200701		yes		MEd, Teaching and Learning	**Retain** per Christin Theno
EDFN	A651	EA	Curriculum Theory & Dev	200601	200703				MEd, Teaching and Learning	**Retain** per Christin Theno
EDRD	A610	EA	Reading and Cognition	200601	200801					**Retain** per Christin Theno
EDSA	A101	EA	Program Mgmt School-Age Care	200703	200703			EDSA A202 (prereq), EDSA A295A (prereq)		
EDSA	A102	EA	Pos Learng Environ School Age	200703	200801			EDSA A202 (prereq), EDSA A295A (prereq)		
EDSA	A212	EA	Program Developmt School Age	200703	N/A			EDSA A295B (prereq)		
EDSA	A234	EA	Admin & Supervision School Age	200703	N/A			EDSA A295B (coreq)		
EDSA	A290	EA	Special Topics School-Age Care	200703	N/A					selected topics course
EDSA	A295A	EA	Practicum for School-Age Care	200703	N/A					
EDSA	A295B	EA	Adv Practicum School-Age Care	200703	N/A					
EDSE	A480	EA	Culture, Schools, and Society	199703	200802					
EDSE	A685	EA	Young Children w/Complex Needs	199702	200801					
EDSE	A698	EA	Individual Research	199702	200801					
EDSE	A699	EA	Thesis	199702	200703					
EE	A407	EN	Power Distribution	200503	N/A	yes	yes		BS, Engineering; Minor, Electrical Engineering	**Retain** per Jens Munk
ESL	A190	CT	Selected Topics in ESL	200801	N/A					selected topics course
ET	A183	CT	Data Communications	200103	200801					
FIRE	A155	CH	Wildland Fire Behavior	200503	200703				AAS, Fire and Emergency Services Technology	
FIRE	A157	CH	Wildland Air Ops & Safety	200503	200801				AAS, Fire and Emergency Services Technology	
FIRE	A230	CH	Fire Dept Org Theory/Behavior	200503	N/A		yes		AAS, Fire and Emergency Services Technology	**Retain** per Robin Wahto
FREN	A306	AS	Adv French Conversation & Comp	200603	200801					selected topics course; **Retain** per Patricia Fagan
GEO	A456	EN	Geomatics/Civil Design	199702	200503	yes	yes			**Purge** per Bill Hazelton
GEOG	A200	AS	Alaskan Geography	199702	200703					

SUBJECT PREFIX	COURSE NUMBER	BANNER COLLEGE CODE	COURSE TITLE	COURSE EFFECTIVE	LAST TERM OFFERED	Was this course carried over by request from the 2011-12 purge list?	Was this course carried over by request from the 2012-13 purge list?	COURSE IMPACTS	PROGRAM IMPACTS	COMMENTS
Scbcrse Subject Code	Scbcrse Crse Number	Scbcrse College Code	Scbcrse Title	Scbcrky Term Code Start	Ssbsect Term Code					
GEOL	A421	AS	Invertebrate Paleontology	200403	N/A	yes	yes		BS, Geological Sciences; BS, Natural Sciences	
GEOL	A457	AS	Soil Genesis & Classification	200403	200703				BA, Environment and Society; BS Environment and Society; BS, Geological Sciences; BS, Natural Sciences; MS, Applied Environmental Science and Technology	
GEOL	A690	AS	Graduate Topics in Geology	200401	200601	yes	yes		MS, Applied Environmental Science and Technology	selected topics course
GER	A310	AS	Sel Top: Lit Trends & Tradtns	199702	200801				BA, International Studies	selected topics course; **Retain** per Patricia Fagan
GUID	A101	AS	Intro To Peer Advising	199702	200601		yes			**Retain** per Linda Morgan
HIST	A239	AS	Black History II	199702	200703					**Retain** per Liz Dennison
HIST	A323	AS	Communist China	200401	200503		yes		BA, History; BA, International Studies	**Retain** per Liz Dennison
HIST	A382	AS	American Women's History	199702	200701		yes		Minor, Women's Studies	**Retain** per Liz Dennison
HIST	A451	AS	Gilded Age/Progressive Era	199702	200801					**Retain** per Liz Dennison
HIST	A690	AS	Studies in History	200502	200602	yes	yes			selected topics course; **Retain** per Liz Dennison
HNRS	A309	HC	Resrch Methds w/Intrdisc Teams	200703	N/A				Natural and Complex Systems Program	
JPC	A405	AS	Comm & Media Theories	200603	N/A		yes		BA, Journalism and Public Communications	**Purge** per Paola Banchero
JPC	A446	AS	Magazine Editing/Production II	200603	N/A		yes		BA, Journalism and Public Communications	**Purge** per Paola Banchero
JPC	A485	AS	Documentary Film Production II	200603	N/A		yes		BA, Journalism and Public Communications	**Retain** per Paola Banchero
JPC	A487	AS	Independent Film Production II	200603	N/A		yes		BA, Journalism and Public Communications	**Retain** per Paola Banchero
JPC	A492	AS	JPC Senior Seminar	200603	N/A		yes		Honors, Journalism and Public Communications; BA, Journalism and Public Communications;	**Retain** per Paola Banchero
JUST	A354	CH	Criminal Procedure	199702	200703			PARL A354 (crosslisted)	UC, Paralegal Studies	
JUST	A400	CH	Adv Research Methods Justice	200403	200603		yes		Honors, Justice Research	
JUST	A401	CH	Inferential Data Analysis	200403	200701		yes		Honors, Justice Research	
JUST	A640	CH	Corrections Theory Research	199803	200603		yes		Master of Public Administration	**Retain** per Allan Barnes
LOG	A664	CB	Supply Chain Mgmt Leadership	200201	200802				MS, Global Supply Chain Management	**Retain** per Darren Prokop
LS	A211	AS	Library Research 21st Century	200601	200701		yes			**Retain** per Page Brannon
LSIC	A392	AS	Seminar in Liberal Studies	200103	200801				Bachelor of Liberal Studies	
MECH	A102	KP	Intermediate Machine Shop	199702	200601				UC, Mechanical Technology	
MUS	A240	AS	Fingerstyle Guitar III	199702	200703			MUS A241 (prereq), MUS A242 (prereq)		
MUS	A241	AS	Fingerstyle Guitar IV	199702	200701		yes			
MUS	A242	AS	Solo Fingerstyle Guitar	199702	200603		yes			
NS	A624	CH	Qualitative Nursing Research	199702	200801					**Retain** per Jill Janke
NS	A631	CH	Women's Health & Obstetrics I	200401	200403	yes	yes	NS A635 (prereq)	GC, Family Nurse Practitioner	**Retain** per Jill Janke
NS	A632	CH	Focus on Pediatrics I	200401	N/A		yes	NS A636 (prereq)	GC, Family Nurse Practitioner	**Retain** per Jill Janke
NS	A635	CH	Women's Health & Obstetrics II	200401	200501	yes	yes		GC, Family Nurse Practitioner	**Retain** per Jill Janke
NS	A636	CH	Focus on Pediatrics II	200403	N/A	yes	yes		GC, Family Nurse Practitioner	**Retain** per Jill Janke
NUPN	A112	CH	Mother Baby Nursing for PNs	200202	200703			NUPN A112L (coreq), NUPN A116 (prereq), NUPN A118L (prereq)		
NUPN	A112L	CH	Mother-Baby Nursing for PN Lab	200202	200703			NUPN A112 (coreq), NUPN A116 (prereq), NUPN A118L (prereq)		
NUPN	A113	CH	Nursing of Children for PN	200202	200703			NUPN A113L (coreq), NUPN A116 (prereq), NUPN A118L (prereq)		
NUPN	A113L	CH	Nursing Children for PN Lab	200202	200703			NUPN A113 (coreq), NUPN A116 (prereq), NUPN A118L (prereq)		
NUPN	A116	CH	Role Transition to LPN	200202	200703			NUPN A118L (coreq)		
NUPN	A118L	CH	Practicum for PNs	200203	200703			NUPN A116 (coreq)		
PARL	A354	CH	Criminal Procedure	199702	200703			JUST A354 (crosslisted)		
PEP	A103	CT	SCUBA	200603	200801					**Retain** per Paula Martin*
PEP	A207	CT	Emerg Water Safety & Lifeguard	200603	200701		yes			**Purge** per T.J. Miller
PEP	A210	CT	Wilderness EMT	200603	N/A		yes			**Purge** per T.J. Miller
PEP	A233	CT	Coaching Track & Field/Running	200603	N/A		yes		Minor, Coaching	**Retain** per Michael Chriss
PEP	A234	CT	Coaching Wrestling	200603	N/A		yes		Minor, Coaching	**Retain** per Michael Chriss
PEP	A235	CT	Coaching Swimming & Diving	200603	N/A		yes		Minor, Coaching	**Retain** per Michael Chriss
PEP	A236	CT	Coaching Skiing	200603	N/A		yes		Minor, Coaching	**Retain** per Michael Chriss
PEP	A237	CT	Coaching Figure Skating	200603	N/A		yes		Minor, Coaching	**Retain** per Michael Chriss
PEP	A239	CT	Coaching Baseball/Softball	200603	N/A		yes		Minor, Coaching	**Retain** per Michael Chriss
PEP	A240	CT	Coaching Football	200603	N/A		yes		Minor, Coaching	**Retain** per Michael Chriss

SUBJECT PREFIX Scbcrse Subject Code	COURSE NUMBER Scbcrse Crse Number	BANNER COLLEGE CODE Scbcrse College Code	COURSE TITLE Scbcrse Title	COURSE EFFECTIVE Scbcrky Term Code Start	LAST TERM OFFERED Ssbsect Term Code	Was this course carried over by request from the 2011-12 purge list?	Was this course carried over by request from the 2012-13 purge list?	COURSE IMPACTS	PROGRAM IMPACTS	COMMENTS
PEP	A243	CT	Coaching Hockey	200603	N/A		yes		Minor, Coaching	**Retain** per Michael Chriss
PEP	A244	CT	Coaching Volleyball	200603	N/A		yes		Minor, Coaching	**Retain** per Michael Chriss
PER	A168	CT	Winter Camping Alaska	200603	N/A					**Retain** per T.J. Miller
PER	A170	CT	Backpack Alaska	200603	N/A		yes	PER A287 (prereq)		**Retain** per Paula Martin*
PER	A171	CT	Outdoor Adventure in Alaska	200603	N/A		yes			**Retain** per T.J. Miller
PER	A178	CT	Discovering Wild Plants	200603	N/A		yes			**Purge** per T.J. Miller
PER	A183	CT	Alaska Marine Survival	200603	N/A		yes			**Purge** per T.J. Miller
PER	A224	CT	Intermediate Karate	200603	N/A		yes			
PER	A237	CT	Intermediate Ice Skating	200603	N/A		yes			
PER	A246	CT	Intermediate Rock Climbing	200603	200603			PEP A467B (prereq)	OEC, Outdoor Leadership; BS, Physical Education; Minor, Outdoor Leadership	
PER	A285	CT	Expedition Glacier School	200603	N/A		yes			**Retain** per T.J. Miller
PER	A287	CT	Expedition Backpacking	200603	N/A		yes		OEC, Outdoor Leadership	**Retain** per T.J. Miller
PHYS	A413	AS	Statistical/Thermal Mechanics	200703	200801			CHEM A333L (prereq)	BS, Chemistry; BS, Natural Sciences	**Retain** per Jim Pantaleone
PS	A344	AS	State and Local Politics	199702	200603		yes		BA, Political Science	**Retain** per Jim Muller
PS	A453	AS	Organization Theory	199702	200703				BA, Political Science; Minor, Public Administration	**Retain** per Jim Muller
PSY	A602	AS	Native Ways of Knowing	200603	N/A		yes		PhD, Clinical-Community Psychology	**Retain** per James Fitterling
PSY	A603	AS	Alaskan and Rural Psychology	200603	N/A		yes		PhD, Clinical-Community Psychology	**Retain** per James Fitterling
PSY	A605	AS	History and Systems	200603	N/A		yes		PhD, Clinical-Community Psychology	**Retain** per James Fitterling
PSY	A606	AS	Native Ways of Healing	200603	N/A					**Retain** per James Fitterling
PSY	A607	AS	Cognition, Affect, and Culture	200603	N/A		yes		PhD, Clinical-Community Psychology	**Retain** per James Fitterling
PSY	A616	AS	Program Evaluation I	200603	N/A		yes	PSY A617 (prereq)	PhD, Clinical-Community Psychology	**Retain** per James Fitterling
PSY	A617	AS	Program Evaluation II	200603	N/A		yes		PhD, Clinical-Community Psychology	**Retain** per James Fitterling
PSY	A659	AS	Multivariate Methods in Psych	200603	N/A		yes			**Retain** per James Fitterling
PSY	A671	AS	Grant Writing	200603	N/A		yes			**Retain** per James Fitterling
RUSS	A490B	AS	Sel Topic-Russ Cult in Transla	199803	200001		yes		BA, International Studies	selected topics course; **Purge** per Patricia Fagan
SOC	A375	AS	Social Psychology	200403	200703				BA, Elementary Education	
SOC	A377	AS	Men, Women and Change	199703	200703				Minor, Women's Studies	
STAT	A405	AS	Nonparametric Statistics	200603	200603		yes		BA, Mathematics; BS, Mathematics; BS, Natural Sciences; Minor, Statistics; MS, Applied Environmental Science and Technology	**Retain** per Sam Thiru
SWK	A667	CH	Clinical Group Therapy	200601	N/A		yes		GC, Clinical Social Work Practice	**Retain** per Beth Sirles
VS	A126	KP	Woodworking II	199702	200801					
WELD	A290	CT	Selected Topics in NDT	200201	N/A					selected topics course

Enrollment Services
University of Alaska Anchorage

PO Box 141629
Anchorage, Alaska 99514-1629
T 907.786.1480 • F 907.786.4888

February 15, 2013

To: Undergraduate Curriculum Board, Graduate Curriculum Board, College Curriculum Boards
From: Lora Volden, University Registrar

Re: Concentrations, Tracks, Options, and Emphasis

Issue

Overtime more and more departments have added a concentration, track, option, or emphasis to their programs of study. Additionally, several programs have expressed the desire to indicate these on student transcripts and/or diplomas. In order to respond to the faculty, the Registrar's Office first needs to better understand how these different terms are being applied at UAA.

Since currently we are unable to determine standard definitions or accepted requirements for these terms, I am asking the UAB, GAB, and the college curriculum committees for information about how they determine the appropriateness of one term over another. In addition to the decision making criteria of the particular boards and committees, I will appreciate any information you can gather from the different programs within your college.

What I need

I would appreciate feedback on the following:

- Is there a standard definition you have for
  - Concentration
  - Track
  - Option
  - Emphasis
- When do you use each? Is there certain criteria you look at?
- Are there implications associated with these terms that are tied to department accreditation?
- What else should we know that we aren't asking?

If you have information on this that you would like to share I ask that you email me or if you prefer I would be happy to come to a future college curriculum meeting to listen and take notes. I would appreciate having this information before the end of this term (April 26).

Thank you in advance for your time.