Graduate Academic Board

Agenda

October 26, 2012
ADM 204
9:30 to 11:30

I. Roll Call

() Arlene Schmuland	() Peter Olsson	() Zhaohui (Joey) Yang	
() Tim Hinterberger	() Susan Garton	() FSAL vacancy (CAS)	Ex-Officio Members:
() Patricia Sandberg	() Mary Dallas Allen	() FSAL Vacancy	() David Yesner
() Greg Protasel	() Deb Russ	() FSAL Vacancy	() Lora Volden
() Yoshito Kanamori	() Hsing-Wen Hu	() Jaime Spatrisano	() Scheduling & Publications

II. Approval of Agenda (pg. 1)

III. Approval of Meeting Summary (pg. 2-3)

IV. Administrative Reports

A. Associate Dean of the Graduate School David Yesner

B. Graduate Student Jaime Spatrisano

C. University Registrar Lora Volden

V. Chair's Report

A. GAB Chair- Arlene Schmuland

B. Faculty Alliance

C. Graduate Council

VI. Program/Course Action Request – Second Reading

VII. Program/Course Action Request - First Readings

Add	BIOL A661L	Advanced Molecular Biology Laboratory (Stacked with BIOL A461L)(3)(0+6)(pg. 4-13)
Chg	GEOL A690	Graduate Topics in Geology (Stacked with GEOL A490)(1-4 cr)(1-4+0)(pg. 14-23)
Add	CE A426	Traffic Modeling and Simulation (Stacked with CE A626)(3 cr)(3+0)(pg. 24-31)

VIII. Old Business

IX. New Business

A. Electronic Signatures

B. Electronic Catalog Presentation *(Lora Volden)*

X. Informational Items and Adjournment

A.

Graduate Academic Board

Summary

October 12, 2012
ADM 204
9:30 to 11:30

I. Roll Call

(x) Arlene Schmuland	(e) Peter Olsson	(x) Zhaohui (Joey) Yang	
(x) Tim Hinterberger	(e) Susan Garton	() FSAL vacancy (CAS)	Ex-Officio Members:
(x) Patricia Sandberg	(x) Mary Dallas Allen	() FSAL Vacancy	(x) David Yesner
(x) Greg Protasel	(x) Deb Russ	() FSAL Vacancy	(x) Lora Volden
(x) Yoshito Kanamori	(x) Hsing-Wen Hu	(x) Jaime Spatrisano	() Scheduling & Publications

II. Approval of Agenda (pg. 1)
BIOL A661L is postponed till next meeting
Approved as amended

III. Approval of Meeting Summary (pg. 2)
Approved

IV. Administrative Reports

A. Associate Dean of the Graduate School David Yesner
Working towards electronic thesis submissions next year
David met last week with Helena, Susan Kalina, and the Provost to plot a strategy for looking at doctoral programs that will be coming forward
Provost is moving the in-state tuition for graduate teaching and research assistants forward and will hopefully have a decision by the end of this year

B. Graduate Student Jaime Spatrisano
Looking for a faculty and student representative from each department in the Graduate School to review applications for the Graduate Student Association scholarship

C. University Registrar Lora Volden
October 26th is the registration deadline for those students who have to register for thesis or special projects
Summer 2013 schedule proofs will be available soon

V. Chair's Report

A. GAB Chair- Arlene Schmuland
Chair thanked members for notifying her of upcoming absences and if quorum looked problematic in future, may ask members to find a voting proxy to attend in their stead

B. Faculty Alliance

C. Graduate Council

VI. Program/Course Action Request – Second Reading

VII. Program/Course Action Request - First Readings

Add BIOL A661L Advanced Molecular Biology Laboratory
(Stacked with BIOL A461L)(3)(0+6)(pg. 3-12)
Postponed

Add PM A690 Selected Topics in Project Management (3 cr)(3+0)(pg. 13-16)
Waive first reading, approve for second

VIII. Old Business

IX. New Business

A. Summer Add Drop/Deadline (pg. 17)
Unanimously Approved

B. Curriculum Handbook Changes (18-106)

a. Revised PAR (pg. 107)

A handout was distributed to the board regarding coordination language; information that needs to be included in a course coordination email will appear on page 20, 21, 22, 25, and 53.
Additional information that will be changed in the handbook is the boxes that need to be completed on the CAR when deleting a course, this includes boxes: 2, 3, 6, 8, 11, 12

Motion to accept changes to the Curriculum Handbook excluding changes to the PAR (Box 6d.).
1st Patricia Sandberg
2nd Mary Dallas Allen
Unanimously Approved

X. Informational Items and Adjournment

A.

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	AMSC Division of Math Science	Biology

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
BIOL	A661L	N/A	3	(0+6)

6. Complete Course Title
Advanced Molecular Biology Laboratory
Adv. Molecular Biology Lab
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 N/A Max Credits N/A

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

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

12. ☐ Cross Listed with _____
☒ Stacked with BIOL A461L
Signature Cross-Listed Coordination

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): Ben Harrison Initiator Signed Initials: _____ Date: _____

13b. Coordination Email Date: 04-26-2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 04-26-2012

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)*
A practical implementation of the theory learned in BIOL A661, which includes in vitro DNA techniques, gene expression analysis, and genomics. Students will also learn and practice experimental design, proposal writing, and oral and written presentation skills, lead research groups, and learn mentorship skills.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
BIOL A661 with minimum grade of C	N/A	

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

16e. 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
Students enrolled in BIOL A661 have frequently requested a laboratory to provide hands-on understanding of the molecular methodologies discussed in the lecture course, particularly when their graduate thesis work involves molecular approaches - an increasingly common trend. Most molecular biology courses at other institutions have associated laboratories, and a laboratory will significantly enhance the learning experience in BIOL A661. Stacking this course with BIOL A461L will enable BIOL A661L students to gain mentorship experience and pursue more elaborate research projects.

Initiator (faculty only)	Date	☐ Approved ☐ Disapproved	Dean/Director of School/College — Date
Ben Harrison 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. Implementation Date: Spring 2012.

II. Course Information

A. College:	College of Arts and Sciences.
B. Course Subject/Number:	BIOL A661L.
C. Course Title:	Molecular Biology Laboratory.
D. Course Description:	A practical implementation of the theory learned in BIOL A661, which includes in vitro DNA techniques, gene expression analysis, and genomics. Students will also learn and practice experimental design, proposal writing, and oral and written presentation skills, lead research groups, and learn mentorship skills. May be stacked with: BIOL A461L.
E. Credit Hours:	3.0
F. Contact Hours:	0+6.
G. Grading Basis:	A-F.
H. Status of Course Relative to Degree Program:	Elective course for graduate students studying at UAA.
I. Lab Fees (Yes/No):	Yes.
J. Coordination:	UAA Faculty Listserv, UAA Deans and Directors.
K. Prerequisites/Corequisite:	BIOL A661, with minimum grade of C, or concurrent enrollment
L. Registration Restrictions:	None

III. Course Activities: This is a laboratory class meeting for two 3 hour sessions per week for 15 weeks.

IV. Evaluation:

Course grading is A-F. The evaluation methods, while at the discretion of the faculty member teaching the course, may include participation in group discussions and experimental work, reading and interpreting primary scientific literature and a presentation of project outcomes.

V. Course Level Justification: Designed for graduate students in the biological sciences as an elective graduate course comparable to 600-level molecular biology laboratory courses offered at other universities. This course covers the practical applications of molecular biology, cell biology, genetics and genomics essential to the student's ability to succeed in biological research and apply this content to research topics in the

biological sciences.

VI. Course Outline

1.0 Research Project Proposals
- 1.1 Choice of topic and experimental system
  - 1.1.1 Developing a research project from a topic of interest
  - 1.1.2. Choosing an effective model organism or model system
- 1.2 Experimental design
  - 1.2.1 Developing research aims
  - 1.2.2 Developing hypotheses and designing experiments to address them
  - 1.2.3 Elaborating experimental protocols

2.0 Experimentation
- 2.1 Practical methodology
  - 2.1.1 Chemical safety
  - 2.1.2 Handling reagents and making solutions
  - 2.1.3. Biological media and organism care
  - 2.1.4 Biological assays and molecular techniques
  - 2.1.5 Data collection
- 2.2 Data analysis
  - 2.2.1. Qualitative data analysis
  - 2.2.2. Quantitative data analysis
  - 2.2.3. Critical analysis and troubleshooting

3.0 Research communication
- 3.1 In-lab journal article presentation/discussion
- 3.2 In-lab research project presentation/discussion
- 3.3 Research Proposal
  - 3.3.1 Peer review
- 3.4 Primary research manuscript
- 3.5 Oral presentation to a scientific audience - In-class presentation
- 3.6 Poster presentation

VII. Instructional Goals and Student Learning Outcomes:

A. The instructor will:

Support the development of group projects aimed at investigating one or more biological phenomena using molecular approaches. This includes facilitating the discussion of research topics, the developments of research aims and experimental design. The instructor will provide review and critical analysis of student proposals in addition to the student-to-student peer review.

B. Student Learning Outcomes:

Students will be able to:	Assessment Method
Develop an experimental research plan, including the elaboration of research aims and experimental strategies, and the	Oral literature summary, written proposal, group discussion and peer review.

evaluation of similar research proposals.	
Demonstrate competency in molecular laboratory technique including, in vitro DNA/RNA protein methods, genomics and gene expression analysis.	Laboratory exercises and group discussion.
Lead a small research team by coordinating group activity, maintaining communication and coordination of group efforts in written work and oral presentation	Laboratory exercises, primary research, written proposals, oral presentation and group discussion.
Communicate, to an audience of scientific peers, their project as primary scientific research.	Oral presentation, primary research paper.

VIII. Suggested Text(s):

Barker K. 1998. At the Bench: A Laboratory Navigator. CSHL Press, Woodbury, NY

IX. Bibliography:

Journal articles from the primary literature (Science, Nature, Cell, EMBO J, Cell and Molecular Biology, etc) related to student research projects.

Web-based resources for project development and data analysis, including genomic analysis (NCBI and model organism databases), microarray and image analysis platforms (Image J and MAGIC Tool), and DNA sequence analysis.

Reference books related to student research topics and model systems, including:

Ashburner M, Golic K, Hawley S. 2004. Drosophila: a laboratory handbook. CSHL Press, Woodbury, NY

Liu J. 2005. Xenopus Protocols: Cell Biology and Signal Transduction. Humana Press, New York, NY

Simpson R, Adams P, Golemis E. 2009. Basic Methods in Protein Purification and Analysis: A Laboratory Manual. CSHL Press, Woodbury, NY

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	AMSC Division of Math Science	Biology

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
BIOL	A461L	N/A	3	(0+6)

6. Complete Course Title
Molecular Biology Laboratory

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 N/A Max Credits N/A

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

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

12. ☐ Cross Listed with _____
☒ Stacked with BIOL A661L
Signature Cross-Listed Coordination

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 in Biological Sciences	97	10/5/2012	Fred Rainey
2. BA in Natural Sciences	122	10/5/2012	Fred Rainey
3.			

Initiator Name (typed): Ben Harrison Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 04-26-2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 04-26-2012

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)*
A practical implementation of the theory learned in BIOL A461, which includes in vitro DNA techniques, gene expression analysis, and genomics. Students will also learn experimental design, proposal writing, and oral and written presentation skills.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
BIOL A461 with minimum grade of C or concurrent enrollment	N/A	

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

16e. 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
Students enrolled in BIOL A461 have frequently requested a laboratory to provide hands-on understanding of the molecular methodologies discussed in the lecture course. Most molecular biology courses at other institutions have associated laboratories, and a laboratory will significantly enhance the learning experience in BIOL A461. Changing the BIOL A461L from one credit to three reflects the significant time commitment of students in the course (6hrs in lab per week), and will attract students to the course when it does not run concurrently with the lecture course.

Initiator (faculty only)	Date	☐ Approved ☐ Disapproved	Dean/Director of School/College — Date
Ben Harrison 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. Implementation Date: Spring 2012.

II. Course Information

A. College:	College of Arts and Sciences.
B. Course Subject/Number:	BIOL A461L.
C. Course Title:	Molecular Biology Laboratory.
D. Course Description:	A practical implementation of the theory learned in BIOL A461, which includes in vitro DNA techniques, gene expression analysis, and genomics. Students will also learn experimental design, proposal writing, and oral and written presentation skills. Stacked with: BIOL A661L.
E. Credit Hours:	3.0
F. Contact Hours:	0+6.
G. Grading Basis:	A-F.
H. Status of Course Relative to Degree Program:	Selective course for BA-Biological Sciences, BS-Biological Sciences majors, Biology minors; BS Natural Sciences major.
I. Lab Fees (Yes/No):	Yes.
J. Coordination:	UAA Faculty Listserv, UAA Deans and Directors.
K. Prerequisites/Corequisite:	BIOL A461, with minimum grade of C, or concurrent enrollment
L. Registration Restrictions:	None

III. Course Activities:

This is a laboratory class meeting for two 3 hour sessions per week for 15 weeks.

IV. Evaluation:

Course grading is A-F. The evaluation methods, while at the discretion of the faculty member teaching the course, may include participation in group discussions and experimental work, reading and interpreting primary scientific literature and a presentation of project outcomes.

V. Course Level Justification:

Designed for Biological and Natural Sciences majors as a selective undergraduate course comparable to 400-level molecular biology laboratory courses offered at other universities.

VI. Course Outline

1.0 Research Project Proposals
- 1.1 Choice of topic and experimental system
  - 1.1.1 Developing a research project from a topic of interest
  - 1.1.2. Choosing an effective model organism or model system
- 1.2 Experimental design
  - 1.2.1 Developing research aims
  - 1.2.2 Developing hypotheses and designing experiments to address them
  - 1.2.3 Elaborating experimental protocols

2.0 Experimentation
- 2.1 Practical methodology
  - 2.1.1 Chemical safety
  - 2.1.2 Handling reagents and making solutions
  - 2.1.3. Biological media and organism care
  - 2.1.4 Biological assays and molecular techniques
  - 2.1.5 Data collection
- 2.2 Data analysis
  - 2.2.1. Qualitative data analysis
  - 2.2.2. Quantitative data analysis
  - 2.2.3. Critical analysis and troubleshooting

3.0 Research communication
- 3.1 In-lab journal article presentation/discussion
- 3.2 In-lab research project presentation/discussion
- 3.3 Research Proposal
  - 3.3.1 Peer review
- 3.4 Primary research manuscript
- 3.5 Oral presentation to a scientific audience - In-class presentation
- 3.6 Poster presentation

VII. Instructional Goals and Student Learning Outcomes:

A. The instructor will:

Support the development of group projects aimed at investigating one or more biological phenomena using molecular approaches. This includes facilitating the discussion of research topics and the developments of research aims and experimental design. The instructor will provide review and critical analysis of student proposals in addition to the student-to-student peer review.

B. Student Learning Outcomes:

Students will be able to:	Assessment Method
Develop an experimental research plan, including the elaboration of research aims and experimental strategies, and the evaluation of similar research proposals.	Oral literature summary, written proposal, group discussion and peer review.
Demonstrate competency in molecular	Laboratory exercises and group

laboratory technique including, in vitro DNA/RNA protein methods, genomics and gene expression analysis.	discussion.
Communicate, to an audience of scientific peers, their project as primary scientific research.	Oral presentation, primary research paper.

VIII. Suggested Text(s):

Barker K. 1998. At the Bench: A Laboratory Navigator. CSHL Press, Woodbury, NY

IX. Bibliography:

Journal articles from the primary literature (Science, Nature, Cell, EMBO J, Cell and Molecular Biology, etc) related to student research projects.

Web-based resources for project development and data analysis, including genomic analysis (NCBI and model organism databases), microarray and image analysis platforms (Image J and MAGIC Tool), and DNA sequence analysis.

Reference books related to student research topics and model systems, including:

Ashburner M, Golic K, Hawley S. 2004. Drosophila: a laboratory handbook. CSHL Press, Woodbury, NY

Liu J. 2005. Xenopus Protocols: Cell Biology and Signal Transduction. Humana Press, New York, NY

Simpson R, Adams P, Golemis E. 2009. Basic Methods in Protein Purification and Analysis: A Laboratory Manual. CSHL Press, Woodbury, NY

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	AMSC Division of Math Science	Geological Sciences

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
GEOL	A690	none	1-4	(1-4+0)

6. Complete Course Title
Graduate Topics in Geology

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 CCG (please specify)
- ☐ Course Number
- ☐ Contact Hours
- ☒ Repeat Status
- ☒ Cross-Listed/Stacked
- ☐ Course Prerequisites
- ☐ Co-requisites
- ☒ Registration Restrictions

9. Repeat Status Yes # of Repeats 2 Max Credits 12

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

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

12. ☐ Cross Listed with _____
☒ Stacked with GEOL A490
Signature Cross-Listed Coordination

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): Kristine J Crossen Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 10-8-12
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 10-8-12

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)*
Intensive study of narrowly defined topic in geology with emphasis on current problems. Independent research project required..
Special note: May be repeated twice for a maximum of 12 credits with change of topic.

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

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

16e. Registration Restriction(s) *(non-codable)*
Graduate Standing

17. ☒ Mark if course has fees

18. ☒ Mark if course is a selected topic course

19. Justification for Action
Designed as 600-level graduate course requiring independent research. Course takes advantage of the expertise of resident faculty, visiting faculty and community professionals. Current issues and topics not normally taught on a scheduled basis will be offered under this heading.

Initiator (faculty only) Date
Kristine J Crossen
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
Department of Geological Sciences

GEOL A690
Graduate Topics in Geology

I. Date of Initiation: Spring 2013

II. Course Information:

A. College or School: College of Arts and Sciences
B. Course Title: Graduate Topics in Geology
C. Course Subject/Number: GEOL A690
D. Credit Hours: 1-4
E. Contact time: (1-4 + 0)
F. Grading Information: A-F
G. Course Description: Intensive study of narrowly defined topic in geology with emphasis on current problems. Independent research project required.. Special note: May be repeated twice for a maximum of 12 credits with change of topic.
H. Status of course relative to degree program: Graduate level course to serve students in interdisciplinary studies, the AEST joint CAS/SOE master's program, and other M.S. degree programs.
I. Course Attributes: Applies toward graduate level degree programs in interdisciplinary studies, AEST and other M.S. programs.
J. Lab fees: yes
K. Coordination: UAA faculty list serve
L. Registration restrictions: Graduate standing

III. Instructional Goals and Student Learning Outcomes:

A. Instructional Goals. The instructor will:
    1) Convey the geological concepts to the study of the particular topic.
    2) Demonstrate the applications of the selected topic to solving geologic problems and problems related to environmental sciences or other areas of interest.
    3) Guide students to utilize their problem solving skills to understand both the principles and applications of the selected geologic topic.
    4) Guide students in choosing a research topic and completing it in a professional manner.

B. Student Learning Outcomes. The students will:
    1) Apply the principles of the selected topic to geologic, environmental, and other appropriate fields of study. Assessment: exams.
    2) Analyze recent literature and examples of modern applications of geological studies. Assessment: literature reviews and discussions.

3) Demonstrate research skills by participating in original research projects. Assessment: presentations and written papers.
4) Produce a professional quality presentation and a professional quality report at the conclusion of an individual research project. Improve their critical thinking skills through the analysis, discussion and synthesis of relevant professional literature. Assessment: professional quality presentations and written reports.

IV. Course Activities

The course consists of lectures, discussions, and small group collaboration facilitated by the instructor. Each student will initiate and complete a research project under the direction of the instructor.

VI Methods of Assessment:

Students will be evaluated based on homework assignments, exams, presentations, reports, and analysis, discussion, and synthesis of professional literature and the design and completion of professional quality research projects. Grades will be determined according to the syllabus of the individual instructor.

VI. Course Level Justification

Designed to be used as graduate level course to serve students in interdisciplinary studies, the AEST joint CAS/SOE master's program, and other M.S. degree programs. Independent research, professional quality presentations and written reports required.

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VII. Topical Course Outline

Course outline will vary by topics selected.

Example from existing course - GEOL A665 - Isotope Geochemistry

1. Law of Radioactivity
2. Radioactive Decay Modes
3. Isotope geochronometers
4. Methods of Dating
5. Applications of Radioactive Isotopes to Environmental Problems
6. Principles of stable isotope geochemistry
7. Isotope fractionation
8. Equilibrium effects
9. Kinetic effects
10. Biological fractionation

11. Trace metal isotopes
12. Isotopes of other elements

VII. Suggested Text(s)

Texts will vary depending on the topic of the course.

Example from Isotope Geochemistry above:
Faure, G. and Mensing, 2010. Isotopes, Principles and Applications of 4th ed., Wiley, 897p.

Hoeffs, J., 1997. Stable Isotope Geochemistry. Springer, 201p.

IX. Bibliography

References will vary depending on the selected topic.

Example from Isotope Geochemistry above.
Canfield, D.E., 2001. Biogeochemistry of Sulfur Isotopes in Stable Isotope Geochemistry, J.W. Valley and D.R. Cole eds. Mineralogical Society of America. pp. 607-626.

Cerling, T.E., Harris, J.M., 1999. Carbon isotope fractionation between diet and bioapatite in ungulate mammals and implications for ecological and paleoecological studies. Oecologia, 120, pp. 347-363.

Gee, A.K., and Bruland, K.W., 2002. Tracing Ni, Cu, and Zn kinetics and equilibrium partitioning between dissolved and particulate phases in South San Franscisco Bay, California, using stable isotopes and high-resolution inductively coupled plasma mass spectrometry. Geochemica et Cosmochimica Acta, vol 66, no. 17, pp. 3063-3083.

Gelinas, Y., and Schmit, J.P., 1997. Extending the use of stable lead isotope ratios as a tracer in bioavailability studies. Environmental Science and Technology, vol. 31, pp. 1968-1972.

Hobbie, E. A., Macko, S.A., Shugart, H.H., 1999. Interpretation of nitrogen isotope signatures using the NIFTE model. Oecologia, 120, pp. 405-415.

Monna, F., Othman, D.B., Luck, J.M., 1995. Pb isotopes and Pb, Zn, and Cd concentrations in rivers feeding a coastal pond (Thau, southern France): constraints on the origin(s) and flux(es) of metals. The Science of the Total Environment, 166, pp. 19-34.

Sjostrom, D.J., et al., 2006. Stable isotopic evidence for a pre-late Miocene elevation gradient in the Great Plains-Rocky Mountain region, USA. Geological Society of America Special Paper 398, pp. 309-319.

Thompson, L.G., et al., 2002. Kilimanjaro Ice Core Records: Evidence of Holocene Climate Change in Tropical Africa. Science, vol 298, pp. 589-593.

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	AMSC Division of Math Science	Geological Sciences

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
GEOL	A490	none	1-4	(1-4+0)

6. Complete Course Title
Advanced Topics in Geology

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 CCG (please specify)
- ☐ Course Number
- ☐ Contact Hours
- ☒ Repeat Status
- ☒ Cross-Listed/Stacked
- ☐ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status Yes # of Repeats 2 Max Credits 12

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

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

12. ☐ Cross Listed with _____
☒ Stacked with GEOL A690
Signature Cross-Listed Coordination

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): Kristine J Crossen Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 10-8-12
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 10-8-12

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)*
Detailed study of selected topics in geology. Special note: May be repeated twice for a maximum of 12 credits with change of topic.

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
GEOL A221		

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

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

17. ☒ Mark if course has fees

18. ☒ Mark if course is a selected topic course

19. Justification for Action
Designed as 400-level undergraduate course. Course takes advantage of the expertise of resident faculty, visiting faculty and community professionals. Current issues and topics not normally taught on a scheduled basis will be offered under this heading.

Initiator (faculty only) Date
Kristine J Crossen
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
Department of Geological Sciences

GEOL A490
Advanced Topics in Geology

I. Date of Initiation: Spring 2013

II. Course Information:

A. College or School: College of Arts and Sciences
B. Course Title: Advanced Topics in Geology
C. Course Subject/Number: GEOL A490
D. Credit Hours: 1-4
E. Contact time: (1-4 + 0)
F. Grading Information: A-F
G. Course Description: Detailed study of selected topics in geology. Special note: May be repeated twice for a maximum of 12 credits with change of topic.
H. Status of course relative to degree program: May be used as upper-division elective to satisfy Geological Sciences major or minor.
I. Course Attributes: Applies toward upper division requirement for Geological Sciences major or minor.
J. Lab fees: yes
K. Coordination: UAA faculty list serve
L. Course Prerequisites: GEOL A221

III. Instructional Goals and Student Learning Outcomes:

A. Instructional Goals. The instructor will:
    1) Convey the geological concepts to the study of the particular topic.
    2) Demonstrate the applications of the selected topic to solving geologic problems and problems related to environmental sciences or other areas of interest.
    3) Guide students to utilize their problem solving skills to understand both the principles and applications of the selected geologic topic.

B. Student Learning Outcomes. The students will:
    1) Apply the principles of the selected topic to geologic, environmental, and other appropriate fields of study. Assessment: exams.
    2) Analyze recent literature and examples of modern applications of geological studies. Assessment: literature reviews.
    3) Develop research skills by participating in original research projects with their peers. Assessment: professional presentation.

IV. Course Activities

The course consists of lectures, discussions, and small group collaboration facilitated by the instructor.

V. Methods of Assessment:

Students will be evaluated based on homework assignments, exams, presentations, reports, and analysis, discussion, and synthesis of professional literature and the design and completion of research projects. Grades will be determined according to the syllabus of the individual instructor.

VI. Course Level Justification

Designed for Geological Science majors as an elective undergraduate course comparable to 400-level offerings at other universities. Designed to provide flexibility to offer and teach innovative senior-level lecture courses on a developmental basis. Such courses are essential to the student's ability to succeed and integrate content with other 400-level courses in geological sciences.

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VII. Topical Course Outline

Course outline will vary by topics selected.

Example from existing course - GEOL A465 - Isotope Geochemistry

1. Law of Radioactivity
2. Radioactive Decay Modes
3. Isotope geochronometers
4. Methods of Dating
5. Applications of Radioactive Isotopes to Environmental Problems
6. Principles of stable isotope geochemistry
7. Isotope fractionation
8. Equilibrium effects
9. Kinetic effects
10. Biological fractionation
11. Trace metal isotopes
12. Isotopes of other elements

VIII. Suggested Text(s)

Texts will vary depending on the topic of the course.

Example from Isotope Geochemistry above:
Faure, G. and Mensing, 2010. Isotopes, Principles and Applications of 4th ed., Wiley, 897p.

Hoeffs, J., 1997. Stable Isotope Geochemistry. Springer, 201p.

IX. Bibliography

References will vary depending on the selected topic.

Example from Isotope Geochemistry above.
Canfield, D.E., 2001. Biogeochemistry of Sulfur Isotopes in Stable Isotope Geochemistry, J.W. Valley and D.R. Cole eds. Mineralogical Society of America. pp. 607-626.

Cerling, T.E., Harris, J.M., 1999. Carbon isotope fractionation between diet and bioapatite in ungulate mammals and implications for ecological and paleoecological studies. Oecologia, 120, pp. 347-363.

Gee, A.K., and Bruland, K.W., 2002. Tracing Ni, Cu, and Zn kinetics and equilibrium partitioning between dissolved and particulate phases in South San Franscisco Bay, California, using stable isotopes and high-resolution inductively coupled plasma mass spectrometry. Geochemica et Cosmochimica Acta, vol 66, no. 17, pp. 3063-3083.

Gelinas, Y., and Schmit, J.P., 1997. Extending the use of stable lead isotope ratios as a tracer in bioavailability studies. Environmental Science and Technology, vol. 31, pp. 1968-1972.

Hobbie, E. A., Macko, S.A., Shugart, H.H., 1999. Interpretation of nitrogen isotope signatures using the NIFTE model. Oecologia, 120, pp. 405-415.

Monna, F., Othman, D.B., Luck, J.M., 1995. Pb isotopes and Pb, Zn, and Cd concentrations in rivers feeding a coastal pond (Thau, southern France): constraints on the origin(s) and flux(es) of metals. The Science of the Total Environment, 166, pp. 19-34.

Sjostrom, D.J., et al., 2006. Stable isotopic evidence for a pre-late Miocene elevation gradient in the Great Plains-Rocky Mountain region, USA. Geological Society of America Special Paper 398, pp. 309-319.

Thompson, L.G., et al., 2002. Kilimanjaro Ice Core Records: Evidence of Holocene Climate Change in Tropical Africa. Science, vol 298, pp. 589-593.

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	CE

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CE	A626	N/A	3.0	(3+0)

6. Complete Course Title
Traffic Modeling 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
- ☐ Other (please specify)
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☐ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status choose one # of Repeats Max Credits

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

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

12. ☐ Cross Listed with _____
☒ Stacked with CE A426
Signature Cross-Listed Coordination

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. Civil Engineering, BS		Courtesy Coordination, 10/12/2012	Dr. Osama Abaza
2. Civil Engineering, MS		Courtesy Coordination, 10/12/2012	Dr. Osama Abaza
3.			

Initiator Name (typed): Ghulam H. Bham Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 10/09/2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 10/09/2012

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 concepts of traffic flow simulation, modeling of driver behavior, and application of traffic simulation in Intelligent Transportation Systems (ITS).

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

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

16e. Registration Restriction(s) *(non-codable)*
Instructor's permission and graduate standing

17. ☐ Mark if course has fees

18. ☐ Mark if course is a selected topic course

19. Justification for Action
A new course for transportation graduate students in traffic simulation. Not offered by other departments.

Initiator (faculty only) Date
Ghulam H. Bham
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: October 9, 2012

II. Course Information

A.	College:	School of Engineering
B.	Course Title:	Traffic Modeling and Simulation
C.	Course Subject/Number:	CE A626
D.	Credit Hours:	3.0
E.	Contact:	3+0
F.	Grading Information:	A-F
G.	Course Description:	Introduces concepts of traffic flow simulation, modeling of driver behavior, and application of traffic simulation in Intelligent Transportation Systems (ITS). Special Note: Stacked with CE A426
H.	Status of course relative to degree or certificate program:	Graduate level course in Civil Engineering
I.	Lab Fees:	No
J.	Coordination:	UAA/SOE/CE faculty list serves
K.	Course Prerequisites:	Graduate standing
L.	Registration Restrictions:	Instructor's permission and graduate standing

III. Course Activities

Course activities will be composed of demonstration, lectures and discussion by instructor. Instructor will provide regular homework assignments, a project, review of high quality technical literature including journal papers and self-study materials. The instructor will also train students in related traffic simulation software. The students' performance will be assessed based on homework, a final examination, project assignments that will lead to a detailed project report, and technical presentation on the project assigned.

IV. Evaluation

Evaluation procedures are at the discretion of the instructor and will be discussed during the first class in the semester. Students will be evaluated on a semester long class project, homework assignments, presentations, technical skills, attendance and participation in class activities. Project evaluation will generally include quality of content, problem solving, and amount of effort. It is understood that progress will vary with individual students and is dependent upon skills, expertise, creativity, and/or amount of time devoted to each assignment.

V. Course Level Justification

This course builds on material covered in CE A402, Transportation Engineering, and CE A423/623, Traffic Engineering. It adds an important graduate level course in transportation engineering.

VI. Course Outline

- Fundamentals of system simulation
  - Define systems, models, simulation models
  - Define types of simulation models
- Building simulation models
  - Components of a simulation model
  - Steps in a simulation model
- Traffic flow simulation approaches
  - Analytical versus simulation
  - Discrete versus continuous
  - Macroscopic, mesoscopic, microscopic
- Traffic flow simulation software
  - PTV-America, McTrans, Transport Simulation System
- Review of probability and statistics
  - Random variables and their properties
  - Simulation output data and stochastic processes
  - Estimation of means and variances
  - Confidence interval
- Detailed review of development, calibration and validation of a microscopic multilane traffic simulation model
  - Concepts
  - Approaches
  - Methods
  - Statistical analysis of results
  - Stability analysis of the model
- Statistical modeling
  - Continuous distributions
  - Goodness-of-fit tests
- Random numbers
  - Mid-Square method
  - Linear Congruential Generators (LCG)
  - Test for random number generators
- Random variates
  - Inverse Transform
  - Composition
  - Convolution
  - Acceptance-Rejection
- Variance reduction technique
  - Common random numbers

VII. Instructional Goals and Student Learning Outcomes

A. Instructional Goals. The instructor will:

1. Emphasize the fundamental concepts and models of traffic simulation with emphasis on the techniques and skills of utilizing traffic simulation software to evaluate traffic operation and control strategies.
2. Develop skills to conduct simulation studies for traffic operation and control, and the application of simulation models in research and the industry.

Student Learning Outcomes. After successful completion of course, student will be able to demonstrate:

Learning Outcomes	Assessment Procedures
Proficiency in the use of microscopic traffic simulation models	Final project report, Class presentations, Exam.
Techniques to evaluate and interpret the results from microscopic traffic simulation models	Project assignments, Class presentations
Proficiency in the concepts of calibration and validation of simulation models	HW assignments, Project assignments, Project report, Exam
The application of simulation models for analyzing traffic operation and control	HW assignments, Project report, Exam.
Understanding of technical literature and their application	Review of technical literature related to traffic simulation models
The capability to write a technical report and present the results of their simulation studies to professionals	Project report and presentation

VIII. Suggested Text

1. Traffic Engineering by R. P. Roess, E. S. Prassas and W. R. McShane, 4th Edition, Pearson, 2011.
2. Simulation Modeling and Analysis by A. Law, 4th Edition, McGraw Hill, 2007.
3. Discrete-Event System Simulation by J. Banks, J. S. Carson II, B. L. Nelson, D. M. Nicol, 5th Edition, Prentice Hall, 2007.

IX. Bibliography and Resources

1. Technical journal papers
2. Traffic Analysis Toolbox, US Department of Transportation, Volume I to V, Federal Highway Administration, Turner-Fairbank Highway Research Center.
3. The following software can be used:
   a. VISSIM from PTV-America (http://www.ptvamerica.com),
   b. CORSIM from McTrans at Univ. of Florida (http://mctrans.ce.ufl.edu/),
   c. AIMSUN from Transport Simulation System (TSS) (http://www.aimsun.com).
4. The Highway Capacity Manual, 2010, Transportation Research Board, National Research Council, Washington, DC.

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	CE

2. Course Prefix	3. Course Number	4. Previous Course Prefix & Number	5a. Credits/CEUs	5b. Contact Hours (Lecture + Lab)
CE	A426	N/A	3.0	(3+0)

6. Complete Course Title
Traffic Modeling 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
- ☐ Other (please specify)
- ☐ Course Number
- ☐ Contact Hours
- ☐ Repeat Status
- ☐ Cross-Listed/Stacked
- ☐ Course Prerequisites
- ☐ Co-requisites
- ☐ Registration Restrictions

9. Repeat Status choose one # of Repeats Max Credits

10. Grading Basis ☒ A-F ☐ P/NP ☐ NG

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

12. ☐ Cross Listed with _____
☒ Stacked with CE A626
Signature Cross-Listed Coordination

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. Civil Engineering, BS		Courtesy Coordination, 10/09/2012	Dr. Osama Abaza
2. Civil Engineering, MS		Courtesy Coordination, 10/09/2012	Dr. Osama Abaza
3.			

Initiator Name (typed): Ghulam H Bham Initiator Signed Initials: _____ Date:_____

13b. Coordination Email Date: 10/09/2012
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison Date: 10/09/2012

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 concepts of traffic flow simulation, modeling of driver behavior, and application of traffic simulation in Intelligent Transportation Systems (ITS).

16a. Course Prerequisite(s) *(list prefix and number)*	16b. Test Score(s)	16c. Co-requisite(s) *(concurrent enrollment required)*
[CE A402 and ES A302] with a minimum grade of C		

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

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

17. ☐ Mark if course has fees

18. ☐ Mark if course is a selected topic course

19. Justification for Action
Increases the available technical electives for civil engineering students. Not offered by other departments.

Initiator (faculty only) Date
Ghulam H. Bham
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: October 9, 2012

II. Course Information

A.	College:	School of Engineering
B.	Course Title:	Traffic Modeling and Simulation
C.	Course Subject/Number:	CE A426
D.	Credit Hours:	3.0
E.	Contact:	3+0
F.	Grading Information:	A-F
G.	Course Description:	Introduces concepts of traffic flow simulation, modeling of driver behavior, and application of traffic simulation in Intelligent Transportation Systems (ITS). Special Note: Stacked with CE A626
H.	Status of course relative to degree or certificate program:	Technical elective, BS program in Civil Engineering
I.	Lab Fees:	No
J.	Coordination:	UAA/SOE/CE faculty list serves
K.	Course Prerequisites:	[CE A402 and ES A302] with a minimum grade of C
L.	Registration Restrictions:	None

III. Course Activities

Course activities will be composed of demonstration, lectures and discussion by instructor. Instructor will provide regular homework assignments, a project, review of high quality technical papers and self-study materials. The instructor will also train students in related traffic simulation software. The students' performance will be assessed based on homework, a final examination, project assignments that will lead to a detailed project report, and technical presentation on the project assigned.

IV. Evaluation

Evaluation procedures are at the discretion of the instructor and will be discussed during the first class in the semester. Students will be evaluated on a semester long class project, homework assignments, presentations, technical skills, attendance and participation in class activities. Project evaluation will generally include quality of content, problem solving, and amount of effort. It is understood that progress will vary with individual students and is dependent upon skills, expertise, creativity, and/or amount of time devoted to each assignment.

V. Course Level Justification

This course is offered as a technical elective in transportation engineering. The course builds on material covered in CE A402, Transportation Engineering, and CE A423, Traffic Engineering.

VI. Course Outline

- Fundamentals of system simulation
  - Define systems, models, simulation models
  - Define types of simulation models
- Building simulation models
  - Components of a simulation model
  - Steps in a simulation model
- Traffic flow simulation approaches
  - Analytical versus simulation
  - Discrete versus continuous
  - Macroscopic, mesoscopic, microscopic
- Traffic flow simulation software
  - PTV-America, McTrans, Transport Simulation System
- Review of probability and statistics
  - Random variables and their properties
  - Simulation output data and stochastic processes
  - Estimation of means and variances
  - Confidence interval
- Detailed review of development, calibration and validation of a microscopic multilane traffic simulation model
  - Concepts
  - Approaches
  - Methods
  - Statistical analysis of results
  - Stability analysis of the model
- Statistical modeling
  - Continuous distributions
  - Goodness-of-fit tests
- Random numbers
  - Mid-Square method
  - Linear Congruential Generators (LCG)
  - Test for random number generators
- Random variates
  - Inverse Transform
  - Composition
  - Convolution
  - Acceptance-Rejection
- Variance reduction technique
  - Common random numbers

VII. Instructional Goals and Student Learning Outcomes

A. Instructional Goals. The instructor will:

1. Emphasize the fundamental concepts and models of traffic simulation with emphasis on the techniques and skills of utilizing traffic simulation software to evaluate traffic operation and control strategies.
2. Develop skills to conduct simulation studies for traffic operation and control, and the application of simulation models for the industry.

Student Learning Outcomes. After successful completion of course, student will be able to demonstrate:

Learning Outcomes	Assessment Procedures
Proficiency in the use of microscopic traffic simulation models	Final project report, Class presentations, Exam.
Techniques to evaluate and interpret the results from microscopic traffic simulation models	Project assignments, Class presentations
Proficiency in the concepts of calibration and validation of simulation models	HW assignments, Project assignments, Project report, Exam
The application of simulation models for analyzing traffic operation and control	HW assignments, Project report, Exam.
The capability to write a technical report and present the results of their simulation studies to professionals	Project report and presentation

VIII. Suggested Texts

1. Traffic Engineering by R. P. Roess, E. S. Prassas and W. R. McShane, 4th Edition, Pearson, 2011.
2. Simulation Modeling and Analysis by A. Law, 4th Edition, McGraw Hill, 2007.
3. Discrete-Event System Simulation by J. Banks, J. S. Carson II, B. L. Nelson, D. M. Nicol, 5th Edition, Prentice Hall, 2007.

IX. Bibliography and Resources

1. Traffic Analysis Toolbox, US Department of Transportation, Volume I to V, Federal Highway Administration, Turner-Fairbank Highway Research Center.
2. The following software can be used:
   a. VISSIM from PTV-America (http://www.ptvamerica.com),
   b. CORSIM from McTrans at Univ. of Florida (http://mctrans.ce.ufl.edu/),
   c. AIMSUN from Transport Simulation System (TSS) (http://www.aimsun.com).
3. The Highway Capacity Manual, 2010, Transportation Research Board, National Research Council, Washington, DC.