

Submit original with signatures + 1 copy + electronic copy to UAF Governance.

See <http://www.uaf.edu/uafgov/faculty/cd> for a complete description of the rules governing curriculum & course changes.

TRIAL COURSE OR NEW COURSE PROPOSAL

SUBMITTED BY:

Department	ECE	College/School	CEM
Prepared by	Bill Bristow	Phone	7357
Email Contact	Bill.Bristow@gi.alaska.edu	Faculty Contact	Bill Bristow

1. ACTION DESIRED

(CHECK ONE):

Trial Course

New Course

X

2. COURSE IDENTIFICATION:

Dept

EE

Course #

614

No. of Credits

3

Justify upper/lower division status & number of credits:

This will be a graduate level lecture course with three contact hours per week. Content will require the background level expected of graduate students.

3. PROPOSED COURSE TITLE:

Numerical Methods for Electrical Engineers

4. To be CROSS LISTED?

YES/NO

no

If yes, Dept:

Course #

(Requires approval of both departments and deans involved. Add lines at end of form for such signatures.)

5. To be STACKED?

YES/NO

no

If yes, Dept.

Course #

6. FREQUENCY OF OFFERING:

Fall, Spring, Summer (Every, or Even-numbered Years, or Odd-numbered Years) — or As Demand Warrants

7. SEMESTER & YEAR OF FIRST OFFERING (if approved)

8. COURSE FORMAT:

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

COURSE FORMAT:

(check all that apply)

1

2

3

4

5

X

6 weeks to full semester

OTHER FORMAT (specify)

Mode of delivery (specify

lecture, field trips, labs, etc)

9. CONTACT HOURS PER WEEK:

3

LECTURE

hours/weeks

LAB

hours/week

PRACTICUM

hours/week

Note: # of credits are based on contact hours. 800 minutes of lecture=1 credit. 2400 minutes of lab in a science course=1 credit. 1600 minutes in non-science lab=1 credit. 2400-4800 minutes of practicum=1 credit. 2400-8000 minutes of internship=1 credit.

This must match with the syllabus. See <http://www.uaf.edu/uafgov/faculty/cd/credits.html> for more information on number of credits.

OTHER HOURS (specify type)

10. COMPLETE CATALOG DESCRIPTION including dept., number, title and credits (50 words or less, if possible):

This course will present the basic techniques for numerical solution of the problems of electrical and computer engineering. Many areas of electrical engineering require analysis of systems that cannot be adequately addressed via analytical means and require numerical modeling. Examples of such electrical engineering problems will be used as a vehicle for study of the necessary numerical techniques. In each class of problem, the basic techniques will be presented, the students will be required to write software for their solutions, and available software packages will be examined.

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

H = Humanities ☐

S = Social Sciences ☐

Will this course be used to fulfill a requirement for the baccalaureate core?

YES ☐

NO ☐

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

O = Oral Intensive, Format 6 ☐

W = Writing Intensive, Format 7 ☐

Natural Science, Format 8 ☐

12. COURSE REPEATABILITY:

Is this course repeatable for credit?

YES ☐

NO ☒

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

How many times may the course be repeated for credit?

TIMES

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

CREDITS

13. GRADING SYSTEM: *Specify only one.*

LETTER: ☒

PASS/FAIL: ☐

RESTRICTIONS ON ENROLLMENT (if any)

14. PREREQUISITES

Graduate standing in Electrical or Computer Engineering, or permission of instructor

These will be *required* before the student is allowed to enroll in the course.

RECOMMENDED

Electromagnetic Waves, Digital Signal Processing, Programming in C and Matlab

Classes, etc. that student is strongly encouraged to complete prior to this course.

15. SPECIAL RESTRICTIONS, CONDITIONS

16. PROPOSED COURSE FEES

\$

Has a memo been submitted through your dean to the Provost & VCAS for fee approval?

Yes/No

17. PREVIOUS HISTORY

Has the course been offered as special topics or trial course previously?

Yes/No

☒ yes

If yes, give semester, year, course #, etc.:

Spring 2006

18. ESTIMATED IMPACT

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

None. Will be offered in place of another graduate course.

19. LIBRARY COLLECTIONS

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

No ☒

Yes ☐

No special library requirements

20. IMPACTS ON PROGRAMS/DEPTS

What programs/departments will be affected by this proposed action?

Include information on the Programs/Departments contacted (e.g., email, memo)

none

21. POSITIVE AND NEGATIVE IMPACTS

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

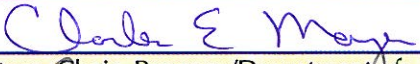
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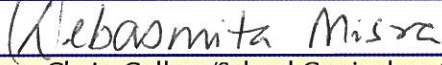
JUSTIFICATION FOR ACTION REQUESTED

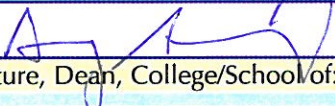
The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. Use as much space as needed to fully justify the proposed course.

This course has been offered previously on a trial basis and was quite successful. It is anticipated that the course will become a regular offering of the department. It fits with the core of a graduate EE curriculum.

APPROVALS:

	Date	9/29/10
Signature, Chair, Program/Department of: ECE		

	Date	10/9/10
Signature, Chair, College/School Curriculum Council for: CEM		

	Date	10/14/10
Signature, Dean, College/School of: CEM		

	Date	
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Signature of Provost (if applicable)

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

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

	Date	
Signature, Chair, UAF Faculty Senate Curriculum Review Committee		

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

	Date	
Signature, Chair, Program/Department of:		

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

	Date	
Signature, Dean, College/School of:		

ATTACH COMPLETE SYLLABUS (as part of this application).

Note: The guidelines are online: <http://www.uaf.edu/uafgov/faculty/cd/syllabus.html>

The department and campus wide curriculum committees will review the syllabus to ensure that each of the items listed below are included. If items are missing or unclear, the proposed course change will be denied.

SYLLABUS CHECKLIST FOR ALL UAF COURSES

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

1. Course information:

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

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

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

3. Course readings/materials:

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

4. Course description:

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

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

6. ☐ Student Learning Outcomes (more specific)

7. Instructional methods:

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

8. Course calendar:

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

9. Course policies:

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

10. Evaluation:

☐ Specify how students will be evaluated, ☐ what factors will be included, ☐ their relative value, and
☐ how they will be tabulated into grades (on a curve, absolute scores, etc.)

11. Support Services:

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

12. Disabilities Services:

The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials.

☐ State that you will work with the Office of Disabilities Services (208 WHIT, 474-5655) to provide reasonable accommodation to students with disabilities."

EE-614 Numerical Techniques for Electrical Engineering - 3 credits

Prerequisites: Graduate standing in Electrical Engineering or approval of instructor. Recommended: background in electromagnetic waves, digital signal processing, and programming in C and MATLAB

Course Description:

This course will present the basic techniques for numerical solution of the problems of electrical and computer engineering. Many areas of electrical engineering require analysis of systems that can not be adequately addressed via analytical means and require numerical modeling. Examples of such electrical engineering problems will be used as a vehicle for study of the necessary numerical techniques. For each class of problem, the basic techniques will be presented, the students will be required to write software for their solutions, and available software packages will be examined.

Course Goals: The goal of this course is to provide students with an understanding of the numerical techniques typically used in the solution of electrical engineering applications.

Learning Outcomes: Students will learn

- 1) Numerical formulation of problems
- 2) Solutions of nonlinear equations
- 3) Systems of nonlinear equations
- 4) Eigenvalues and eigenvectors
- 5) Numerical solution of differential equations

Instructor: William Bristow Elvey 701D, Ph: 474-7357

E-Mail: Bill.Bristow@gi.alaska.edu

Office Hours: MWF 9:30-10:30 PM in Duckering 207

Lectures: MWF, 10:30-11:30 AM, Duckering 232

Potential Texts:

Applied Numerical Methods for Engineers and Scientists, Rao, Prentice Hall

Grading: Course grade will be determined from: 30% homework, 40% in class examinations, 30% project.

Evaluation: Numerical scores will be given for all assignments. Final grades will be based upon a curve.

Course readings: Weekly readings from the text will be assigned, with supplementary materials provided.

Instructional methods: The course is primarily delivered through lectures, though there will be some in class discussion. In addition there will be weekly programming assignments.

Course policies: Attendance is not mandatory, though highly recommended. Late homework is not accepted.

Course Outline:

1. Foundations.

Sample Problems and Numerical Methods. Some Basic Issues. Algorithms and Computer Programs.

- A. Introduction.
- B. Nonlinear Equations
- C. Simultaneous Linear Equations.
- D. Eigenvalues and Eigenvectors.
- E. Curve Fitting and Interpolation.

2. Numerical Differentiation and Integration.

- A. Differentiation.
- B. Basic Numerical Integration.
- C. Better Numerical Integration.

3. Ordinary Differential Equations: Initial-Value Problems.

- A. Taylor Methods.
- B. Runge-Kutta Methods.
- C. Multistep Methods.
- D. Stability.
- E. Methods of Modern Computing.

4. Ordinary Differential Equations: Boundary-Value Problems.

- A. Shooting Method for Linear BVP.
- B. Shooting Method Nonlinear BVP.
- C. Finite-Difference Method for Linear BVP.
- D. Finite-Difference Method for Nonlinear BVP.
- E. Methods of Modern Computing.

5. Partial Differential Equations.

- A. Classification of PDE.
 - i. Heat equation: Parabolic PDE.
 - ii. Wave equation: Hyperbolic PDE.
 - iii. Poisson Equation - Elliptic PDE.
- B. Finite Element Method for an Elliptic PDE.
- C. Methods of Modern Computing.

Disabilities Services: The Office of Disability Services implements the American with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. I will work with the Office of Disability Services to provide reasonable accommodation to students with disabilities.