TRIAL COURSE OR NEW COURSE PROPOSAL

<table>
<thead>
<tr>
<th>SUBMITTED BY:</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Department</td>
<td>Electrical and Computer Eng.</td>
</tr>
<tr>
<td>Prepared by</td>
<td>Seta Bogosyan</td>
</tr>
<tr>
<td>Email Contact</td>
<td><a href="mailto:ffsob@uaf.edu">ffsob@uaf.edu</a></td>
</tr>
<tr>
<td>College/School</td>
<td>CEM</td>
</tr>
<tr>
<td>Phone</td>
<td>474-7135</td>
</tr>
<tr>
<td>Faculty Contact</td>
<td>474-2755</td>
</tr>
</tbody>
</table>

1. ACTION DESIRED (CHECK ONE):
   - Trial Course
   - New Course [X]

2. COURSE IDENTIFICATION:
   - Dept: EE
   - Course #: 673
   - No. of Credits: 3

Justify upper/lower division status & number of credits:
This course is proposed as a graduate course

3. PROPOSED COURSE TITLE:
   Modern Control Engineering

4. CROSS LISTED?
   - YES/NO
   - If yes, Dept: [ ]
   - Course # [ ]

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

5. STACKED?
   - YES/NO
   - If yes, Dept: [ ]
   - Course # [ ]

6. FREQUENCY OF OFFERING:
   - Alternate Fall or as demand warrants
   - (Every or Alternate) Fall, Spring, Summer — or As Demand Warrants

7. SEMESTER & YEAR OF FIRST OFFERING (if approved):
   Fall 2004

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 one)
   - 1
   - 2
   - 3
   - 4
   - 5 [X] 6 weeks to full semester

   OTHER FORMAT (specify):
   in-class lectures, use of MATLAB/SIMULINK and regular use of the Blackboard

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):
CRN#75745 (EE F693): Modern Control Engineering: Introduction to state-space systems in the study of dynamical systems; brief review of modeling and basic concepts of classical control theory and matrix algebra; stability analysis of feedback systems; design of output and state feedback control systems; controllability and observability of dynamical systems; state feedback, state observers; introduction to robust control; introduction to optimal control. Analysis and design using MATLAB and SIMULINK; demonstrations on PUMA 560 and Hardware-in-the-Loop (HIL) simulator test-beds.

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 [ ]
N = Natural Science [ ]
S = Social Sciences [ ]

Will this course be used to fulfill a requirement for the baccalaureate core? [ ] YES [X] 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 [X] 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:

LETTER: [X] PASS/FAIL: [ ]

RESTRICTIONS ON ENROLLMENT (if any)

14. PREREQUISITES

EE 471 or equivalent AND permission of instructor

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

RECOMMENDED
EE 471 at UAF

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

15. SPECIAL RESTRICTIONS, CONDITIONS

16. PROPOSED COURSE FEES

$0

Has a memo been submitted through your dean to the Provost & VCAS for NO

17. PREVIOUS HISTORY

Has the course been offered as special topics or trial course previously? Yes/No [X] YES

If yes, give semester, year, course #, etc.: Fall 2004, Fall 2007
18. ESTIMATED IMPACT
WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

NONE

19. LIBRARY COLLECTIONS
Have you contacted the library collection development officer (ffklj@uaf.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 X Yes

I am aware that UAF has a good collection of books and...

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)

The course offers standard material that is necessary for the analysis and design of control systems. In that sense, the course could address the needs of electrical, computer, mechanical, and mining students or shortly, the needs of graduate students who intend to perform control/estimation tasks on a system related to their discipline.

21. POSITIVE AND NEGATIVE IMPACTS
Please specify positive and negative impacts on other courses, programs and departments resulting from the proposed action.

none

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

This course is an essential addition to the Power and Control Program of UAF ECE Department. The proposed course is a very standard course for graduate engineering education in most universities and should be added as a new course to our ECE program. Currently, no such graduate course is offered in that option. Additionally, the course will benefit graduate students doing projects or thesis in many different engineering disciplines that use some aspects of control. There is no such course at UAF to address general control analysis and design methods in time-domain. The students are also introduced to observers, robust control, and optimal control which all have significant amount of practical use and applications.
21. POSITIVE AND NEGATIVE IMPACTS

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none

JUSTIFICATION FOR ACTION REQUESTED

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APPROVALS:

[Signatures and dates]

Signature, Chair, Program/Department of: [Signature] Date [Date]

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

Signature, Dean, College/School of: [Signature] Date [Date]

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

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

[Signature] Date [Date]

Signature, Chair, UAF Faculty Senate Curriculum Review Committee
ATTACH COMPLETE SYLLABUS (as part of this application).

Note: syllabus must follow the guidelines discussed in the Faculty Senate Guide 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 □ Student Learning Outcomes (more specific)

6. **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.).

7. **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.

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

9. **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.)

10. **Support Services:**
    - Describe the student support services such as tutoring (local and/or regional) appropriate for the course.

11. **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 (203 WHIT, 474-7043) to provide reasonable accommodation to students with disabilities.”
SYLLABUS AND COURSE INFORMATION

Lecture Time: T, TR (5:20-6:50PM)    Room: Duckering 354

2007 Catalog Description:

Introduction to state-space systems in the study of dynamical systems; brief review of modeling and basic concepts of classical control theory and matrix algebra; stability analysis of feedback systems; Bode, Nyquist methods; design of output and state feedback control systems; controllability and observability of dynamical systems; state feedback, state observers; introduction to robust control; introduction to optimal control. Analysis and design using MATLAB and SIMULINK; demonstrations on experimental test-beds.

Prerequisites: EE471 or equivalent in control; PHYS F211X/F212 or equivalent


Instructor: Seta Bogosyan    Office: Duckering 221
Telephone: 474-2755    e-mail: ffosob@uaf.edu

Office Hours:

T : 2:00- 3:00 pm;    Tr: 12:00-1:00 pm or by appointment.

COURSE POLICIES

Point Distribution:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Midterm I</td>
<td>15%</td>
</tr>
<tr>
<td>Midterm II</td>
<td>15%</td>
</tr>
<tr>
<td>Final Project</td>
<td>35%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>15%</td>
</tr>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Class Performance</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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Assessment Criteria:

➤ No late homework will be accepted unless previously authorized by the instructor.
➤ Work should be done on an individual basis.
➤ Students are expected to know Matlab/Simulink software.
Regular class attendance is strongly recommended and participation in class by asking relevant questions and answering the instructor’s questions will be graded by the above mentioned percentage.

Tests will be open/close book at the instructor’s discretion.

DETAILED COURSE TOPICS:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1, 2</td>
<td>General concepts in modern control systems</td>
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<tr>
<td>3</td>
<td>Review of classical control theory</td>
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<tr>
<td>4</td>
<td>Cont’d</td>
</tr>
<tr>
<td>5</td>
<td>Review of linear and nonlinear system stability analysis</td>
</tr>
<tr>
<td>6</td>
<td>Cont’d</td>
</tr>
<tr>
<td>7</td>
<td>State-space methods</td>
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<tr>
<td>8</td>
<td>Cont’d; Midterm I</td>
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<tr>
<td>9</td>
<td>Design of state feedback</td>
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<tr>
<td>10</td>
<td>Design of state observers</td>
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<tr>
<td>11</td>
<td>Intro. robust control</td>
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<tr>
<td>12</td>
<td>Cont’d</td>
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<tr>
<td>13</td>
<td>Intro. Optimal control</td>
</tr>
<tr>
<td>14</td>
<td>Cont’d; Midterm II</td>
</tr>
<tr>
<td>15</td>
<td>In-class presentation of final projects</td>
</tr>
<tr>
<td>16</td>
<td>In-class presentation of final projects</td>
</tr>
</tbody>
</table>

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. I will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide reasonable accommodations to students with disabilities.