THE UNIVERSITY OF MARYLAND, COLLEGE PARK
PROGRAM/CURRICULUM PROPOSAL

DIRECTIONS: Provide one form with original approval signatures in lines 1 - 4 for each proposed action. Keep this form to one-page in length. Forms and appropriate attachments should be submitted to the Office of Academic Affairs, who will assign a Log Number to each proposal. Additional copies may be required at a later time.

DATE SUBMITTED_02/25/04____

PCC LOG NO.

03040

COLLEGE/SCHOOL__ CMPS

DEPARTMENT/PROGRAM__ AMSC/CSCAMM

PROPOSED ACTION (A separate form for each) ADD_X__ DELETE____ CHANGE____

DESCRIPTION (Provide a succinct account of the proposed action. Additional detail may be provided in an attachment. Provide old and new sample programs for curriculum changes.)

A Certificate in Computational Science is proposed. The program introduces students to basic computational methods for better understanding and solving problems in the physical sciences. Numerical techniques and computer architecture will be taught with the goal of applying these to situations in the physical sciences. Computational methods will be applied to problems that are not analytically tractable; for comparison, physical problems that are amenable to analysis will also be examined. The goal of the program is to enhance student understanding of numerical methods that will be of use in graduate school, academic research, and industry.

JUSTIFICATION/REASONS/RESOURCES (Explain the reason for the proposed action. Identify the source of new resources that may be required. Attach additional material if needed.)

The Certificate will allow students in CMPS units to add a concentration in computational science.

A new course has been proposed and an existing course would have to be reoriented somewhat to effect the above requirements.

AMSC462 (proposed): This would be a new course in Computer Organization, patterned as an undergraduate version of the existing AMSC662. A proposed course description is given in Appendix H.

PHYS474 (to be reoriented): Currently, this course is offered as a course in numerical methods in physics. Given the Certificate, numerical methods will be well covered in the core requirements of AMSC460 and AMSC462. Thus, PHYS474 could concentrate more on applications to Physics problems, as described earlier in the second Section.

AMSC462 will be developed and taught jointly between AMSC, PHYS, MATH, and CMSC, using existing resources.
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<th>Approval Signatures</th>
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<tr>
<td>1. Department Committee Chair</td>
<td>26 Feb 04</td>
</tr>
<tr>
<td>2. Department Chair</td>
<td>26 Feb 04</td>
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<tr>
<td>3. College/School PCC Chair</td>
<td>2nd week 04</td>
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<td>4. Dean</td>
<td>2-24-04</td>
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<td>5. Dean of the Graduate School (if required)</td>
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<td>6. Chair, Senate PCC</td>
<td>4/11/04</td>
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<tr>
<td>7. Chair of Senate</td>
<td>4/19/04</td>
</tr>
<tr>
<td>8. Vice President for Academic Affairs &amp; Provost</td>
<td>5/5/04</td>
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VPAAP Rev. 2/2/98
May 10, 2004

Dr. C.D. Mote, Jr.
1101 Main Administration Building
University of Maryland, College Park
College Park, MD 20742

Dear Dan:

I received the request from University of Maryland, College Park to offer an Upper Division Certificate in Computational Science. I am pleased to approve this request and please express my appreciation to departmental faculty and administrative committees for their work in planning for this change.

Sincerely,

William E. Kirwan
Chancellor

cc: Dr. Irwin Goldstein
Dr. Gertrude Eaton
Dr. William Destler
Dr. Joel Cohen
Dr. Steve Halperin
May 5, 2004

MEMORANDUM

TO:        Stephen Halperin
           Dean, College of Computer, Mathematical and Physical Sciences

FROM:      Victor Korenman
           Associate Provost for Academic Planning and Programs

SUBJECT:   Proposal to Offer an Upper Division Certificate in Computational Science
           (PCC Log. No. 03040)

On May 3, 2004, the Maryland Higher Education Commission (MHEC) approved our proposal to offer an Upper Division Certificate in Computational Science. The Chancellor has also indicated his approval. The certificate is effective immediately. Enclosed is a copy of the letter from MHEC, along with a copy of the approved program and signed cover sheet.

The College of Computer, Mathematical and Physical Sciences should ensure that this certificate program is appropriately reflected in all university documentation.

VK:sfm
Enclosures
Cc:        Dr. Sylvester J. Gates, Chair, PCC
           Dr. Mary Giles, University Senate
           Ms. Barbara Hope, Data Administration
           Dr. Phyllis Peres, Undergraduate Studies
           Ms. Anne Turkos, Archives
           Mr. Frank Valines, Student Financial Aid
           Dr. Scott Wolpert, College of Computer, Mathematical and Physical Sciences
           Dr. Linda Yokoi, Records & Registrations
May 3, 2004

Dr. Victor Korenman
Associate Provost for Planning
and Academic Affairs
University of Maryland, College Park
1101 Main Administration Building
College Park MD 20742-5025

Dear Dr. Korenman:

The Maryland Higher Education Commission has reviewed a proposal received from University of Maryland, College Park to offer an Upper Division Certificate in Computational Science as a part of an existing degree program. I am pleased to inform you that the certificate program has been administratively approved. This decision was based on an analysis of the proposal in conjunction with the Maryland Higher Education Commission’s Policies and Procedures for Academic Program Proposals and the Maryland State Plan for Postsecondary Education. The program demonstrates potential for success, an essential factor in making this decision.

For purposes of providing enrollment and degree data to the Commission, please use a HEGIS code of 1703-03 and a CIP code of 27.0301 for the Computational Science certificate program. Should the program require any substantial changes in the future, please keep the Commission apprised. I wish you continued success.

Sincerely,

Calvin W. Burnett
Acting Secretary of Higher Education

CWB:mjk

cc: Dr. Clayton D. Motz, Jr., UMCP
    Dr. William W. Destler, UMCP
    Dr. Gertrude Eaton, USM
    Dr. Lynn M. Gangone, MICUA
April 20, 2004

Memorandum

TO:  Irwin L. Goldstein
      Vice Chancellor for Academic Affairs
      University System of Maryland

      Michael Kiphart
      Acting Assistant Secretary for Planning and Academic Affairs
      Maryland Higher Education Commission

FROM: Victor Korenman
      Associate Provost, Academic Planning and Programs

SUBJECT: Program Proposal: Upper Division Certificate in Computational Science

On President Mote’s behalf, I am hereby forwarding to you a proposal to offer an Upper Division Certificate in Computational Science at the University of Maryland, College Park. The proposal was submitted by the College of Computer, Mathematical, and Physical Sciences, has been approved by the relevant faculty and administrative committees, and received the support of the University Senate at its meeting on April 19, 2004.

Thank you for your consideration of this proposed program.

VK:vk
Attachment:

CC: Joel Cohen, Chair, University Senate
    Steve Halperin, Dean, College of Computer, Mathematical, and Physical Sciences
    William W. Dealter, Senior Vice President for Academic Affairs and Provost
    C. D. Mote, Jr., President
PROPOSAL FOR
A NEW PROGRAM SUBMITTED BY A
UNIVERSITY SYSTEM OF MARYLAND INSTITUTION
IN ACCORD WITH SECTION 11-206.1 OF THE ANNOTATED CODE OF
MARYLAND

University of Maryland, College Park

Upper Division Certificate in Computational Science

HEGIS: 1703.01  CIP: 27.0301

College of Computer, Mathematical, & Physical Sciences
Unit Offering the Program

Professor David Levermore
Contact Person

Upper Division Certificate
Degree to be Awarded

Signature of President or Designee

Fall, 2004
Proposed Initiation Date

4-19-04
Date

Date Received by the Commission
PROPOSAL FOR AN ENHANCEMENT OF
THE CMPS UNGERGRADUATE CURRICULUM TO REFLECT COMPUTATIONAL PROBLEM-SOLVING

March 3, 2004

Version 3.5
Motivation

Computational problem solving is integral to the physical sciences. “Experiment and Theory”, the two traditional foundations of physical science research and development, have given way to the triad “Experiment, Computation, and Theory”.

A graduate curriculum that enhances computation in the physical sciences - the Applied Math and Scientific Computation Program, AMSC - was established two years ago. The present proposal aims to similarly enhance the computation curriculum for CMPS undergraduates.

Guidelines for construction of an undergraduate curriculum in computation

The proposed curriculum is based on the guidelines of intellectual coherence and universality. In addition, the curriculum should not compromise the major, and the students should be acknowledged for their participation in the program. The curriculum must not only present the computational tools, but must also demonstrate application to scientific problems1.

The Certificate

The Campus Certificate has been chosen as the vehicle for delivery of the computation curriculum. It satisfies the guidelines. The Campus awards a Certificate if a student takes courses in some focus area that, altogether, satisfy the following requirements:2

- The courses must add up to a minimum 21 credits
- 12 of these must constitute an intellectual core of the focus
- 12 must be at the 300-400 level
- Not more than 9 credits should also count for the major

Intellectual core of the proposed certificate

In constructing the Certificate3, four topic areas were considered essential for the intellectual core: Programming Languages, Numerical Methods, Computer Organization, and Computational Science. For example, four basic courses that could deliver material in these topic areas are

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1 Detail on guidelines is given in Appendix A.
2 A detailed description of Program Requirements for the Campus Certificate is attached as Appendix B.
3 Further detail on the intellectual core of the program is given in Appendix C.
CMSC106 or 131 - Introduction to C Programming
AMSC460 - Computational Methods
AMSC462 - Computer Organization
PHYS474/ASTR415 – Computational Physics/Astrophysics

In addition, it is important that the student also attain a basic grounding in some scientific area. Courses required in this area would be the introductory Physics sequence (PHYS171, 272, 273)

Proposed Certificate in Computational Science

The requirements to be awarded a Certificate in Computational Science are given below.

**CERTIFICATE IN COMPUTATIONAL SCIENCE** (proposed)

Core courses, as below, are required. In addition, courses must be selected from the Electives list such that the entire sequence of courses meets the following two conditions: (a) at least 12 credit hours must be at the 300-400 level; (b) at least 12 credit hours must be outside the major. In the case of multiple majors, at least 12 credit hours must be outside all the other major requirements.

**Core Requirements**
The following courses are required:

{CMSC106 or 131, 114 or 132, 214 or 212, ENEE114, PHYS165} - Programming base

PHYS273 - Science base

AMSC460 - Computational Methods

{AMSC462, CMSC(311&351)} - Computer Organization

{PHYS474, ASTR415} - Computational Science

**Electives**
Supporting courses must be selected from the list below so as to meet remaining requirements:

ASTR120, 121, 320

PHYS171, PHYS272, PHYS273

PHYS 374, 401 or 420, 402, 404, 410, 411

MATH 240, 241, 246, 431, 452, 462

CMSC114 or 132 or 214 or 212 or 250

PHYS474, ASTR415, GEOL341

1 choose one

2 PHYS263 may be substituted for PHYS273; likewise, 262 for 272, 161 for 171

---

4 A key to course numbers is in Appendix D.
5 The framework underlying these requirements is described in detail in Appendix E.
**Typical Scenarios**

Given the requirements as listed above, a typical student would take at least 5 core courses and take a minimum of 2-5 courses from the elective list by the time they present themselves as qualifying for the Certificate. Given the way this Certificate is constructed and because of the overlap-with-major constraint and the upper-level course constraint from the general Certificate requirements, each student would end up taking at least 7 courses that form a coherent set in Computational Science.

In Appendix G, we show typical scenarios: for each Department, we list all courses with “Computational Science content” taken by a major in that Department by the time all the requirements of the major and the Certificate are done. This method of listing shows several things: intellectual coherence, concentration in Computational Science, and courses taken that are outside the major. These scenarios were arrived at assuming that the student takes the path of least resistance. More than one scenario is possible in some Departments, given different Tracks or flexible requirements. In all cases, the student takes a minimum of four courses over and above their major requirements.

**Course Development**

One new course would have to be developed and an existing course would have to be reoriented somewhat to effect the above requirements.

**AMSC462 (proposed)**: This would be a new course in Computer Organization, patterned as an undergraduate version of the existing AMSC662. A proposed course description is given in Appendix H.

**PHYS474 (to be reoriented)**: Currently, this course is offered as a course in numerical methods in physics. Given the Certificate, numerical methods will be well covered in the core requirements of AMSC460 and AMSC462. Thus, PHYS474 could concentrate more on applications to Physics problems, as described earlier in the second Section.
Research

An honors program would provide opportunities for outstanding students to engage in research on a computational project with a faculty member. Students would be accepted into this program after their sophomore year based on their academic performance.

Several groups in CMPS use intensive computation for scientific research projects. An advanced undergraduate preparing for the Certificate could be a productive member of these groups. Undergraduate research within these groups is clearly encouraged and appropriate course credit could be used to satisfy Certificate requirements. One specific avenue is the Research Interaction Teams (RIT) instituted in AMSC. A list of research groups interested in supporting undergrad research could be constituted to aid students in locating research interests.

Name

The objective of this curriculum is to introduce CMPS undergrads to the computing infrastructure necessary to be able to do better science. In a sense, the courses {PHYS474, ASTR415} represent capstone courses wherein the student applies the computational skills learned to traditional as well as analytically intractable scientific problems. A name for the Certificate that reflects this spirit would be Certificate for Computational Science.
Appendix A: Guidelines for construction of an undergraduate curriculum in computation

The goal of a proposed curriculum in computation must be to introduce the student to computational tools that would help them better understand the knowledge base of the physical sciences and to solve problems therein. Thus, the curriculum must not only present the computational tools, but must also demonstrate application to scientific problems. The application could be to traditional problems but can easily extend beyond this to demonstrate how the computer solves problems in cases where analytic approaches are not tractable.

Four additional guiding principles were used to fashion the curriculum proposed herein:

- Must have intellectual coherence
- Must apply universally over CMPS units
- Acknowledge the program accomplished
- Don’t compromise the major

The first two follow from CMPS goals. In addition, upon the completion of a coherent set of courses, the student should receive acknowledgement of the program accomplished in the form of a written document. Such an acknowledgement would stand well in the student’s future career plans. Finally, the existing required courses for the departmental majors are already optimized; thus, any computation curriculum has to sit “on top” of the departmental curriculum.

Appendix B: Program Requirements for Certificate

http://www.inform.umd.edu/provost/PCC_DO DOCUMENTS/ProgramDesign.html

Minimum of twenty-one (21) credit hours

1. The program must include a core requirement of at least twelve (12) credit hours chosen from a limited list;
2. Non-core courses must be chosen from a specific list of acceptable electives;
3. No more than nine (9) credit hours may be applied toward the major;
4. A minimum of twelve (12) credit hours must be taken in upper division courses (i.e., those numbered 300 or above);
5. A maximum of three (3) credit hours of "Special Topics" or "Selected Topics" courses may be taken;
6. No more than nine (9) credit hours may be taken at institutions other than UMCP.

Appendix C: Intellectual core of the proposed certificate

In constructing the Certificate, building a coherent intellectual core takes priority. Four topic areas were considered essential for a student to master to claim a computational science focus: Programming Languages, Numerical Methods, Computer Organization, and Computational Science. CMPS courses exist in almost all these areas. For example, four basic courses that could deliver material in these topic areas are
These courses were used as a basis for a Certificate Program as will be detailed in the next Section. The third course is at the graduate level – an undergraduate version of this would have to be developed. The last set of Physics and Astrophysics courses cover the applied computation part of the Program. As mentioned above, these courses would solve traditional problems computationally but also take advantage of the methodology put in place to solve traditional problems that cannot be solved analytically.

In addition to the four course areas as above, it is important that the student also attain a basic grounding in some scientific area. Such grounding would in fact be essential to understanding the applications in the Computational Physics or Astrophysics courses above. Thus, an additional area, a “Science Base”, is added to the core areas above. Courses required in this area would be the introductory Physics sequence (PHYS171, 272, 273). In the longer run, as more Departments develop courses in applied computation, the set {PHYS474, ASTR415} could be added to and the set of introductory courses in the science base could be correspondingly added to.

The above core courses, or equivalent, would satisfy the intellectual coherence guideline. In addition, the core taken as a whole can be made to apply universally to almost all CMPS units.

Appendix D: Key to Course numbers

CMSC106 or 131 – Introduction to C Programming
AMSC460 – Computational Methods
AMSC462 – Intro to Computer Science
PHYS474/ASTR415 – Computational Physics/Astrophysics

ASTR120 Introductory Astrophysics-Solar System (3)
ASTR121 Introductory Astrophysics II-Stars and Beyond (4)
ASTR320 Theoretical Astrophysics (3)
ASTR415 Computational Astrophysics
CMSC114 or 132 Computer Science I (4)
CMSC214 or 212 Computer Science II (4)
CMSC250 Discrete Structures (4)
GEOL341 Structural Geology (4)
MATH240 Introduction to Linear Algebra (4)
MATH241 Calculus III (4)
MATH246 Differential Equations for Scientists and Engineers (3)
MATH431 Geometry for Computer Graphics (3)
MATH452 Introduction to Dynamics and Chaos (3)
Appendix E: Framework underlying the Certificate Requirements

The requirements to be awarded a Certificate in Computational Science are reproduced below:

**CERTIFICATE IN COMPUTATIONAL SCIENCE** (proposed)

Core courses, as below, are required. In addition, courses must be selected from the Electives list such that the entire sequence of courses meets the following two conditions: (a) at least 12 credit hours must be at the 300-400 level; (b) at least 12 credit hours must be outside the major. In the case of multiple majors, at least 12 credit hours must be outside all the other major requirements.

### Core Requirements

The following courses are required:

- **Programming base**
  - {CMSC106 or 131, 114 or 132, 214 or 212, ENEE114, PHYS165} \(^1\)
  - PHYS273 \(^2\)
- **Science base**
  - AMSC460
  - {AMSC462, CMSC(311&351)} \(^1\)
- **Computational Methods**
  - PHYS474, ASTR415 \(^1\)

### Electives

Supporting courses must be selected from the list below so as to meet remaining requirements:

- ASTR120, 121, 320
- PHYS171 \(^2\), PHYS272 \(^2\), PHYS273 \(^2\)
- PHYS 374, 401 or 420, 402, 404, 410, 411
- MATH 240, 241, 246, 431, 452, 462
- CMSC114 or 132 or 214 or 212 or 250
- PHYS474, ASTR415, GEOL341

\(^1\) choose one

\(^2\) PHYS161 may be substituted for PHYS171; likewise, 262 for 272, 263 for 273
The presumed framework underlying the above requirements is as follows:*

1. At base, all students would be required to take courses spanning the intellectual core as already described. These are: a basic course in Programming Languages, a Computational Methods course, courses in Computer Organization, and a course in Computational Science. The four courses are substantial, upper-level, and constitute the intellectual foundation of this field. In addition, courses constituting a science base are also required.

2. These core courses have prerequisites. Possible prerequisites are included in the supporting set of courses listed under Electives. A listing of the prerequisites for the core courses is given in Appendix C.

3. The Certificate requires, in addition, 12 upper level credits. Thus, a set of upper level courses that fits into the intellectual framework of scientific computation is also added to the Electives list.

4. Finally, each student must ensure that overlap of courses with their major requirements does not exceed 9 credits. Put another way, at least 12 credits must be taken that are outside the major (given the 21 credit minimum required by the Certificate). The Elective list has been constructed so as to allow this leeway.

Appendix F: Prerequisites for the Core Courses

- AMSC460 - MATH240/241
- AMSC462 - CMSC106 or 131, AMSC460
- PHYS474 - CMSC106 or 131, MATH240/241, PHYS273 or 263
- ASTR415 - CMSC106 or 131, MATH240/241
- CMSC351/311 - CMSC106 or 131/114 or 132/214 or 212/250
- PHYS273 - PHYS272/171, MATH240/241/246
- PHYS263 - PHYS262/161, MATH241
- ASTR121 - ASTR120

* a key to course numbers is given in Appendix D
## Appendix G: Typical Scenarios

Courses with Comp/Sci content taken by the time the Cert is presented.
Courses outside of major are marked **X**.

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Appendix H: Description of AMSC462 (proposed)

AMSC 462 - Computer Science for Scientific Computing  (3 credits)  Prerequisite: CMSC106 or equivalent, AMSC 460/MAPL 460, or permission of instructor. The student must have completed the lower division (1xx, 2xx) requirements for his or her major. Cannot be used to satisfy the degree requirements for CMS.

This course is a survey of computer science for scientists and engineers. The goal is to enable the student to write efficient, well-organized programs for today's machines. Topics to be treated are computer organization, computer arithmetic, processes and operating systems, the memory hierarchy, comparison of the Fortran and C families of languages, compilers, the run time environment, memory allocation, preprocessors and portability, and documentation. Roughly a fourth of the course will be devoted to material of the instructor's own choosing--e.g., parallel computing or the analysis of a widely used applications package. The course will be accessible to anyone with programming experience in any of the languages commonly used in scientific computing.

Acknowledgement

A committee from across CMPS was appointed by Dean Halperin and CSCAMM Acting Director J. Drake to develop this proposal. Committee members met several times during the Spring 02 semester. The members were H. Elman (CS), A. Hassam (Physics, Chair), B. Hunt (Math), D. Jiang (Geology), J. Stone (Astro), E. Williams (Physics, MRSEC).
Certificate in Computational Science

College of Computer, Mathematical, and Physical Sciences
Applied Mathematics and Scientific Computation Program
3103 Mathematics Building, (301) 405-0924
http://www.amsc.umd.edu/

The Certificate in Computational Science introduces students to basic computational methods for better understanding and solving problems in the physical sciences. Numerical techniques and computer architecture will be taught with the goal of applying these to situations in the physical sciences. Computational methods will be applied to problems that are not analytically tractable; for comparison, physical problems that are amenable to analysis will also be examined. The goal of the program is to enhance student understanding of numerical methods that will be of use in graduate school, academic research, and industry.

Certificate Requirements

1. Core Requirements

The following courses are required:

Three courses in Programming Languages, Numerical Methods, and Computer Architecture

CMSC106 or CMSC131 – Introduction to Programming
AMSC460 – Computational Methods
AMSC462 – Intro to Comp Organization and Tools for Scientific Computing

A course in which advanced computation is applied to scientific problems

PHYS474 - Computational Physics
or ASTR415 – Computational Astrophysics

A science base

PHYS273 – Introductory Physics: Waves
or PHYS263 - General Physics: Electrodynamics, Light, Relativity …

[Any of CMSC106 or CMSC131, CMSC114 or CMSC132, CMSC214 or CMSC212, ENEE114, PHYS165, may be substituted for CMSC106 or CMSC131. AMSC466 may be substituted for AMSC460. CMSC311 and CMSC351 may be substituted for AMSC462.]
2. Electives

Elective courses must be chosen from the list below such that the entire sequence of courses for the Certificate meets the following two conditions: (a) at least 12 credit hours must be at the 300-400 level; (b) at least 12 credit hours must be outside the major. In the case of multiple majors, at least 12 credit hours must be outside all the other major requirements.

- ASTR120 Introductory Astrophysics-Solar System (3)
- ASTR121 Introductory Astrophysics II-Stars and Beyond (4)
- ASTR320 Theoretical Astrophysics (3)
- ASTR415 Computational Astrophysics
- CMSC114 or CMSC132 Computer Science I (4)
- CMSC214 or CMSC212 Computer Science II (4)
- CMSC250 Discrete Structures (4)
- GEOL341 Structural Geology (4)
- MATH240 Introduction to Linear Algebra (4)
- MATH241 Calculus III (4)
- MATH246 Differential Equations for Scientists and Engineers (3)
- MATH431 Geometry for Computer Graphics (3)
- MATH452 Introduction to Dynamics and Chaos (3)
- MATH462 Partial Differential Equations for Scientists and Engineers (3)
- MATH464 Transform Methods to Scientists and Engineers (3)
- PHYS171 Introductory Physics: Mechanics and Relativity (3)
- PHYS272 Introductory Physics: Fields (3)
- PHYS273 Introductory Physics: Waves (3)
- PHYS374 Intermediate Theoretical Methods (4)
- {PHYS401 Quantum Physics I (4)
  Or PHYS420 Principles of Modern Physics (3)}
- PHYS402 Quantum Physics II (4)
- PHYS404 Introduction to Statistical Thermodynamics (3)
- PHYS410 Classical Mechanics (4)
- PHYS411 Intermediate Electricity and Magnetism (4)
- PHYS474 Computational Physics

Research
An honors program will provide opportunities for outstanding students to engage in research on a computational project with a faculty member. Students will be accepted into this program after their sophomore year based on their academic performance.

To obtain more information, contact the Applied Math and Scientific Computing Program, 3103 Mathematics Building, UMCP, Telephone: (301) 405-0924, [http://www.amsc.umd.edu/](http://www.amsc.umd.edu/)

**Supporting letters**

Subject: Re: [Fwd: TIMELY AMSC 462 (re do) of teaching commitment]
Date: Tue, 02 Mar 2004 10:16:29 -0500
From: Mike Fitzpatrick <pmf@math.umd.edu>
To: Scott Wolpert <saw@math.umd.edu>

Scott:

OK. The math dept is committed to the agreement.

Mike

Scott Wolpert wrote:

> Mike,
> This message provides the particulars of the plan. Can you please email back with an OK.
> Scott
> 
> -------- Original Message --------
> Subject: TIMELY AMSC 462 (re do) of teaching commitment
> Date: Fri, 27 Feb 2004 11:21:33 -0500
> From: Scott Wolpert <saw@math.umd.edu>
> To: lsd@cs, Mike Fitzpatrick <pmf@math.umd.edu>
> 
> Mike and Larry,
> I am writing to each of you to set the correct record.
> Please confirm that MATH joint with CS through the Numerical Analysis Field Committee are jointly-commiting to provide every third year for the staffing of AMSC 462 the planned scientific computation course.
> An email ok is sufficient.
> Scott
> 
> --
> Patrick M. Fitzpatrick
> Professor and Chair
> Department of Mathematics
> University of Maryland
> 301 405 5051
OK. The math dept is committed to the agreement.

Mike

Scott Wolpert wrote:

>Mike,
> >This message provides the particulars of the plan. Can you please email
> >back with an OK.
> >Scott
> >
> >-------- Original Message --------
> >Subject: TIMELY AMSC 462 (re do) of teaching commitment
> >Date: Fri, 27 Feb 2004 11:21:33 -0500
> >From: Scott Wolpert <saw@math.umd.edu>
> >To: lsdacs, Mike Fitzpatrick <pmf@math.umd.edu>
> >
> >Mike and Larry,
> >I am writing to each of you to set the correct record.
> >Please confirm that MATH joint with CS through the Numerical Analysis
> >Field Committee are jointly-committing to provide every third year for
> >the staffing of AMSC 462 the planned scientific computation course.
> >An email OK is sufficient.
> >Scott
> >
> --
>
> Patrick M. Fitzpatrick
> Professor and Chair
> Department of Mathematics
> University of Maryland
> 301 405 5051
OK.

-----Original Message-----
From: Scott Wolpert [mailto:saw@math.umd.edu]
Sent: Friday, February 27, 2004 11:22 AM
To: lsd@cs.umd.edu; Mike Fitzpatrick
Subject: TIMELY AMSC 462 (re do) of teaching commitment

Mike and Larry,
I am writing to each of you to set the correct record.
Please confirm that MATH joint with CS through the Numerical Analysis
Field Committee are jointly-committing to provide every third year for
the staffing of AMSC 462 the planned scientific computation course.
An email ok is sufficient.
Scott
March 1, 2004

Professor Scott Wolpert
Associate Dean
CMPS
University of Maryland
College Park MD 20742

Dear Scott,

I am writing to you with respect to the new AMSC 462 course. Based on the recommendation of the Undergraduate Computer Initiative committee assembled by CSCAMM, a new undergraduate course AMSC 462 will be offered as part of the proposed AMSC Undergraduate Certificate in Computational Science. We strongly support the new AMSC 462 course as an integral part of the education mission of CSCAMM.

CSCAMM is committed to provide its faculty for teaching the AMSC 462 course one semester every three years, with the understanding that departments of Physics, Mathematics and Computer Science are committed for staffing the AMSC 462 in each of the other two years.

While AMSC will maintain the administrative responsibilities of this course, CSCAMM should be kept involved in the decision process re: future development of the AMSC 462 course.

Sincerely,

Eitan Tadmor
Director, CSCAMM

cc: Professor David Levermore, AMSC Director
    Mrs Donna Bower, CSCAMM Director of administration
17 December 2003

Professor Scott Wolpert, Associate Dean
College of Computer, Mathematical, and Physical Sciences
University of Maryland
College Park, MD 20742-3281

Dear Scott,

This letter outlines the staffing agreements for the proposed course AMSC 462, Computer Science for Scientific Computing. This course is a central component of the proposed AMSC Undergraduate Certificate in Computational Science.

The plan is to offer AMSC 462 once a year. The faculty staffing for the course will come equally from three sources: (1) CSCAMM, (2) the Department of Physics, (3) the Numerical Analysis Field Committee which consists of Faculty from the Department of Mathematics and the Department of Computer Science. Beginning with the 2004-2005 academic year, responsibility to staff AMSC 462 will rotate between these three sources.

So long as the syllabi of AMSC 462 and CMSC 311 remain similar, these courses should be cross-listed in years when a faculty member of the Computer Science will teach AMSC 462. When this happens up to 20 seats will be reserved for certificate students who register for AMSC 462. These students will not be required to have taken CMSC 250, which is currently a prerequisite for CMSC 311, but will be required to meet the usual AMSC 462 prerequisites (CMSC 106 or CMSC 131 or equivalent; AMSC/MAPL 460). Under the above schedule, such a cross-listing would likely happen only once every six to nine years.

Professors Fitzpatrick, Goodman, Davis, and Tadmor will provide you with written endorsements of their respective agreements.

Sincerely yours,

C. David Levermore, Director
Applied Mathematics and Scientific Computation Program

[Signature]

[Signature]
Dear Dean Halperin,

The Department of Physics strongly supports the proposed Certificate in Computational Science.

I note that the Certificate requires CMPS students to take courses in Physics as part of the requirements for the Certificate. In particular, as part of the requirements, students can choose to complete the PHYS 171/272/273 sequence or the PHYS 161/262/263 sequence. Because of the relatively small number of students anticipated in the Certificate program, there should be no problem accommodating them in these classes as offered.

In addition, we understand that PHYS 474, Computational Physics, will need some additional development work and reorientation so that it addresses primarily applications of numerical methods to physics problems (currently, the emphasis is on numerical methods, which will now be taught in other courses). A textbook that is illustrative of applications to physics problems is "Computational Physics" by Koonin.

In the case of both the PHYS 171 (or 161) series and PHYS 474, the additional registration can be accomplished within existing resources.

Sincerely,

[Signature]

Frederick C. Wellstood
Professor and Associate Chair
Department of Physics
Stephen Halperin  
Prof. And Dean College of Computer,  
Mathematical & Physical Sciences  
Dean's Office  
A.V. Williams Bldg.

January 30, 2003

Dear Dean Halperin,

The Computer Science Department is in support of the proposed Certificate in Computational Science.

I note that the Certificate requires CMPS students to take courses in CMSC as part of the requirements for the Certificate. In particular, students are expected to take CMSC106, CMSC311, and CMSC 351. In addition, some of the Certificate candidates may also elect to take CMSC114, 214, or 250. Because of the relatively small number of students anticipated in the Certificate program, there should be no problem accommodating them in these classes as offered. The additional seats registered can be handled within existing resources.

Sincerely,

[Signature]

Larry S. Davis  
Prof. & Chair, Computer Science Department
January 29, 2003

Professor Stephen Halperin
Dean, CMPS
University of Maryland
3400 AV Williams Bldg.
Campus

Dear Dean Halperin,

The Department of Mathematics is in support of the proposed Certificate in Computational Science.

I note that the Certificate requires students to take courses in MATH as part of the requirements for the Certificate. In particular, from direct or indirect requirements, students may elect to take some of MATH 240, 241, 246, 431, 452, or 462.

Because of the relatively small number of students anticipated in the Certificate program, there should be no problem accommodating them in these classes as offered. The additional seats registered can be handled within existing resources.

Sincerely yours,

[Signature]

Patrick M. Fitzpatrick
Professor and Chair
Department of Mathematics

mms
March 11, 2003

Dear Dean Halperin,

The Department of Astronomy supports the proposed Certificate in Computational Science.

The Certificate requires CMPS students to take courses in Astronomy as part of the requirements for the Certificate. In particular, students can choose ASTR120, 121, or 320 as electives. Because of the relatively small number of students anticipated in the Certificate program, there should be no problem accommodating them in these classes as offered.

We understand that ASTR415, Computational Astronomy, is a general requirement. Astronomy has offered this course in the past. We intend to offer the course again in Spring of 2005, and, ideally, every other year after that.

Best regards,

Lee Mundy
Chair Astronomy