LSC Use Only No: 07-16 p.	LSC Action-Date:	UWUCC USE Only No.	UWUCC Action-Date:
		Senate Action Date: App-12/4/07	App-10/30/07

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person: **Sanwar Ali**	Email Address: **sanwar@iup.edu**
Proposing Department/Unit: **Computer Science**	Phone: **7-7994**

Check all appropriate lines and complete information as requested. Use a separate cover sheet for each course proposal and for each program proposal.

1. Course Proposals (check all that apply)

_____New Course _____Course Prefix Change _____Course Deletion

_____Course Revision _____Course Number and/or Title Change _____Catalog Description Change

***Current* Course prefix, number and full title**	***Proposed* course prefix, number and full title, if changing**

2. Additional Course Designations: check if appropriate change

_X_ This course is also proposed as a Liberal Studies Course.

_____ This course is also proposed as an Honors College Course.

_____ Other: (e.g., Women's Studies, Pan-African)

3. Program Proposals

_____New Degree Program _____Program Title Change

_____New Minor Program _____New Track

__X__Catalog Description Change __X__Program Revision

_____Other

Bachelor of Science- Computer Science/ Languages and Systems Track	
***Current* program name**	***Proposed* program name, if changing**

4. Approvals		**Date**
Dept Curriculum Committee Chair	for Dilip	5 Dec 06
Department Chair	Wen Ogilvie	12/7/06
Coll. Curriculum Committee Chair		05/17/07
College Dean	Lynne Brunet	9/24/07
Director of Liberal Studies *	Mary Sadler	9/27/07
Director of Honors College *		
Provost *	(on)	10/29/07
Additional signatures as appropriate:		
(include title)		
UWUCC Co-Chairs	Gail S Sechrist	10/30/07

* where applicable

RECEIVED
OCT 25 2007
PROVOST OFFICE

Received
SEP 25 2007
Liberal Studies

Part II. Description of Curriculum Change

1. Catalog Description for the Revised Bachelor of Science- Computer Science/Language and Systems Track

Liberal Studies: As outlined in Liberal Studies section with the following specifications: *48*
Natural Science: Must choose Liberal Studies Science option one
Mathematics: *3cr*, MATH 125(1)
Liberal Studies Electives: *3cr*, MATH 126(1), no courses with COSC prefix.

Major: *45*

Core Courses:

COSC 105 Fundamentals of Computer Science	3cr
COSC 110 Problem Solving and Structured Programming	3cr
COSC 210 Object-Oriented and GUI Programming	3cr
COSC 300 Computer Organization and Assembly Language	3cr
COSC 310 Data Structures and Algorithms	3cr
COSC 319 Software Engineering Concepts	3cr
COSC 341 Introduction to Database Management Systems	3cr
COSC 380 Seminar in Computing Profession and Ethics	2cr
COSC 480 Seminar on Technical Topics	1cr

Required Courses:

COSC 345 Computer Networks	3cr
COSC 432 Introduction to Operating Systems	3cr
COSC 460 Theory of Computation	3cr

Select 12 cr from the following elective courses

COSC/MATH 250 Introduction to Numerical Methods (4)	3cr
COSC 316 Host Computer Security	3cr
COSC 320 Software Engineering Practice or	3cr
COSC 493 Internship in Computer Science (2)	12cr
COSC 355 Computer Graphics	3cr
COSC 362 Unix Systems	3cr
COSC 365 Web Architecture and Application Development or	3cr
COSC 444 Productivity Tools and 4th Generation Languages	
COSC 405 Artificial Intelligence	3cr
COSC 410 Computer Architecture	3cr
COSC 420 Modern Programming Languages or	
COSC 424 Compiler Construction	3cr
COSC 481 Special Topics in Computer Science (as approved for majors)	1-4cr

Other Requirements: *19*

ENGL 322 Technical Writing	3cr
One Science with lab in addition to the Liberal Studies requirement	4cr
Mathematics: A minor in mathematics including	*12cr*

the following courses: (3)
MATH 171 Introductions to Linear Algebra (3cr)
MATH 216 Probability and Statistics for Natural Sciences (3cr)
MATH 219 Discrete Mathematics (3cr)
MATH 225 Calculus-III for Physics, Chemistry & Mathematics (3cr) or
MATH 250 Introduction to Numerical Methods (3cr) (4)

Free Electives: *8*

Total Degree Requirements: **120**

(1) MATH 125 and 126 can be substituted by taking both MATH 121 and 122.
(2) COSC 493 may be selected in either the second semester of the junior year or the first semester of the senior year. If COSC 493 is selected and approved, COSC 380 should be taken in the immediately preceding semester. Only 4cr can be counted towards major.
(3) MATH 125 and 126 (taken as Liberal Studies requirements) are also counted towards the minor.
(4) COSC/MATH 250 may be counted as a Computer Science elective or as a part of the Mathematics minor, but not both.

2. a. Summary of Changes

Side-by-side comparison of Current and Proposed programs (additions and changes are shown in italics).

Current Program

Bachelor of Science - Computer Science/Languages and Systems Track.
Liberal Studies: As outlined in Liberal Studies section with the following specifications: **50**
Mathematics: ~~MATH 123 (1)~~
Liberal Studies Electives: ~~4cr, MATH 124~~, no courses with COSC prefix.

Major: **42**
Required Courses:

COSC 105 Fundamentals of Computer Science	3sh
COSC 110 Problem Solving and Structured Programming	3sh
COSC 210 Object Oriented and GUI Programming	3sh
~~COSC 220 Applied Computer Programming~~	~~4sh~~
COSC 300 Assembly Language Programming	3sh
COSC 310 Data Structures and Algorithms	3sh
COSC 319 Software Engineering Concepts	3sh
COSC 341 Introduction to Database Management Systems	3sh
COSC 380 Seminar on the Computer Profession	1sh
COSC 480 Seminar on Technical Topics	1sh

Select 9cr from the following the upper-level electives:

COSC 405 Artificial Intelligence	3cr
COSC 410 Processor Architecture and Microprogramming	3cr
COSC 420 Modern Programming Languages	3cr
COSC 424 Compiler Construction	3cr
COSC 432 Introduction to Operating Systems	3cr
COSC 460 Theory of Computation	3cr

Controlled Electives:
Select 6cr from the following: (2)

COSC 250 Introduction to Numerical Methods	3cr
~~COSC 304 Interactive Internet Programming with Java~~	~~3cr (3)~~
COSC 316 Host Computer Security	3cr (4)
COSC 320 Software Engineering Practice	3cr (5)
COSC 344 Productivity Tools and 4th Generation Languages	3cr (3)
COSC 345 Data Communications	3cr
~~COSC/IFMG 354 Testing and Controlling LANs~~	~~3cr~~
COSC 355 Computer Graphics	3cr
~~COSC 356 Network Security~~	~~3cr~~
~~COSC 360 IBM Job Control Language~~	~~1cr~~
COSC 362 Unix Systems	3cr
~~COSC 415 Internet Architecture and Programming~~	~~3cr~~
~~COSC 419 Software Development with ADA~~	~~3cr~~
~~COSC 427 Introduction to Cryptography~~	~~3cr~~
~~COSC 430 Intro to Systems Programming~~	~~3cr~~
~~COSC 450 Applied Numerical Methods~~	~~3cr~~
~~COSC 451 Numerical Methods for Supercomputers~~	~~3cr~~
COSC 481 Special Topics in Computer Science (only sections approved for majors)	1-4cr
~~COSC 482 Independent Study~~	~~1-4cr~~
COSC 493 Internship in Computer Science	12cr (5)(6)
~~IFMG 455 Data Warehousing & Mining~~	~~3cr~~

Proposed Program

Bachelor of Science - Computer Science/Languages and Systems Track.
Liberal Studies: As outlined in Liberal Studies Section with the following specifications: ***48***
Natural Science: *Must choose Liberal Studies Science option one*
Mathematics: *3cr, MATH 125* (1)
Liberal Studies Electives: *3cr, MATH 126 (1)*, no courses with COSC prefix.

Major: ***45***
Core Courses:

COSC 105 Fundamentals of Computer Science	3cr
COSC 110 Problem Solving and Structured Programming	3cr
COSC 210 Object-Oriented and GUI Programming	3cr
COSC 300 Computer Organization and Assembly Language	*3cr*
COSC 310 Data Structures and Algorithms	3cr
COSC 319 Software Engineering Concepts	3cr
COSC 341 Introduction to Database Management Systems	3cr
COSC 380 Seminar in Computing Profession and Ethics	*2cr*
COSC 480 Seminar on Technical Topics	1cr

Required Courses:

COSC 345 Computer Networks	*3cr*
COSC 432 Introduction to Operating Systems	3cr
COSC 460 Theory of Computation	3cr

Electives: 12cr from the following elective courses

COSC/MATH 250 Introduction to Numerical Methods (4)	3cr
COSC 316 Host Computer Security	3cr
COSC 320 Software Engineering Practice ***or*** COSC 493 Internship in Computer Science (2)	3cr 12cr
COSC 355 Computer Graphics	3cr
COSC 362 Unix Systems	
COSC 365 Web Architecture and Application Development ***or*** COSC 444 Productivity Tools and 4th Generation Languages	3cr
COSC 405 Artificial Intelligence	3cr
COSC 410 Computer Architecture	*3cr*
COSC 420 Modern Programming Languages ***or*** COSC 424 Compiler Construction	3cr
COSC 481 Special Topics in Computer Science (as approved for majors)	1-4cr

Program Revision- B.S. Computer Science (Languages and Systems Track)

Current Program

Other Requirements: **13-19**

~~Additional Writing:~~
ENGL 322 Technical Writing 3cr
~~Foreign Language Intermediate Level 0-6cr~~
Mathematics: A minor in mathematics including *10cr*
the following courses: (7)
~~MATH 123 Calculus I (MATH 121 and 122 may be substituted)~~
~~MATH 124 Calculus II~~
MATH 171 Introduction to Linear Algebra
MATH 216 Probability and Statistics for Natural Sciences
MATH 219 Discrete Mathematics

Free Electives: **9-15**

Total Degree Requirements: **120**

(1) MATH 123 can be substituted by taking both MATH 121 and 122.
(2) Select at least 6cr from the list of controlled electives. Note: Only 4cr of COSC 493 may be counted toward these 6cr.
(3) Credit for both COSC 304 and 344 may be counted toward the degree, but only one will be counted toward the major requirements.
(4) COSC 316 cannot be counted for major credit if a student does an Information Assurance minor.
(5) Credit for both COSC 320 and 493 may be counted toward the degree, but only one will be counted toward the major requirements.
(6) COSC 493 may be selected in either the second semester of the junior year or the first semester of the senior year. If COSC 493 is selected and approved, COSC 380 may be taken in the immediately preceding semester.
(7) In addition to MATH 171, 216 and 219, MATH 123-124 (taken as Liberal Studies requirement) are also counted towards the minor.

Proposed Program

Other Requirements: ***19***

ENGL 322 Technical Writing 3cr
One Science with lab in addition to the Liberal Studies requirement *4cr*
Mathematics: A minor in mathematics including *12cr*
the following courses: (3)
MATH 171 Introduction to Linear Algebra
MATH 216 Probability and Statistics for Natural Sciences
MATH 219 Discrete Mathematics
MATH 225 Calculus-III for Physics, Chemistry & Mathematics
or
MATH 250 Introduction to Numerical Methods (4)

Free Electives: ***8***

Total Degree Requirements: **120**

(1) MATH 125 and 126 can be substituted by MATH 121 and 122.
(2) COSC 493 may be selected in either the second semester of the junior year or the first semester of the senior year. If COSC 493 is selected and approved, COSC 380 should be taken in the immediately preceding semester. **Only 4cr can be counted towards major.**
(3) MATH 125 and 126 (taken as Liberal Studies requirements) are also counted towards the minor.
(4) COSC/MATH 250 may be counted as a Computer Science elective or as a part of the Mathematics minor, but not both.

Program Revision- B.S. Computer Science (Languages and Systems Track)

Principal motivations for the revision is to allow the department to apply for ABET (Accreditation Board for Engineering and Technology).

2 b. List of all associated course changes (new or revised courses, number, title or description changes and deletions).

1. **Changes from Deleted Courses**: COSC 220 Applied Computer Programming is dropped.
2. **Course Status change:**
    a. Course categories changed required courses, controlled and upper level electives to core, required and electives.
    b. Foreign language requirement changed.
    c. A two-semester sequence in a laboratory science is required; an additional science course with lab is required.

3. Rationale for change

a) COSC 220 Applied Computer Programming dropped because it is not required for ABET accreditation.

b) The core courses provide a base of fundamentals computer science materials as required for ABET accreditation. The required courses provide additional background essential for ABET accreditation. Some of the electives were dropped. The electives left are the ones which support the ABET requirements.

c) Foreign language requirement will be satisfied by completing courses in multiple computer programming languages; through Java and C++, our students are getting a similar exposure to languages, albeit computer rather than natural languages. In past years, Departments of Geosciences and Biology have done the same. The additional requirement for this track for students to take COSC 460 will guarantee exposure to the theory of languages and some linguistic concepts.

d) A two-semester sequence in a laboratory science, option one and the additional science course were adopted to meet the ABET accreditation for science requirement.

e) MATH 123 and 124 are replaced by two new courses, MATH 125 and 126, respectively by the Department of Mathematics. Credit hours of both MATH 125 and 126 are 3 each. These changes were approved by the Senate.

f) Liberal studies credit hours are reduced from 50 to 48 because of reduced credit hours of MATH 125 and 126.

g) COSC 304, 360, 419, and 450 have been deleted from the department.

h) COSC/IFMG 354, COSC 356, 427, 430, 451, 482, and IFMG 455 do not provide the type of breadth that ABET requires of computer science electives. Therefore, they have been removed to comply with ABET criteria.

i) COSC 415 Internet Architecture and Programming has been revised, re-titled, and re-numbered as COSC 365 Web Architecture and Application Development.

j) Student may choose either COSC 365 or COSC 444. These are somewhat similar in content but use different programming languages. To enhance the breadth that ABET looks for in the electives, we limit students to counting only one of the two.

k) Students may choose either COSC 320 or COSC 493. Both courses involve practical experiences in software engineering. To enhance the breadth that ABET looks for in the electives, we limit students to counting only one of the two.

l) The footnote (4) in the current program was a mistake. It has been removed from the proposed program.

m) Students may choose either COSC 420 or 424. Both courses involve the study of programming language structure and features. To enhance the breadth that ABET looks for in the electives, we limit students to counting only one of the two.

Part III. Implementation: Provide answers to the following questions

1. How will the proposed revision affect students already in the existing program?
    a. The students in the Languages and Systems track who wish to graduate under the new requirements need to do the following:
        i. Take the required courses as electives- the COSC courses are among the controlled and upper level electives now.
        ii. Take Science option one; a two semester sequence in a laboratory science and an additional science course with lab.
    b. Languages and Systems students who do not wish to take these courses can still get their degree with no ABET accreditation provided they complete the courses specified in the catalog at the time they matriculated.
    c. Students in the track will be informed of the option at the beginning of each year.

2. Are faculty resources adequate? If you are not requesting or have not been authorized to hire additional faculty, demonstrate how this course will fit into the schedule(s) of current faculty.

    Faculty resources are adequate. No new courses have been created. Because some of the courses have been moved from electives to required, it may mean that some courses will have to be offered more often than now (others will be offered less often).

3. Are other resources adequate? (space, equipment, supplies, travel funds)
    a. Space: yes
    b. Equipment: yes
    c. Supplies: yes
    d. Travel Funds: yes

4. Do you expect an increase or decrease in the number of students as a result of these revisions? If so, how will the department adjust?

    The track will become accredited; this will attract more students to the track; however we do not expect any significant increase in the total number of students in our program from these changes. We expect only a shift in which tracks students select.

Part IV. Periodic Assessment

1. Describe the evaluation plan. Include evaluation criteria. Specify how student input will be incorporated into the evaluation process.

    Checklists have been developed for the evaluation process. The checklists list the concepts that must be explained in class. These are the concepts student must acquire and demonstrate an understanding. In addition, the checklists outline the activities to be performed by the students. The faculty shall keep copies of the graded assignments from students. At the end of the semester, each faculty is required to indicate the activities used to evaluate student understanding of the concepts.

2. Specify the frequency of the evaluation

    At every two years of cycle each courses will be evaluated

3. Identify the evaluation entity

    The Department Chair and Department Curriculum committee will review the checklists to verify that the concepts have been covered and will examine the graded assignments to ensure that the assignments support achieving the course objectives and that the students have successfully completed them.

Part V. Course Proposals

Proposed course revisions are included in this package proposal.

Part VI. Letters of Support or Acknowledgement

A Letter of Acknowledgement regarding foreign language and a Letter of Support from MIS are attached.

From: "James A Rodger" <jrodger@iup.edu>
Subject: Re: Need a supporting email or a letter
Date: Mon, 05 Feb 2007 23:10:19 -0500
To: "Sanwar Ali" <sanwar@iup.edu>

Headers
Decode

Dr. Ali:

I am sending you a supporting email expressing that our department has no objection to removing IFMG 455 from the LAS Track. In the Old LAS track, IFMG 455 Data Warehousing & Mining was included. But according to ABET criteria, students in the LAS track are not required to have this course. Therefore, you may delete IFMG 455 from the REVISED LAS track, to comply with ABET criteria.

Sincerely,

Jim Rodger

On Mon, 05 Feb 2007 11:07:19 -0500
"Sanwar Ali" <sanwar@iup.edu> wrote:

> *Dear Jim,*
>
> *You already know that the Computer Science department is in a process of ABET accreditation for its Language and System (LAS) track. Our LAS track is designed for those students who want to pursue graduate studies. About 10/12 best students are in this track every year.*
>
> *Previously you gave me two supporting letters. I appreciate it very much. I need one more supporting letter or supporting email from you.*
>
> *In our Old LAS track IFMG 455 Data Warehousing & Mining was included. But according to ABET criteria, students in LAS track do not require to have this course any more. Therefore, we have deleted IFMG 455 from the REVISED LAS track to comply with ABET criteria. Please see the attachment. In the past no students from LAS track enrolled this course.*
>
> *Would you please send me a supporting email or a supporting letter expressing that your department has no objection?*
>
> *Thank you my friend.*
>
> *Sanwar*
>
> ==========
> *Dr. Sanwar Ali*
> *Professor of Computer Science*
> *Indiana University of Pennsylvania*
> *332A Stright Hall*
> *210 South 10th Street*
> *Indiana, PA 15705, U.S.A.*
> *Tel: 724-357-7994 (Office)*

Fax: 724-357-2724
Email: sanwar@iup.edu

==========

Professor James A. Rodger
203 MIS&DS
Eberly College of Business & IT
Indiana University of Pennsylvania
Indiana, PA 15701
Ph: (724) 357-5773
Fax:(724) 357-4831

From: "Sanwar Ali" <sanwar@iup.edu>
Subject: Need a Supporting Letter
Date: Mon, 05 Feb 2007 15:08:35 -0500
To: lauradel@iup.edu
Cc: sanwar

Headers
Decode

Dr. Laura Delbrugge
Chair, Dept. of Spanish

Dear Dr. Delbrugge,

The Languages and Systems (LAS) track in the Department of Computer Science is in the process of ABET accreditation. LAS track is designed for those students who want to pursue graduate studies. Currently, about 10 to 12 best students are in this program. In the old LAS curriculum, an Intermediate Level Foreign Language (0-6cr) is included as per College of NS&M requirement.

To comply with ABET criteria, the ABET and the Curriculum committees of the department completely revised the LAS curriculum. In order to maintain both 120 credits for graduation requirement and the ABET criteria (the foreign language is not required by the ABET); we removed the foreign language requirement from the LAS track. I have attached the revised LAS Curriculum to this email (please see page 5).

Since foreign language requirement was set by the College, our College Dean has no objection to remove the foreign language.

However, we need a courtesy supporting letter or a supporting email from you indicating that you have no objection in removing foreign language from our LAS curriculum.

Thank you for your cooperation.

Sincerely,

Dr. Sanwar Ali
ABET Coordinator

==========
Dr. Sanwar Ali
Professor of Computer Science
Indiana University of Pennsylvania
332A Stright Hall
210 South 10th Street
Indiana, PA 15705, U.S.A.
Tel: 724-357-7994 (Office)
Fax: 724-357-2724
Email: sanwar@iup.edu

Open File

Attachment: BS-LAS-ABET.doc (158Kbytes)

From: "Laura Delbrugge" <lauradel@iup.edu>
Subject: Response from Spanish/ French & German regarding lang deletion for COMP SCI BS (LAS) track
Date: Wed, 7 Feb 2007 11:08:27 -0500
To: "Sanwar Ali" <sanwar@iup.edu>
Cc: "Gail Sechrist" <gailsech@iup.edu>, <JBURIOK@iup.edu>, "Yaw Asamoah" <osebo@iup.edu>, <OBLITEY@iup.edu>, "Charles McCreary" <CHASMC@iup.edu>

Headers

Decode

Good morning Dr. Ali
I have attached a response to the request for support of the deletion of the foreign language requirement for the Comp Sci BS (LAS) track. Hard copy to follow.

Thank you for you kind attention
Laura
Dr. Laura Delbrugge
Chair, Department of Spanish and
Associate Professor
464 Sutton Hall
Indiana University of PA
Indiana PA 15705
(724) 357-2327
lauradel@iup.edu

Open File

Attachment: LettertoCompSci2.doc (35Kbytes)

Departments of Spanish, French and German
454 Sutton Hall
Indiana University of Pennsylvania
Indiana PA 15705
(724) 357-2325

February 5, 2007

To: Sanwar Ali, ABET coordinator, Computer Science Dept, IUP

Re: Proposed Deletion of Foreign Language Requirement in B.S. in Computer Science degree, Languages and Systems Track

Dear Dr. Ali and Computer Science Curriculum Committee Members:

On February 5, 2007, we received a request from your department for our support in the proposed elimination of Foreign Language as a requirement of the LAS (Languages and Systems) track of the B.S. degree in Computer Science. Specifically, your proposal states that:

"Foreign language requirement dropped because by taking multiple computer programming languages; Java, C++, our students are getting a similar exposure to languages, albeit computer rather than natural languages...the additional requirement for this track for students to take COSC 460 will guarantee exposure to the theory of languages and some linguistic concepts."

The statement above posits some type of "equivalency" between computer programming languages and natural foreign languages, which is NOT supported in the professional literature of our discipline. Artificial computer programming languages and natural foreign languages have very different purposes. The primary reason for foreign language study is to enable students to:

- communicate with other people in other cultures in a variety of settings;
- look beyond their customary cultural borders;
- develop insight into their own language and culture;
- act with greater awareness of self, of other cultures, and their own relationship to those cultures;
- gain direct access to additional bodies of knowledge by consulting sources in the foreign language; and
- participate more fully in the global community and marketplace (*Standards for Foreign Language Learning in the 21st Century,* 2006).

It has been suggested that in COSC 460, Theory of Computation, students would receive some exposure to theory of languages and linguistic concepts. This "exposure" at most refers to passive theoretical knowledge about communicating data or about mathematical structures and does not refer to our current-day understanding of what it means to "know a natural language," which involves, among other components, face-to-face and written

interpersonal communication with others, negotiating meaning with other speakers, investigating and gaining an understanding of the cultures in which the foreign language is spoken, and using the foreign language to acquire new knowledge through exploration of cultural and literary texts. The acquisition of a spoken language is not an equivalent to the mastery of programming, which is also a vital skill and is, of course, intrinsic to the computer science discipline. In sum, the argument for deleting the foreign language requirement should not be made on the basis that computer programming languages are a substitute for natural foreign languages since this is a false comparison.

We also understand that the elimination of the foreign language component is meant to address the 120 credit mandate as well as to include other criteria necessary for ABET accreditation. While the study of foreign language does not meet an ABET requirement, it would seem counterintuitive to eliminate the study of a discipline that would aid Computer Science students as they progress toward graduate studies and seek employment in any organization that requires foreign language skills.

We have the utmost respect for our colleagues in the Computer Science Department, and we understand both the pressures of curricular revision and an accreditation process. Further we do not intend to present ourselves as experts on the discipline of computer science. We are simply stating that we do not believe the acquisition of computer programming languages to be an interchangeable substitute for learning a foreign language. Thus, we cannot support the removal of the foreign language requirement from the Computer Science BS, LAS track. Thank you for your kind attention.

Sincerely,

Laura Delbrugge
Chair, IUP Department of Spanish

Charles McCreary
Chair, IUP Department of French and German

CC: Gail Sechrist, Chair, UWUCC, IUP
William Oblitey, Chair, Department of Computer Science, IUP
Yaw Asamoah, Dean, College of Humanities and Social Sciences, IUP
Gerald Buriok, Interim Dean, College of Natural Sciences, IUP