| LSC Use Only  Proposal No: | UWUCC Use Only Proposal No: 11-124a. | |
|---|---|---|
| LSC Action-Date: AP-3/22/12 | UWUCC Action-Date: AP-4/3/12 | Senate Action Date: App- 5/01/12 |

## Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

| Contact Person(s) David T. Smith | Email Address dtsmith@iup.edu |
|---|---|
| Proposing Department/Unit Computer Science | Phone 7-4478 |

Check all appropriate lines and complete all information. Use a separate cover sheet for each course proposal and/or 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. Liberal Studies Course Designations, as appropriate

This course is also proposed as a Liberal Studies Course (please mark the appropriate categories below)

☐ Learning Skills    ☐ Knowledge Area    ☐ Global and Multicultural Awareness    ☐ Writing Across the Curriculum (W Course)

☐ Liberal Studies Elective (please mark the designation(s) that applies – must meet at least one)

    ☐ Global Citizenship     ☐ Information Literacy     ☐ Oral Communication

    ☐ Quantitative Reasoning     ☐ Scientific Literacy     ☐ Technological Literacy
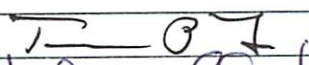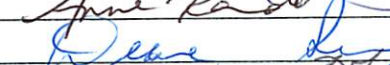
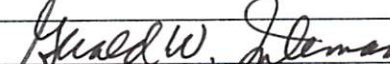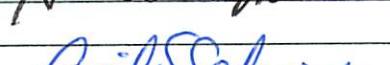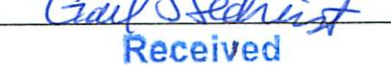### 3. Other Designations, as appropriate

☐ Honors College Course     ☐ Other: (e.g. Women's Studies, Pan African)

### 4. Program Proposals

☐ Catalog Description Change     ☑ Program Revision     ☐ Program Title Change     ☐ New Track

☐ New Degree Program     ☐ New Minor Program     ☐ Liberal Studies Requirement Changes     ☐ Other

*Current* program name: Bachelor of Science - Computer Science / Applied Computer Science Track _____

*Proposed* program name, if changing: _____

### 5. Approvals

| | Signature | Date |
|---|---|---|
| Department Curriculum Committee Chair(s) | *[signature]* | 2/6/12 |
| Department Chairperson(s) | *[signature]* Wm. Oblitey | 2/10/2012 |
| College Curriculum Committee Chair | *[signature]* Anne Kondo | 3/7/12 |
| College Dean | *[signature]* | 3/12/12 |
| Director of Liberal Studies (as needed) | *[signature]* H Prible | 3/22/12 |
| Director of Honors College (as needed) | | |
| Provost (as needed) | *[signature]* Gerald W. Intemann | 3/27/12 |
| Additional signature (with title) as appropriate | | |
| UWUCC Co-Chairs | *[signature]* Gail Sechrist | 4/24/12 |

## Part II. Description of Curriculum Change

### 1. Catalog Description for the Revised Bachelor of Science- Computer Science/Applied Computer Science Track

*Note: Retain COSC preamble in catalog as it currently appears.*

**Liberal Studies:** As outlined in Liberal Studies                43-44
section with the following specifications:
**Mathematics:** *3cr*, MATH 125 (1)
**Liberal Studies Electives:** *3cr*, MATH 216, no courses with
COSC prefix.

**Major:**                                                          46
**Required 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 220 Applied Computer Programming                4cr
COSC 300 Computer Organization and
          Assembly Language     3cr
COSC 310 Data Structures and Algorithms              3cr
COSC 319 Software Engineering Concepts               3cr
COSC 341 Intro to Database Management Systems        3cr
COSC 365 Web Architecture and
          Application Development   3cr
COSC 380 Seminar in Computing Profession and
          Ethics                   2cr
COSC 480 Seminar on Technical Topics                 1cr
COSC 473 Software Engineering Practice  or           3cr
    COSC 493 Internship in Computer Science (2)

**Controlled Electives:** *9cr* from the following (3)
COSC/MATH 250 Introduction to Numerical Methods      3cr
COSC 316 Host Computer Security  (4)                 3cr
COSC 345 Computer Networks                           3cr
COSC/IFMG 354 Testing and Controlling LANs           3cr
COSC 355 Computer Graphics                           3cr
COSC 356 Network Security                            3cr
COSC 362 Unix Systems                                3cr
COSC 481 Special Topics in Computer Science
        (only sections approved for majors)   1-4cr
COSC 482 Independent Study                           1-4cr
IFMG 455 Data Warehousing & Mining                   3cr

**Upper-level Electives by Categories: 3cr from**
**the following:**                                   3cr
Artificial Intelligence: COSC 405
Computer Architecture: COSC 410
Database Management: COSC 444
Distributed Systems: COSC 465
Numerical Methods: COSC 427, 451
Systems Programming: COSC 430
Theory of Languages:  420, 424, 460

**Other Requirements:**                              6
**Additional Writing:**
ENGL 222 Technical Writing                           3cr
**Additional Mathematics:**
MATH 219 Discrete Mathematics                        3cr

Complete a minor from one of the following areas:    **8-20**
Information Assurance                       12-18cr
Any department in the College of Natural Sciences and
Mathematics                                 8-20cr
Designated Business courses                 18cr

2

| | |
|---|---|
| Designated Economics courses | 12-15cr |
| Designated Communications Media courses | 18cr |

**Free Electives:**                                     **4-17**

**Total Degree Requirements:**                          **120**

(1)     MATH 125 can be substituted by MATH 121.

(2)     COSC 493 may be selected after completion of sophomore year. Note: Only 3cr of first 6cr of COSC 493 can be counted toward controlled electives or 6cr of a total 12cr of COSC 493 can be counted towards major. A student who does not complete all 12cr of COSC 493 must take COSC 473.

(3)     Upper-level electives may be counted as controlled electives. 3cr of Intermediate Level foreign language may be applied toward controlled electives.

(4)     COSC 316 cannot be counted for major credit if a student does an Information Assurance minor.

## 2. Summary of Changes

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

**Current Program**

**Bachelor of Science - Computer Science/Applied Computer Science Track**

| | |
|---|---|
| **Liberal Studies:** As outlined in Liberal Studies section with the following specifications: | **48** |
| **Mathematics:** *3cr*, MATH 125 (1) | |
| **Liberal Studies Electives:** *3cr*, MATH 216, no courses with COSC prefix. | |

| **Major:** | **40** |
|---|---|
| **Required 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 220 Applied Computer Programming | 4cr |
| COSC 300 Computer Organization and Assembly Language | 3cr |
| COSC 310 Data Structures and Algorithms | 3cr |
| COSC 319 Software Engineering Concepts | 3cr |
| COSC 341 Intro to Database Management Systems | 3cr |
| COSC 365 Web Architecture and Application Development | 3cr |
| COSC 380 Seminar in Computing Profession and Ethics | 2cr |
| COSC 480 Seminar on Technical Topics | 1cr |
| Select one of the following two courses: | |
| ~~COSC 320 Software Engineering Practice~~ | ~~3cr (2)~~ |
| COSC 493 Internship in Computer Science | ~~12cr (3)~~ |

| **Controlled Electives:** ~~3cr~~ from the following: | **(4)** |
|---|---|
| COSC/MATH 250 Introduction to Numerical Methods | 3cr |
| COSC 316 Host Computer Security | 3cr (5) |
| COSC 345 Computer Networks | 3cr |
| COSC/IFMG 354 Testing and Controlling LANs | 3cr |
| COSC 355 Computer Graphics | 3cr |
| COSC 356 Network Security | 3cr |
| COSC 362 Unix Systems | 3cr |
| COSC 481 Special Topics in Computer Science (only sections approved for majors) | 1-4cr |
| COSC 482 Independent Study | 1-4cr |
| IFMG 455 Data Warehousing & Mining | 3cr |

| **Upper-level Electives by Categories: 3cr from the following:** | 3cr (6) |
|---|---|
| Artificial Intelligence: COSC 405 | |
| Computer Architecture: COSC 410 | |
| Database Management: COSC 444 | |
| Numerical Methods: COSC 427, 451 | |
| Systems Programming: COSC 432 | |
| Theory of Languages: 420, 424, 460 | |
| **Other Requirements:** | **6-12** |
| **Additional Writing:** | |
| ENGL ~~322~~ Technical Writing | 3cr |
| ~~Foreign Language Intermediate Level~~ | ~~0-6cr~~ |
| **Additional Mathematics:** | |
| MATH 219 Discrete Mathematics | 3cr (1) |

**Proposed Program**

**Bachelor of Science - Computer Science/Applied Computer Science Track**

| | |
|---|---|
| **Liberal Studies:** As outlined in Liberal Studies section with the following specifications: | *43-44* |
| **Mathematics:** *3cr*, MATH 125 (1) | |
| **Liberal Studies Electives:** *3cr*, MATH 216, no courses with COSC prefix. | |

| **Major:** | *46* |
|---|---|
| **Required 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 220 Applied Computer Programming | 4cr |
| COSC 300 Computer Organization and Assembly Language | 3cr |
| COSC 310 Data Structures and Algorithms | 3cr |
| COSC 319 Software Engineering Concepts | 3cr |
| COSC 341 Intro to Database Management Systems | 3cr |
| COSC 365 Web Architecture and Application Development | 3cr |
| COSC 380 Seminar in Computing Profession and Ethics | 2cr |
| COSC 480 Seminar on Technical Topics | 1cr |
| Select one of the following two courses: | |
| *COSC 473 Software Engineering Practice* or COSC 493 Internship in Computer Science (2) | 3cr |

| **Controlled Electives:** *9cr* from the following: (3) | |
|---|---|
| COSC/MATH 250 Introduction to Numerical Methods | 3cr |
| COSC 316 Host Computer Security (4) | 3cr |
| COSC 345 Computer Networks | 3cr |
| COSC/IFMG 354 Testing and Controlling LANs | 3cr |
| COSC 355 Computer Graphics | 3cr |
| COSC 356 Network Security | 3cr |
| COSC 362 Unix Systems | 3cr |
| COSC 481 Special Topics in Computer Science (only sections approved for majors) | 1-4cr |
| COSC 482 Independent Study | 1-4cr |
| IFMG 455 Data Warehousing & Mining | 3cr |

| **Upper-level Electives by Categories: 3cr from the following:** | 3cr |
|---|---|
| Artificial Intelligence: COSC 405 | |
| Computer Architecture: COSC 410 | |
| Database Management: COSC 444 | |
| *Distributed Systems: COSC 465* | |
| Numerical Methods: COSC 427, 451 | |
| Systems Programming: COSC 430, 432 | |
| Theory of Languages: 420, 424, 460 | |
| **Other Requirements:** | **6** |
| **Additional Writing:** | |
| ENGL *222* Technical Writing | 3cr |
| **Additional Mathematics:** | |
| MATH 219 Discrete Mathematics | 3cr |

## Current Program

| | |
|---|---|
| Complete a minor from one of the following areas: | 8-18 |
| Information Assurance | 18cr |
| Any department in the College of Natural Sciences and Mathematics | 8-18cr |
| Designated Business courses | 18cr |
| Designated Economics courses | 15cr |
| ~~Designated Geography courses~~ | ~~15cr~~ |
| Designated Communications Media courses | 18cr |

**Free Electives:**  2-18

**Total Degree Requirements:**  120

(1)   MATH 125 can be substituted by MATH 121.

(2)   Credit for both COSC ~~320~~ and 493 may be counted toward the degree, but only one will be counted toward the major requirements.

(3)   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.~~ Note: Only ~~4cr~~ of COSC 493 can be counted towards major.

(4)   Select at least 3cr from the list of controlled electives and/or the list of upper-level electives.

(5)   COSC 316 cannot be counted for major credit if a student does an Information Assurance minor.

(6)   Select at least one additional course from list of upper-level electives.

## Proposed Program

| | |
|---|---|
| Complete a minor from one of the following areas: | *8-20* |
| Information Assurance | *12-18cr* |
| Any department in the College of Natural Sciences and Mathematics | *8-20cr* |
| Designated Business courses | 18cr |
| Designated Economics courses | *12-15cr* |
| Designated Communications Media courses | 18cr |

**Free Electives:**  *4-17*

**Total Degree Requirements:**  120

(1)   MATH 125 can be substituted by MATH 121.

(2)   *COSC 493 may be selected after completion of sophomore year. Note: Only 3cr of first 6cr of COSC 493 can be counted toward controlled electives or 6cr of a total 12cr of COSC 493 can be counted towards major. A student who does not complete all 12cr of COSC 493 must take COSC 473.*

(3)   *Upper-level electives may be counted as controlled electives. 3cr of Intermediate Level foreign language may be applied toward controlled electives.*

(4)   COSC 316 cannot be counted for major credit if a student does an Information Assurance minor.

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**b) List of associated course changes**

The following courses have changed course numbers:

**COSC 320** Software Engineering Practice, re-numbered
  as **COSC 473** Software Engineering Practice

The following courses have been revised:

**COSC 493 Internship in Computer Science**

The following courses have been added:

**COSC 465 Distributed Processing and Web Services**

**3. Rationale**

This program revision represents a few changes based on recommendations from the Computer Science Corporate Advisory board together with minor curriculum changes to replace an outdated course with an alternative, and renumber a course to better align with level and purpose. Specifics are:

a) COSC 320 Software Engineering Practice is the practicum that is intended to be a capstone of the Computer Science program where student apply their skills and knowledge to sizable projects that are representative to industry. It is the on-campus counterpart to an internship experience. Given this, it is being renumbered to 473 to indicate a senior level course that is on par with COSC 493 Internship experience. Furthermore, this change provides alignment with the department's ABET accreditation plan in which COSC 493 or COSC 473 are the designated capstone courses.

b) The number of credits hours of COSC 493 that can be counted toward a major was increased from 2cr per 6cr of 493 to 3cr per 6cr of 493. This change enabled the first 6cr of 493 to be counted as a controlled elective and the last 6cr of 493 to be counted as fulfilling the practicum requirement of the Applied and Information Assurance tracks (or as a second controlled elective in the remaining tracks). In making this change, students may undertake an internship without incurring excessive credits beyond the 120 required for graduation.

c) COSC 465 Distributed Processing and Web Services is an upper level elective that follows COSC 365 Web Architecture and Application Programming. Distributed Processing and Web Services is an area that is experiencing considerable growth and demand in the industry and is above and beyond the material that can be covered in 365. The topics related to distributed processing and web services can only be covered at a cursory level in 365 due to the volume of content encompassing web technologies. 365 provides minimal discussion of web services and then only in the context of future directions. 465 thus provide a detailed study of web services technologies providing students hand-on labs/exercises/and assignments to use these technologies.

d) Due to the expansion of the field and the need to cover leading-edge technologies, additional courses in the field are required by many majors. On the advice of the Corporate Advisory Board, the mandate for a foreign language has been removed from the curriculum for pragmatic reasons. In addition, the removal of this mandate provides flexibility for majors to switch tracks with minimal impact. However, the Computer Science department acknowledges the benefits of studying a foreign language and has provided the option to include an intermediate level foreign language course as a controlled elective. The department will continue to encourage the foreign language option when a student's area of concentration permits.

e) The credits noted in the proposed program for the minors have been corrected to reflect the range of additional credits a student may need to complete a given minor. The actual number of credits is dependent on the minor selected and the degree to which overlap exists between the requirements of the minor and the courses selected by the student in meeting the major and liberal studies requirements. For example a minor in Information Assurance may be completed with 9 additional credits for Criminology provided the student completed CRIM 101 as a social science and COSC 354 as part of the major.

f) The Geography minor has been removed since such minor is no longer available in the catalog.

g) ENGL 322 was changed to ENGL 222 as a result of a change in course number initiated by the English department. Course content was not changed.

h) Change the number of credits in COSC electives and the number of free electives. This change was made to accommodate changes in the new Liberal Studies curriculum.

## Part III. Implementation

### 1. Proposed Date of Change.

It is proposed that the changes be implemented for the academic year after the Senate approval.

### 2. Effects on Currently Enrolled Students.

Students currently enrolled in the program may elect to not complete the foreign language requirement provided they complete the additional Computer Science elective. Conversely, students that have completed a foreign language requirement are not required to complete the additional elective.

All currently enrolled students may elect to take 465 as the required controlled or upper level elective.

### 3. Effects on Faculty/Resources.

There are no overall effects to the Computer Science faculty. COSC 429, 454, and 465 will be scheduled on a rotating basis with other electives. The frequency that these courses are offered will depend on student demand/interest. Current faculty are prepared to present the content of these courses.

### 4. Effects on the Number of Students.

It is expected that there will be no significant effects on the number of students in the program. It is anticipated that the requirement of an additional controlled elected to be taken by all students will result in increased enrollment in the controlled and upper level electives, but will not exceed the class capacity. These changes are needed to maintain the department's reputation on preparing students to become software development professionals.

## Part IV. Periodic Assessment

The assessment of the success of the proposed changes described in this proposal will be performed as part of the Computer Science Department's overall curriculum assessment policies. This change is minor and will not affect the way current assessment is done.

## Part V. Course Proposals

The course proposals for:

### COSC 465 Distributed Processing and Web Services

are attached.

## Part VI. Letters of Support or Acknowledgement

A request for a letter of support or acknowledgement has been sent to the Department of Foreign Languages.