**Curriculum Proposal**

**MATH.CS 15-16 #09**

<table>
<thead>
<tr>
<th>Packet Contents</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Summary</td>
<td></td>
</tr>
</tbody>
</table>

**Course Modification**

| 1.2 CS 2322 Computer Science II (4 credits); description change |
| 1.4 CS 3370 Mobile Application Development (3 credits); description and prerequisite change |
| 1.6 CS 4840 Operating Systems (3 credits); prerequisite change |

**New Course**

| 1.8 CS 3752 Data Mining (3 credits) |

**Course Drop**

| 1.12 CS 3718 Computer Graphics (3 credits) |

**Program Modification**

| 1.13 Computer Science, B.S. major |
| 1.16 Computer Science minor |

| 1.19 Signatures |  |

---
BSU Curriculum Forms

Form 1

Curriculum Modification Summary

College: Arts and Sciences
Department: Mathematics and Computer Science
Proposer: Marty J. Wolf and François Neville
Proposer’s position: Professor of Computer Science and Assistant Professor of Computer Science
Describe the modification(s) you propose, and how it (/they) will work to students' advantage. (This description and explanation will be included in Curriculum Report packets forwarded to the Faculty Senate.):

Through the proposed course modifications and changed course descriptions will make the catalog better reflect the actual material in the courses and align the pre-requisites with the background material students need to be successful in the courses.

The modifications to the minor and major require that a certain fraction of the upper-division courses used to complete the degree requirements be actually taken at BSU. This helps the faculty ensure the integrity of the degree BSU students are receiving in Computer Science and protects against a cheapening of the degree for those students who do most of their upper-division Computer Science course work at BSU.

Modifications proposed (specify number of each):
___3___Course Modification(s) (form 2)
___1___New Course(s) (form 3)
___1___Course Drop(s) (form 4)
___2___Program Modification(s) (form 5)
_____New Program(s) (form 6)
_____Program Drop(s) (form 7)
The modifications affect (check):
____ Liberal Education
__X__ Undergraduate Curriculum
_____ Graduate Curriculum
_____ Teacher Licensure Program(s)
BSU Curriculum Forms
Form 2
Course Modification Form

Current Course Number(s):
  Undergraduate: CS 2322
  Graduate:
Proposed Course Number(s), if different:
  Undergraduate:
  Graduate:

Current Course Title: Computer Science II
Proposed Course Title, if different:

Current Course Description: Topics include pointers, dynamic allocation, recursion, and structured data types such as objects, strings, lists, stacks, queues, templates, containers, binary trees, and hash tables. Also includes a group-oriented software design and implementation project. Includes a two-hour lab. Prerequisite: CS 2321.

Proposed Course Description, if different: Topics include recursion and the study of object-oriented concepts including encapsulation, inheritance and polymorphism. It includes the study of fundamental data structures including strings, lists, stacks, queues, containers classes, binary trees, and hash tables. Also includes a group-oriented software design and implementation project. Includes a two-hour lab. Prerequisite: CS 2321.

Current Credits: 4
Proposed Credits, if different:

Current Prerequisite(s): CS 2321
Proposed Prerequisite(s), if different:

1) Reason(s) for change(s): The new description more accurately reflects what is taught in the course as some of the topics were moved to CS 3528 in our last curriculum change.

2) May this modified course replace the current course for students remaining in the old curriculum? Yes ___X__ No _____ If not, please drop the current course and submit a new course form for the modification.

3) Do these modifications change any of the following? For all Yes answers, please provide updated information on the next page.
   Student Learning Outcomes Yes _____ No _X___
   Major Content Areas Yes _____ No _X___
   Projected Maximum Class Size (Cap) Yes _____ No _X___

2
4) Current Course fee(s) per student: $
for:
Proposed Course fee(s) per student, if different: $
for:

5) Service Areas:
This course is a requirement or an elective in the programs/areas listed below. To locate where this course appears please search the online catalog, as follows:
   a) go to [http://www.bemidji.edu/academics/catalog/](http://www.bemidji.edu/academics/catalog/) and choose the most recent catalog(s),
   b) click on “Areas of Study, and Course Descriptions,”
   c) click on “PDF of Entire Catalog” in upper right,
   d) press Ctrl F, and enter the prefix and number of the course(s) from this form.

   Non-licensure programs: Computer Information Systems
   Teacher Licensure programs: Mathematics Education
   Liberal Education:

The above “service area” programs/departments were notified of this modification on 18 September 2015 (date) by email____________ (mail, email, or phone).

Please check one of the items below:

___X___ No comments were received from other programs or departments within one week of the notification.

_____ Comments were received within one week of the notification, and are attached.
BSU Curriculum Forms

Form 2

Course Modification Form

Current Course Number(s):
  Undergraduate: CS 3370
  Graduate:
Proposed Course Number(s), if different:
  Undergraduate:
  Graduate:

Current Course Title: Mobile Application Development
Proposed Course Title, if different:

Current Course Description: An overview of how to develop interactive applications for a variety of mobile devices using popular mobile application development platforms such as the iPhone and Android SDKs. Examines the specific requirements for mobile systems. Emphasizes how the requirements in mobile application development link to other core areas in computing. May not be offered every year. Prerequisite: CS 2270.

Proposed Course Description, if different: A study of development techniques to address issues that arise in the development of interactive applications for mobile devices using a popular mobile application development platforms such as the iPhone and Android SDKs. Examines the specific requirements for mobile systems. Emphasizes how the requirements in mobile application development link to other core areas in computing. May not be offered every year. Prerequisites: CS 2270 and (CS 2321 or CS 3270).

Current Credits: 3
Proposed Credits, if different:

Current Prerequisite(s): CS 2270
Proposed Prerequisite(s), if different: CS 2270 and (CS 2321 or CS 3270)

1) Reason(s) for change(s): The additional prerequisite ensures students have sufficient background in computer science to understand the distinctive software development methodology for mobile applications.

2) May this modified course replace the current course for students remaining in the old curriculum? Yes ___X___ No ______ If not, please drop the current course and submit a new course form for the modification.
3) Do these modifications change any of the following? **For all Yes answers, please provide updated information on the next page.**

- Student Learning Outcomes: Yes _____  No __X____
- Major Content Areas: Yes _____  No __X____
- Projected Maximum Class Size (Cap): Yes _____  No __X____

4) Current Course fee(s) per student: $  
for:  
Proposed Course fee(s) per student, if different: $  
for:  

5) Service Areas:  
This course is a requirement or an elective in the programs/areas listed below. To locate where this course appears please search the online catalog, as follows:  
a) go to [http://www.bemidjistate.edu/academics/catalog/](http://www.bemidjistate.edu/academics/catalog/) and choose the most recent catalog(s),  
b) click on “Areas of Study, and Course Descriptions,”  
c) click on “PDF of Entire Catalog” in upper right,  
d) press Ctrl F, and enter the prefix and number of the course(s) from this form.  

Non-licensure programs: Computer Information Systems  
Teacher Licensure programs:  
Liberal Education:  

The above “service area” programs/departments were notified of this modification on 18 Sept 2015 (date) by _email____ (mail, email, or phone).  

Please check one of the items below:  

__X____  No comments were received from other programs or departments within one week of the notification.  

_______  Comments were received within one week of the notification, and are attached.
BSU Curriculum Forms

Form 2

Course Modification Form

Current Course Number(s): CS 4840  
   Undergraduate:  
   Graduate:  
Proposed Course Number(s), if different:  
   Undergraduate:  
   Graduate:  

Current Course Title: Operating Systems  
Proposed Course Title, if different:

Current Course Description: Fundamentals of operating system design with emphasis on at least one modern operating system. Topics include scheduling, memory management, paging, file management, and mutual exclusion. Required work will include programming investigations.  
Proposed Course Description, if different:

Current Credits: 3  
Proposed Credits, if different:

Current Prerequisite(s): CS 2810 and CS 3528  
Proposed Prerequisite(s), if different: CS 2810 and CS 2322

1) Reason(s) for change(s): The prerequisite material is largely found in CS 2322.

2) May this modified course replace the current course for students remaining in the old curriculum? Yes __X__ No _____ If not, please drop the current course and submit a new course form for the modification.

3) Do these modifications change any of the following? **For all Yes answers, please provide updated information on the next page.**  
   - Student Learning Outcomes: Yes _____ No ___X___  
   - Major Content Areas: Yes _____ No ___X___  
   - Projected Maximum Class Size (Cap): Yes _____ No ___X___

4) Current Course fee(s) per student: $  
   for:  
   Proposed Course fee(s) per student, if different: $  
   for:  

5) Service Areas:
This course is a requirement or an elective in the programs/areas listed below. To locate where this course appears please search the online catalog, as follows:

a) go to http://www.bemidjistate.edu/academics/catalog/ and choose the most recent catalog(s),
b) click on “Areas of Study, and Course Descriptions,”
c) click on “PDF of Entire Catalog” in upper right,
d) press Ctrl F, and enter the prefix and number of the course(s) from this form.

Non-licensure programs:

Teacher Licensure programs:

Liberal Education:

The above “service area” programs/departments were notified of this modification on _ (date) by ______________ (mail, email, or phone).

Please check one of the items below:

_X__ No comments were received from other programs or departments within one week of the notification.

______ Comments were received within one week of the notification, and are attached.
BSU Curriculum Forms

Form 3

New Course Form

Course Number: CS 3752
   Undergraduate: Y
   Graduate: N
Course Title: Data Mining
Course Description:
This course will provide an overview of common Data Mining models, methods and techniques pioneered within the field of Artificial Intelligence. Topics may include: knowledge representation, clustering schema, decision trees and neural networks. Some student facility with mathematics and basic statistics concepts is assumed. Prerequisites: CS 3528. May not be offered every year.
Credits: 3
Prerequisite(s): CS3528

1. Reason(s) for creating this course: Better align department curriculum with faculty expertise; provide current material useful for research, workplace

2. How often will this course be offered? 2-yr rotation, Spring semester even years

3. What are the student learning outcomes for the course (please precede each outcome with "Students will...")?
   Students will demonstrate working knowledge of various common data mining methods
   Students will apply new knowledge to real-world datasets resistant to traditional analytic approaches
   Students will present results of one or more approaches, acknowledging strengths and shortcomings of each

4. What are the major content areas for the course?
   Core Computer Science – Applied Artificial Intelligence
   Machine Learning
   Model interpretation and validation
   Information Extraction and Analysis

5. Is this course repeatable for credit, and if so, what is the maximum number of credits that can be earned? N

6. If this course is intended primarily for off-campus delivery (not offered on campus), what delivery mechanism will be used? N/A
7. What is the projected maximum class size (cap)? 30

8. What qualified faculty will be available to teach this course?
   NOTE WELL: Department and dean, in approving this proposal, attest both to the adequacy of the qualifications of faculty here named, and to their availability to teach the course at the frequency specified above, without excessive overload or disruption to other curriculum.
   François Neville, Assistant Professor of Computer Science

9. What additional library and other resources need or should be provided for this course, that are not already available? N/A

10. What special personal property or service fee(s) would be charged to students taking this course? These charges would be for 1) items that are retained by the student and have an educational or personal value beyond the classroom, or 2) services that are on the student’s behalf (see MnSCU Board Policy 5.11).
   Amount per student: $ N/A
   For: N/A

11. Attach a sample syllabus for the course. Note: if this course is double-numbered (u-grad/grad), the syllabus must include an additional component for graduate students.
CS 3758: Introduction to Data Mining, Spring 2016

Instructor: François Neville
Office: 361 Hagg Sauer Hall
Email: fneville@bemidjistate.edu
Phone Number: 755-2840
Office hours: 10:00 – 11:30AM MW, and by drop in or appointment.

Class Times and Location: Class meets TH from 10:00 – 11:15 AM in HS229, and occasionally in lab


Course Description: This course will provide an investigation into common Data Mining models, methods and techniques pioneered within the field of Artificial Intelligence. Topics covered may include any/all of the following: knowledge representation, clustering schema, decision trees and neural networks.
By the end of this course, students should be able to 1) demonstrate working knowledge of various common data mining techniques, 2) be able to apply this knowledge to real-world datasets, 3) be able to compare results of multiple approaches, with an awareness of the strength and shortcomings of each.
Some student facility with mathematics and basic statistics is assumed. Course prerequisite: CS3528 – Data Structures and Algorithms

Evaluation Procedures and Criteria:
Homework Assignments 40%
Quizzes and Exams 30%
Final Project, Presentation 20%
Attendance, Participation 10%


Makeups: Makeup exams will be given only if they are arranged in advance and there are extenuating circumstances.

Homework: I expect at this stage that everyone is familiar with MS Word or some other full-featured word processor. Accordingly, I expect all assignments handed in to me to be typed, rather than hand-written. Please also restate the question you are answering first, in bold, in addition to your response. Font-size no smaller than 10, no larger than 12. Lengthy responses to essay questions or papers should have a line-spacing of 1.5 or 2 (double-spaced). Figures, graphs, etc may be included inline in your document if you wish, but can also be appended to the end of your document so long as they are referred to in the appropriate places in your text.
Figures must always be labeled and captioned. Graph paper is fine; if you must use lined paper, please trim the ragged edges. Always staple multiple sheets together; no paper-clips or folding.

Late policy: Assignments are due by a specified date and time. In general, assignments turned in late will lose at least 10% per week for tardiness.

Attendance: You are strongly encouraged to attend class. If you miss a class you are responsible for material covered in class. There may be occasional changes in dates or policies mentioned in class.

Academic Responsibility Policy: I strongly encourage you all to help each other out in the course of doing your assignments, etc. However all work handed in must be your own, and must be completed in a manner consistent with BSU University Senate Policy.
BSU Curriculum Forms

Form 4

Course Drop Form
(Use this form to drop a course from the university curriculum file.
To drop a course from a program only, use Form 5 Program Modification Form)

Course Number: CS3718
Undergraduate:
Graduate:

Course Title: Computer Graphics (3 credits)

New or current courses that will universally replace this dropped course for students remaining in the old curriculum:

This dropped course is a requirement or an elective in the programs/areas listed below. To locate where this course appears please search the online catalog, as follows:
1) go to http://www.bemidjistate.edu/academics/catalog/ and choose the most recent catalog(s),
2) click on “Areas of Study, and Course Descriptions,”
3) click on “PDF of Entire Catalog” in upper right,
4) press Ctrl F, and enter the prefix and number of the course(s) from this form.

Non-licensure programs: Computer Information Systems, B.S.

Teacher Licensure programs:

Liberal Education:

The above “service area” programs/departments were notified of this modification on 18.Sept.2015 (date) by _email_____________ (mail, email, or phone).

Please check one of the items below:

__X__ No comments were received from other programs or departments within one week of the notification.

_______ Comments were received within one week of the notification, and are attached.

Reason(s) for dropping this course:
No remaining well-qualified faculty to teach this course
BSU Curriculum Forms

Form 5

Program Modification Form

Program to be modified: Computer Science, B.S. Major

List all proposed change(s):
--require student to complete at least 15 credits at the 3000-level and above at BSU in order to obtain the degree.
--add CS 3752, Data Mining to the Computer Science major
--drop CS 3718, Computer Graphics from the Computer Science major

Reason(s) for the change(s):

--The prevalence of online courses opens the possibility for students to obtain a BSU Computer Science degree without actually completing many of our upper-division courses. We want to ensure that our faculty are confident about the abilities of every student receiving our Computer Science degree.

--We are adding the Data Mining course and dropping the Computer Graphics course to better align the curriculum with faculty expertise.

Note: In order to avoid hidden prerequisites, if a course is being dropped from this program (but not from the entire curriculum), please check for which remaining courses may include this dropped course as a prerequisite. Course prerequisites may be found in the online catalog (http://www.bemidjistate.edu/academics/catalog/). Remedies for hidden prerequisites may be found under Curriculum Forms at (http://www.bemidjistate.edu/faculty_staff/faculty_association/forms/).

Note: If a course from another department/program was either added to or dropped from this program, please notify the chair/coordinator of that course's department/program and indicate the following:
The course’s home department/program was notified of the addition or dropping of their course(s) on ________ (date) by ____________________ (mail, email, or phone).

Please check one of the items below:

______   No comments were received from other programs or departments within one week of the notification.

______   Comments were received within one week of the notification, and are attached.
Note: If this is a joint program, the signatures of both department chairs (and both deans, if different colleges) must be provided.

Alert: Attach a copy of the current program showing the marked changes. Please copy the current program from the online catalog (http://www.bemidjistate.edu/academics/catalog/) and paste it into Word. Then use either the Track Changes feature under Tools, or the underline and strikethrough Font feature under Format. (Please note that the Track Changes feature may be easily switched on and off by holding down the Ctrl+Shift+E keys.)

Computer Science, B.S. major

Required Credits: 60
Required GPA: 2.25

Additional Requirement: Successful completion of the degree requires students to earn 15 of the credits from areas I and II at the 3000/4000 level while in residence at BSU.

I REQUIRED CORE COURSES

COMPLETE THE FOLLOWING COURSE:

CS 1309 Problem Solving and Computation (3 credits)

or

CS 1107 Introduction to Computers (3 credits)
and CS 1108 Introduction to Computers II (3 credits)

COMPLETE THE FOLLOWING COURSES:

- CS 2321 Computer Science I (4 credits)
- CS 2322 Computer Science II (4 credits)
- CS 2810 Computer Organization and Assembly Language Programming (3 credits)
- CS 3528 Data Structures and Algorithms (4 credits)
- CS 4390 Social, Ethical, and Professional Issues in Computing (2 credits)
II REQUIRED ELECTIVES

Select 21 credits from among the following courses, with at least 3 courses from Section A and 3 courses from Section B. Note: Courses may have prerequisites either not included or not required in this major.

A. Core Computer Science

- CS 3507 Introduction to Databases (3 credits)
- CS 3560 Data Communications and Networks (3 credits)
- CS 3718 Computer Graphics (3 credits)
- CS 3752 Data Mining (3 credits)
- CS 4298 Compiler Construction (3 credits)
- CS 4627 Theory of Computation (3 credits)
- CS 4840 Operating Systems (3 credits)
- MATH 3720 Numerical Methods (3 credits)

B. Application Development Techniques

- CS 3270 Advanced Web Programming (3 credits)
- CS 3350 Event-Driven Programming in a Windows Environment (3 credits)
- CS 3360 Object-Oriented Software Development (3 credits)
- CS 3370 Mobile Application Development (3 credits)
- CS 3380 Game Development (3 credits)
- CS 4360 Software Engineering (3 credits)

III REQUIRED OUTSIDE COURSES

- MATH 1470 Precalculus (5 credits)
  or MATH 2471 Calculus I (5 credits)
- MATH 2210 Discrete Mathematics (4 credits)
- MATH 3310 Linear Algebra (4 credits)
  or STAT 2610 Applied Statistics (4 credits)
  or STAT 3631 Probability And Statistics I (4 credits)
- SPCM 1100 Public Speaking (3 credits)

Select one of the following courses:

- ENGL 2150 Technical Writing (3 credits)
- ENGL 3150 Writing In The Disciplines (3 credits)
- ENGL 3155 Professional Writing (3 credits)
BSU Curriculum Forms

Form 5

Program Modification Form

Program to be modified: Computer Science Minor

List all proposed change(s):
--require student to complete at least one BSU Computer Science course at the 3000-level and above in order to obtain the minor.

Reason(s) for the change(s):
--The prevalence of online courses opens the possibility for students to obtain a BSU Computer Science minor without actually completing any of our upper-division courses. We want to ensure that our faculty are confident about the abilities of every student receiving our Computer Science minor.

Note: In order to avoid hidden prerequisites, if a course is being dropped from this program (but not from the entire curriculum), please check for which remaining courses may include this dropped course as a prerequisite. Course prerequisites may be found in the online catalog (http://www.bemidjistate.edu/academics/catalog/). Remedies for hidden prerequisites may be found under Curriculum Forms at (http://www.bemidjistate.edu/faculty_staff/faculty_association/forms/).

Note: If a course from another department/program was either added to or dropped from this program, please notify the chair/coordinator of that course's department/program and indicate the following:
The course’s home department/program was notified of the addition or dropping of their course(s) on __________ (date) by _________________ (mail, email, or phone).

Please check one of the items below:

______ No comments were received from other programs or departments within one week of the notification.

______ Comments were received within one week of the notification, and are attached.

Note: If this is a joint program, the signatures of both department chairs (and both deans, if different colleges) must be provided.

Alert: Attach a copy of the current program showing the marked changes.
Please copy the current program from the online catalog (http://www.bemidjistate.edu/academics/catalog/) and paste it into Word. Then use either the Track Changes feature under Tools, or the underline
and strikethrough Font feature under Format. (Please note that the Track Changes feature may be easily switched on and off by holding down the Ctrl+Shift+E keys.)

**Computer Science minor**

Required Credits: 15-20  
Required GPA: 2.00

Additional requirement: Successful completion of the minor requires at least one Computer Science course at the 3000/4000 level taken while in residence at BSU.

*****************************************************************

**COMPUTER SCIENCE MINOR REQUIREMENTS WEB EMPHASIS:**

MUST COMPLETE ALL AREAS WITH A TOTAL OF AT LEAST 15 SEMESTER CREDITS AND A 2.00 GPA

I REQUIRED COURSES

COMPLETE THE FOLLOWING COURSE:

- CS 1309 *Problem Solving and Computation* (3 credits)  
  or  
- CS 1107 *Introduction to Computers* (3 credits)  
  and CS 1108 *Introduction to Computers II* (3 credits)

II REQUIRED EMPHASIS—WEB EMPHASIS

COMPLETE THE FOLLOWING COURSES:

- CS 2270 *Introduction to Web Programming* (3 credits)
- CS 3270 *Advanced Web Programming* (3 credits)

SELECT 6 SEMESTER CREDITS FROM THE FOLLOWING COURSES:

- CS 2321 *Computer Science I* (4 credits)  
- CS 2322 *Computer Science II* (4 credits)  
- CS 2810 *Computer Organization and Assembly Language Programming* (3 credits)  
- CS 3370 *Mobile Application Development* (3 credits)  
- CS 4390 *Social, Ethical, and Professional Issues in Computing* (2 credits)

*MAY INCLUDE 1:*
- GEOG 4275 Advanced Geographic Information Systems (3 credits)
  or ENGL 3179 Elements of Electronic Rhetoric (3 credits)
  or TADD 3549 Digital Media/Interactive (4 credits)

*****************************************************************
COMPUTER SCIENCE MINOR REQUIREMENTS PROFESSIONAL EMPHASIS:
MUST COMPLETE ALL AREAS WITH A TOTAL OF AT LEAST 20 SEMESTER
CREDITS AND A 2.00 GPA

I REQUIRED COURSES
COMPLETE THE FOLLOWING COURSE:
- CS 1309 Problem Solving and Computation (3 credits)
  or CS 1107 Introduction to Computers (3 credits)
  and CS 1108 Introduction to Computers II (3 credits)

II REQUIRED EMPHASIS-PROFESSIONAL EMPHASIS
COMPLETE THE FOLLOWING COURSES:
- CS 2321 Computer Science I (4 credits)
- CS 2322 Computer Science II (4 credits)

SELECT 9 SEMESTER CREDITS FROM THE FOLLOWING COURSES:
- CS 2810 Computer Organization and Assembly Language Programming (3 credits)
- PHYS 2500 Electronics I (4 credits)
- Computer Science courses at the 3000 and 4000 levels
BSU Curriculum Forms

Form 8

Signatures

Marty Wolf / Prof of Computer Science / 28.Sept.2015
Proposer / Title / Date

Francois Neville / Asst Prof of Computer Science / 29.Sept.2015
Proposer / Title / Date

Derek Webb / Chair, Dept of Math & CS / 29.Sept.2015
Chair or Director / Department or Program / Date
Note: "All departmental recommendations [on curriculum] must be reviewed and approved by the department's faculty."--IFO/MnSCU Master Agreement 2009-2011, 20.A.3 (p. 80).

Colleen Greer / Arts and Sciences / 10.7.15
Dean / College / Date

[Note: at this point, packet goes to Academic Affairs Office.]