Revision of the Computer Information Systems and Computer Science majors

The College at Brockport, College Senate
Resolution #11 2016-2017
College Senate

TO: Dr. Heidi Macpherson, College President

FROM: The College Senate: 03/20/17

RE: I. Formal Resolution (Act of Determination)
   II. Recommendation (Urging the Fitness of)
   III. Other, For Your Information (Notice, Request, Report, etc.)

SUBJ: Revision of the Computer Information Systems and Computer Science majors (#19_16-17UC)

Signed: ___________________________ Date: 4/17/17
(Sharon Lubkemann Allen, 2016-17 College Senate President)

Please fill out the bottom portion and follow the distribution instructions at the end of this page.

TO: Dr. Sharon Lubkemann Allen, College Senate President

FROM: Dr. Heidi Macpherson, College President

RE: I. Decision and Action Taken on Formal Resolution (circle choice)
   a. Accepted **Implementation Effective Date**: Fall 2018
   **Implementation of resolution requires final approval from SUNY- State Education Department. **YES ☐ NO ☐
   b. Deferred for discussion with the Faculty Senate on __/__/__
   c. Unacceptable for the reasons contained in the attached explanation

II, III. Response to Recommendation or Other/FYI
   a. Received and acknowledged __/__/__
   b. Comment: ___________________________

Signed: ___________________________ Date: 5/15/17
(Dr. Heidi Macpherson, President, The College at Brockport)

DISTRIBUTION:
Upon approval, the College President will forward copies of resolutions to his/her staff who will, in turn, forward copies to their staff. The College Senate Office will post resolutions to the College Senate Web at http://www.brockport.edu/collegesenate/resolutions.
COLLEGE SENATE OFFICE
RESOLUTION PROPOSAL COVER PAGE
DEADLINE FOR SUBMISSIONS: February 28
Incomplete proposals will be returned and proposals received after the deadline may not be reviewed until next semester.

INSTRUCTIONS
- Use committee guidelines available at brockport.edu/collegesenate/proposal.html.
- Prepare ONE complete document in Word format: include this proposal cover page, proposal, attachments and support letters from your department chair and dean if applicable.
- Locate the Resolution # and date this proposal will replace at our “Approved Resolutions” page on our Web site.
- Email completed proposal to senate@brockport.edu. (General Education Proposals and questions go to dlamphron@brockport.edu in the Vice Provost's Office first.)
- Make revisions on the paperwork emailed to you from the Senate office that shows the assigned routing number on top. Submit updated document to senate@brockport.edu.
- Questions? Call the Senate office at 395-2586 or the appropriate committee chairperson.

1. PROPOSAL TITLE: Please be somewhat descriptive, ie. Use a course number and/or title, indicate if for GED code, etc.
   - Revision of the Computer Information Systems and Computer Science majors

2. BRIEF DESCRIPTION OF PROPOSAL:
   - Based on recent changes in our accreditation agency ABET's criteria, the implementation of the SUNY Transfer Path program, and results from our internal program to assess our Student Learning Outcomes, the department needs to revise several aspects of all of our programs.

3. WILL ADDITIONAL RESOURCES AFFECTING BUDGET BE NEEDED? _x_ NO ___ YES
   - EXPLAIN YES

4. DESCRIBE ANY DATA RELATED TO STUDENT LEARNING OUTCOMES ASSESSMENT USED AS PART OF THE RATIONALE FOR THE REQUESTED SENATE ACTION.
   - The department regularly assesses eight SLOs for each major. We also survey and interview all graduating students, and periodically survey the employers of our alumni in the local area. Data from these processes has indicated that our students need improvement in SLOD and SLOH. This proposal includes changes to address these issues.

5. HOW WILL THIS AFFECT TRANSFER STUDENTS (ie: Transfer Paths)
   - This proposal includes a 2-year plan of study for each program that shows how a transfer student can complete the program in 2 years at Brockport

6. ANTICIPATED EFFECTIVE DATE:
   - Fall 2018

7. SUBMISSION & REVISION DATES: PLEASE DATE ALL REVISED DOCUMENTS TO AVOID CONFUSION.
   - First Submission | Updated on | Updated on | Updated on
     - 02/13/17

8. SUBMITTED BY: (contact person)
   - Name | Department | Phone | Email
     - Sandeep Mitra | Computing Sciences | 395-2146 | smitra@brockport.edu

9. COMMITTEES: (Senate office use only)
   - Standing Committee | Forwarded To | Dates Forwarded
     - Executive Committee | Standing Committee | 02/13/17
     - Enrollment Planning & Policies | Executive Committee | 3/06/17
     - Faculty & Professional Staff Policies | Senate | 3/20/17
     - General Education & Curriculum Policies | SenatePresident/GED'SViceProvost | 4/17/17
     - Graduate Curriculum & Policies | College President | 5/15/17
     - Student Policies | OTHER |
     - Undergraduate Curriculum & Policies | REJECTED -WITHDRAWN |

NOTES: APPROVED-Senate 4/3/17 Resolutions #11
The Department of Computing Sciences at Brockport offers three (3) undergraduate programs:

- Major in Computer Information Systems (CIS)
- Major in Computer Science - Advanced Computing track (CSC-AC)
- Major in Computer Science - Software Development track (CSC-SD)

The CIS and CSC-AC programs are both accredited by the Computing Accreditation Commission (CAC) of ABET, Inc. (www.abet.org). Brockport is the only college in New York State to offer an ABET-accredited program in Information Systems. We are one of only 11 colleges in New York that provide an ABET-accredited Computer Science degree.

It is important to ensure that all of our programs stay up-to-date with trends in the discipline. In order to accomplish this goal, the department seeks input from various stakeholders, including ABET, curriculum guidelines published by the national professional societies, the department’s external advisory board, faculty, current students, employers of our students and alumni.

Several recent events have motivated the proposed revisions to the three majors:

1) The SUNY Transfer Path in Computer Science mandate that began in Fall 2015.
2) The ABET re-accreditation site visit to Brockport in 2014-15.
3) Publication of the “Computer Science Curricula 2013” guidelines by the ACM and IEEE Joint Task Force on Computing Curricula.
4) Results from our internal program to assess our Student Learning Outcomes.

This proposal is the result of the department’s efforts to respond to all of the above inputs. We describe each change, and the rationale for each change, in the following section. Please see the provided side-by-side tables for a summary of the proposed changes for each of the three programs. We have also provided a 4-year plan-of-study for each program to illustrate how it may be completed by an incoming first-year student. We have also provided a 2-year plan-of-study for each program to illustrate how it may be completed by a transfer student who has completed the SUNY Transfer Path courses.

1. Rationale for Restructuring the programs in the Dept. of Computing Sciences

There is considerable overlap in the curricula of the three programs CIS, CSC-AC and CSC-SD. Many of the introductory courses are taken by students in all of the programs. We first describe changes that are common to all three programs and then describe changes that are specific to each of them.

Revisions Common to all Majors

1) Add CSC 117 (Intro. to Web Development) as a required course. Basic web development skills are now considered fundamental for all students in the computing sciences. This 1-credit, lab-based class will enable students to acquire these skills early in their college career, thus enabling them to seek internships or part-time work opportunities while they are in school. This will also allow the upper-division required and elective courses relating to web development (CIS 442: E-commerce Systems and
CSC 423: Web Application Development) to focus on more advanced topics in this area. This change was recommended during a past ABET site visit.

2) Add CSC 356 (Life in the Digital Age) as a required course. CSC 356 covers topics related to the impact of computing on society-at-large, including issues such as: the changing nature of privacy and growing use of government surveillance, the Internet's effect on societal communication and differences in gender communication patterns, issues of freedom of expression and censorship, etc. CSC 356 carries the General Education codes IWY. Some of this material is also covered in the required course CSC 486 (Junior/Senior Seminar), together with other topics related to preparing students for the job search, such as resume writing and interviewing skill development. Program assessment data indicates that students need more help developing job search skills. The department will revise the content of CSC 486 to include more coverage of topics related to searching for jobs in the IT industry, and also to contain a component in which students learn a particular concept/acquire a skill independently (e.g., via a freely available short course, delivered in a MOOC format), and write a reflective essay on their experience. This will decrease the time available in CSC 486 to cover ethical and social issues related to computing. Therefore, CSC 356 is added as a required course in the 3 majors. Adding CSC 356 will not increase any student’s time-to-graduation, since it satisfies several Gen Ed codes.

3) Revise the content of CSC 486 (Junior/Senior Seminar) to include a greater emphasis on life-long learning and the computing profession, which will reduce the time that can be devoted to ethical and social topics. See the rationale above.

4) Revise the content and re-name the introductory course sequence CSC 120 – CSC 203 – CSC 205 – CSC 311. In 2015 SUNY implemented the Transfer Path program, which ensures that students completing the set of Transfer Path courses in a major at one college will be able to enter another college with junior standing in that same major. SUNY defined four (4) Computer Science courses as part of the Transfer Path for the CS major. The corresponding courses at Brockport are: CSC 120, CSC 203, CSC 205 and CSC 311. In order to make our 4 courses match the 4 Transfer Path courses, we need to re-arrange the topics in those courses. We will also need to change the names of these 4 courses. In order to cover the required material in greater depth, the number of credits in CSC 120 will be increased from 3 to 4, and this class will have a formal laboratory component.

5) Add a new required course CSC 312 (Cybersecurity). ABET is expected to revise their curriculum requirements in the coming year to add a requirement that all computing students receive a thorough grounding in topics related to computer and cyber security. This ABET requirement already exists for Information Systems programs. Therefore we are adding CSC 312 as a required course for students in all three programs.

**Further Revisions Specific to the Computer Information Systems (CIS) major**

1) Add ECN 100 (Contemporary Economic Issues) as a required course. Students in the CIS major are required to complete 15 credits in an Information Systems Environment. The majority of our students complete the Business Administration environment. One of the required courses in that environment is BUS 325 (Principles of Finance). One of the pre-requisite courses for BUS 325 (for non-majors) is ECN 100. Making ECN 100 a required course for CIS majors will facilitate students’ ability to enroll in BUS 325. This requirement will not add to any student’s credit-load, since it will satisfy the S code for General Education.

2) Replace CIS 106 (End-User Computing) by CIS 116 (Introduction to Excel). The 3-credit course CIS 106 will be replaced by a 1-credit course CIS 116. CIS 106 currently provides an overview of office
productivity software (Word, PowerPoint, Excel, Access). Students are now entering Brockport with greater familiarity with these tools, and the department deems that a 1-credit course in Excel spreadsheets will be sufficient preparation for upper-level courses in the major.

3) Add CIS 309 (IT Hardware and Networking Lab) as a required 1-credit course. Data gathered from our assessment of SLOs, together with recommendations from the past ABET site visit, suggest that CIS students need more hands-on experience in computer hardware and networking. In 2014-15 the college invested about $20,000 to obtain new equipment to furnish a laboratory space for this purpose.

4) Remove the third required Math course. ABET curriculum guidelines indicate that requiring only the two Math courses MTH 243 (Elementary Statistics) and MTH 281 (Discrete Mathematics I) will be sufficient. Therefore, as the curriculum is already credit-heavy, the department has decided to eliminate the third required Math course.

5) Add CIS 472 (Enterprise Architecture and IS Strategy) as a required course. The ABET accreditation agency requires that all students be exposed to 15 credits in an Information Systems Environment. Brockport students have a choice of two environments: Business Administration and Healthcare Administration. The course CIS 472 will serve as a “capstone” course for this part of the major, and will be a natural place for the department to gather assessment data related to Student Learning Outcomes (SLOs) associated with this part of the major, as required by both ABET and the College at Brockport. This course will replace an existing course in these IS Environments, so it will not increase the credit count of the major.

**Further Revisions Specific to both of the Computer Science majors CSC-AC and CSC-SD**

1) Formally include MTH 201 (Calculus I) and MTH 281 (Discrete Math I) as required courses in the major. MTH 201 and MTH 281 are pre-requisites to many courses in the CSC major, but currently they are not formally listed as required. In other words, they are “hidden pre-requisites” in the program. The department wishes to make these two courses formally part of the major. Note that both MTH 201 and MTH 281 are 4-credit courses at Brockport. A transfer student who completed a 3-credit version of these courses would be deemed to have satisfied this requirement.

2) Remove the required course CSC 303 (Computer Systems Hardware and Software). Trends in the discipline indicate that less coverage of hardware-related issues is expected in Computer Science programs. This can be seen in both the 2013 ACM-IEEE “Computer Science Curricula 2013” guidelines, and also in the most recent versions of the ABET criteria. Some of the topics from CSC 303 will be moved into the revised Transfer Path course CSC 311 (Computer Organization and Architecture).

3) Remove the required hardware-related course CSC 411 (Computer Architecture). See rational above.

4) Add the course CSC 219 (Programming in C) as a required course. CSC 219 will be a 1-credit, lab-based course which gives students skills in a different programming language than is used in the main introductory course sequence CSC 120-203-205. These skills were formerly taught in CSC 311, but the content of CSC 311 will be revised due to the SUNY Transfer Path mandate.

5) Adding a requirement to complete, as part of the elective courses, one of:
Both of the above courses require the student to work as a member of a team developing a substantial software product (defined as a product that has multiple features and is implemented with several hundred lines of code or more) over a fairly long period (defined as around half a semester at least). This will provide all CSC students with an opportunity for at least one form of experiential learning (creative work), and enable them to include product development experience on their resumes. Given the nature of these courses, the department considers this a means for students to obtain a “capstone experience.” Furthermore, ABET has recently added a requirement that students must participate in developing a significant software project.

Further Revisions Specific to the Computer Science (Advanced Computing track) major

1) Require students to complete, as part of their chosen electives, two courses chosen from CSC 412 (Operating Systems), CSC 419 (Computer Networks) and CSC 422 (Database Systems). This requirement directly mirrors a recent addition to the ABET accreditation criteria.

2) Remove the required course MTH 346 (Probability and Statistics). ABET requires that all students take at least 15 credits of mathematics. The proposed required Math courses (MTH 201, 202, 281 and 481) will be sufficient to satisfy this requirement.

3) Reduce the Mathematics and Science requirements. The latest revision of the ABET accreditation curriculum has decreased its requirements for Mathematics and Science courses. As the CSC-AC major is already credit-heavy, we will reduce those requirements accordingly.

Further Revisions Specific to the Computer Science (Software Development track) major

1) Add CSC 427 (Software Systems Engineering) as a required course. This course, which focuses on practices that facilitate the development of very large software systems (millions of line of code), is arguably the most important of all the upper-division courses in the Computer Science major. Formerly this course was an elective, but it will now be required of all CSC-SD majors.

2) Raise the number of elective credits in the major. The proposed new credit-count for the Core and Elective courses will be 33+15 = 48, which will match the credit-count in the CSC-AC major. This ensure that the two tracks in the Computer Science majors are equally rigorous.

2. Staffing issues

The department anticipates that we will be able to offer the revised programs given our current faculty strength. Although some new courses are being added to the program (e.g., CSC 312, CIS 309), other courses are being removed (e.g., CSC 303, CSC 411). Some courses that will become required (e.g., CIS 117, CSC 356) are already being regularly taught, and have sufficient capacity to allow more students to enroll in those sections.
If enrollment in the programs rises, then more faculty may be required. The Department appreciates the steady commitment that the College has shown over many years to ensure that all of our programs are appropriately staffed. We have every confidence that this support will continue in the future.

3. **Academic Administration Commentary**

   The proposed changes are the result of extensive discussion in the department’s Curriculum Committee. It has the full support of the department. The author of this proposal is the Chair of the Computing Sciences Department, therefore no additional Chair’s letter is provided. A letter of support from Dean Maliekal of the School of Science and Mathematics is attached.

4. **Resources and Facilities**

   Existing facilities are sufficient for implementing the proposed changes.

5. **Letters of Support**

   The departments on campus that are impacted by this proposal are: Business Administration, Accounting, Economics and Finance, Healthcare Studies, Mathematics and Physics. Support letters from these departments are attached.
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<th>New Program</th>
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<td>(minus Math course)</td>
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<td>CSC 120 Introduction to Computer Science</td>
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<td>MTH 122 Pre-calculus (GenEd M)</td>
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<td>CIS 117 Introduction to Web Development</td>
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<td>CSC 203 Fundamentals of Comp Science I</td>
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<td>CSC 486 Junior/Senior Seminar</td>
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<td>CIS 202 Fundamentals of Info. Systems</td>
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<td>CIS 442 E-commerce Systems</td>
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<td><strong>Elective Courses</strong></td>
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<td>MTH 243 Elementary Statistics</td>
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## Computer Information Systems (CIS) Major

Meets Current General Education and IS Environment Requirements

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<td>CIS 206 IT Tools</td>
<td>General Education</td>
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<td>CSC203 Problem Solving with Objects</td>
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<td>CIS 303 Information Technology HW&amp;SW</td>
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Students may receive transfer and AP exam credits that meet some of the requirements. Students may also receive waivers from some prerequisites. Waivers do not imply allocation of credits.
# Computer Information Systems (CIS) Major

Meets Current General Education and IS Environment Requirements

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Students may receive transfer and AP exam credits that meet some of the requirements. Students may also receive waivers from some prerequisites. Waivers do not imply allocation of credits.
# Computer Information Systems (CIS) Major

## Study Plan for Transfer Student

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| TOTALS        | 23 | 23 | 7 | 15 | 33 | 19 |

## Computer Science (Advanced Computing Track)

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## Advanced Computing Track of the Computer Science Major

Meets General Education Requirements

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| | Fine Arts 1 (F) | | | | | | 3
| | MIH281 Discrete Mathematics I | | | | | | 4
| | CIS 117 Intro Web Dev | | | | | | 1
| | CSC203 Problem Solving with Objects | | | | | | 4
| **Fall Sophomore Year** (16 credits) | Foreign Language (FL) | | | | | | 3
| | NScience Lab 1 (L) | | | | | | 4
| | MIH201 Calculus I | | | | | | 4
| | CSC205 Fundamental Data Structures | | | | | | 4
| | CSC209 UNIX Tools | | | | | | 1
| **Spring Sophomore Year** (15 credits) | NScience Lab 2 (L) | | | | | | 4
| | MIH481 Discrete Mathematics II | | | | | | 3
| | CSC219 Programming in C | | | | | | 1
| | CSC311 Computer Org. and Architecture | | | | | | 4
| | Free Elective | | | | | | 3

**SUBTOTALS**: 15 0 11 8 20 7

Students may receive transfer and AP exam credits that meet some of the requirements. Students may also receive waivers from some prerequisites. Waivers do not imply allocation of credits.
The College at Brockport, State University of New York  
Department of Computing Sciences  
Advanced Computing Track of the Computer Science Major  
Meets General Education Requirements

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<tr>
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<td>Spring</td>
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|                          | SUBTOTALS               | 3        | 24       | 4        | 0        | 12       | 16   |
|                          | TOTALS                | 18       | 24       | 15       | 8        | 32       | 23   |

A course carrying multiple codes will satisfy several general education requirements. Students should take note of restrictions that apply to general education courses, science courses, mathematics courses, and CSC electives.
## Advanced Computing Track of the Computer Science Major

### Study Plan for Transfer Path Student

<table>
<thead>
<tr>
<th>Year Semester</th>
<th>Course (Dept., Number, Title)</th>
<th>Computer Science Fundamental</th>
<th>Computer Science Advanced</th>
<th>Mathematics</th>
<th>Science</th>
<th>General Education</th>
<th>Other</th>
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<tr>
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<td>C SC203 Problem Solving with Objects</td>
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<td>C SC205 Fundamental Data Structures</td>
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<td>C SC311 Computer Org. and Architecture</td>
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<td>Discrete Mathematics</td>
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<td>General Education</td>
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</table>

**Subtotals:** 12 0 8 0 30 10

Students may receive transfer and AP exam credits that meet some of the requirements. Students may also receive waivers from some prerequisites. Waivers do not imply allocation of credits.
## Advanced Computing Track of the Computer Science Major

### Study Plan for Transfer Path Student

<table>
<thead>
<tr>
<th>Year Semester</th>
<th>Course (Dept., Number, Title)</th>
<th>Category (credit hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall Junior Year (15 credits)</strong></td>
<td><strong>Computer Science Fundamental</strong></td>
<td><strong>Computer Science Advanced</strong></td>
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<tr>
<td></td>
<td>NScience Lab 1 (L)</td>
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<tr>
<td></td>
<td>MTH202 Calculus II</td>
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<td>MTH481 Discrete Mathematics II</td>
<td>3</td>
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<tr>
<td></td>
<td>CSC209 UNIX Tools</td>
<td>1</td>
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<tr>
<td></td>
<td>CSC312 Cybersecurity</td>
<td>3</td>
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<tr>
<td><strong>Spring Junior Year (14 credits)</strong></td>
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<td>CSC486 Junior/Senior Seminar (Y)</td>
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<tr>
<td></td>
<td>CSC219 Programming in C</td>
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</tr>
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<td></td>
<td>CSC406 Algorithms and Data Structures</td>
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</tr>
<tr>
<td></td>
<td>CSC483 Theory of Computation</td>
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<td></td>
<td>Free Elective</td>
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</tr>
<tr>
<td></td>
<td>CIS 117 Intro Web Dev</td>
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</tr>
<tr>
<td><strong>Fall Senior Year (16 credits)</strong></td>
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<td>NScience Lab 2</td>
<td>4</td>
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<td>CSC427 Software Systems Engineering</td>
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<td>CSC401 Prog. Languages</td>
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<td>CSC Elective 2</td>
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<tr>
<td><strong>Spring Senior Year (15 credits)</strong></td>
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<td>CSC356 Life in the Digital Age (IW)</td>
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<td>CSC Elective 3</td>
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<td><strong>TOTALS</strong></td>
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<td>21</td>
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</tbody>
</table>

A course carrying multiple codes will satisfy several general education requirements. Students should take note of restrictions that apply to general education courses, science courses, mathematics courses, and CSC electives.

### Computer Science (Software Development Track)
## Current Program

<table>
<thead>
<tr>
<th>General Education</th>
<th>Cr</th>
<th>New Program</th>
<th>Cr</th>
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<tbody>
<tr>
<td>(minus Math course)</td>
<td>35</td>
<td>(minus M, IWY course)</td>
<td>32</td>
</tr>
</tbody>
</table>

- APS, 1 ENL, 1 FL, 2 S, 2 H, 1 N, 1 L, 1 F, and 1 P: 32 Cr
- AIWY: 3 Cr

### Prerequisites

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>13</th>
<th>8</th>
</tr>
</thead>
</table>

- CSC 120 Introduction to Computer Science: 3 Cr
- MTH 122 Pre-calculus (GenEd M): 3 Cr
- MTH 201 Calculus I: 4 Cr
- MTH 281 Discrete Mathematics I: 3 Cr

### Core Courses

<table>
<thead>
<tr>
<th>Core Courses</th>
<th>28</th>
<th>33</th>
</tr>
</thead>
</table>

- CSC 117 Introduction to Web Development: 1 Cr
- CSC 203 Fundamentals of Computer Science I: 4 Cr
- CSC 206 Fundamentals of Computer Science II: 4 Cr
- CSC 209 UNIX Tools: 1 Cr
- CSC 219 Programming in C: 1 Cr
- CSC 303 Computer Systems HW & SW: 3 Cr
- CSC 311 Computer Organization & SW Interface: 4 Cr
- CSC 312 Cybersecurity: 3 Cr
- CSC 356 Life in the Digital Age (GenEd IWY): 3 Cr
- CSC 401 Programming Languages: 3 Cr
- CSC 406 Algorithms and Data Structures: 3 Cr
- CSC 411 Computer Architecture: 3 Cr
- CSC 427 Software Systems Engineering: 3 Cr
- CSC 486 Junior/Senior Seminar: 3 Cr

### Elective Courses

<table>
<thead>
<tr>
<th>Elective Courses</th>
<th>12</th>
<th>15</th>
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</thead>
</table>

- One course from the list: CSC 423, CSC 428, CSC 429: 3 Cr
- Four CSC courses numbered 400-489: 12 Cr

### Mathematics Co-requisites

<table>
<thead>
<tr>
<th>Mathematics Co-requisites</th>
<th>3</th>
<th>11</th>
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</thead>
</table>

- MTH 201 Calculus I: 4 Cr
- MTH 281 Discrete Mathematics I: 4 Cr
- MTH 481 Discrete Mathematics II: 3 Cr

### Free electives

<table>
<thead>
<tr>
<th>Free electives</th>
<th>29</th>
<th>21</th>
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</table>

| Total | 120 | 120 |

---

The College at Brockport, State University of New York  
Department of Computing Sciences

Software Development Track of the Computer Science Major
<table>
<thead>
<tr>
<th>Year</th>
<th>Semester</th>
<th>Course (Dept., Number, Title)</th>
<th>Category (credit hours)</th>
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<tr>
<td>Year</td>
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<td>Seminar</td>
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<tr>
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<td>ENL 112 College Composition</td>
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<td>Humanities 1 (H)</td>
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<td>MTH122 Pre-calculus (M)</td>
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<td></td>
<td>Programming</td>
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<tr>
<td>Spring</td>
<td>Freshman</td>
<td>Social Science 1 (S)</td>
<td>3</td>
</tr>
<tr>
<td>Year</td>
<td>(15 credits)</td>
<td>Fine Arts 1 (F)</td>
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<td></td>
<td></td>
<td>MTH281 Discrete Mathematics I</td>
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<td></td>
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<td>CSC203 Problem Solving</td>
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<tr>
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<td></td>
<td>with Objects</td>
<td></td>
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<tr>
<td>Fall</td>
<td>Sophomore</td>
<td>Foreign Language (FL)</td>
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<tr>
<td>Year</td>
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<td>MTH1201 Calculus I</td>
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<td></td>
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<td>CSC205 Fundamental Data</td>
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<td>Structures</td>
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<td>CSC209 UNIX Tools</td>
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<td>Sophomore</td>
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<tr>
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<td>CSC311 Computer Org. and</td>
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<td>Architecture</td>
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<td>SUBTOTALS</td>
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</table>

Students may receive transfer and AP exam credits that meet some of the requirements. Students may also receive waivers from some prerequisites. Waivers do not imply allocation of credits.
### Software Development Track of the Computer Science Major

Meets General Education Requirements

<table>
<thead>
<tr>
<th>Year Semester</th>
<th>Course (Dept., Number, Title)</th>
<th>Computer Science Fundamental</th>
<th>Computer Science Advanced</th>
<th>Mathematics</th>
<th>Science</th>
<th>General Education</th>
<th>Other</th>
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<tbody>
<tr>
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<td>CSC312 Cybersecurity</td>
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</tr>
<tr>
<td></td>
<td>Free Elective</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>Free Elective</td>
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<td></td>
</tr>
<tr>
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<td>CSC-401 Programming Languages</td>
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<td><strong>Spring Junior Year (15 credits)</strong></td>
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<td>CSC-486 Junior/Senior Seminar (Y)</td>
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<td></td>
<td>3</td>
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</tr>
</tbody>
</table>

**SUBTOTALS**

| Computer Science Fundamental | 2 |
| Computer Science Advanced | 25 |
| Mathematics | 0 |
| Science | 0 |
| General Education | 12 |
| Other | 21 |

**TOTALS**

| Computer Science Fundamental | 17 |
| Computer Science Advanced | 25 |
| Mathematics | 11 |
| Science | 7 |
| General Education | 32 |
| Other | 28 |

A course carrying multiple codes will satisfy several general education requirements. Students should take note of restrictions that apply to general education courses, science courses, mathematics courses, and CSC electives.
# Software Development Track of the Computer Science Major

## Study Plan for Transfer Path Student

<table>
<thead>
<tr>
<th>Year Semester</th>
<th>Course (Dept., Number, Title)</th>
<th>Category (credit hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Computer Science Fundamental</td>
<td></td>
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<tr>
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<td>Computer Science Advanced</td>
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</tr>
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<td></td>
<td>Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General Education</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CSC120 Introduction to Programming</td>
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</tr>
<tr>
<td></td>
<td>CSC203 Problem Solving with Objects</td>
<td>4</td>
</tr>
<tr>
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<td>CSC205 Fundamental Data Structures</td>
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</tr>
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<td></td>
<td>CSC311 Computer Org. and Architecture</td>
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</tr>
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<td></td>
<td>Calculus I</td>
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<td></td>
<td>Discrete Mathematics</td>
<td>4</td>
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<tr>
<td></td>
<td>General Education</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>6</td>
</tr>
</tbody>
</table>

**SUBTOTALS**

|               | 12 | 0  | 8  | 0  | 30 | 10 |

Students may receive transfer and AP exam credits that meet some of the requirements. Students may also receive waivers from some prerequisites. Waivers do not imply allocation of credits.
<table>
<thead>
<tr>
<th>Year Semester</th>
<th>Course (Dept., Number, Title)</th>
<th>Computer Science Fundamental</th>
<th>Computer Science Advanced</th>
<th>Mathematics</th>
<th>Science</th>
<th>General Education</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>CSC Elective 1</td>
<td></td>
<td>3</td>
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<td></td>
<td>Free Elective</td>
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<tr>
<td><strong>Junior</strong></td>
<td>MIT 481 Discrete Mathematics II</td>
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<td></td>
<td>CIS 117 Intro Web Dev</td>
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<td>CSC 209 UNIX Tools</td>
<td></td>
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<td>CSC 312 Cybersecurity</td>
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<tr>
<td><strong>Spring</strong></td>
<td>CSC 486 Junior/Senior Seminar (Y)</td>
<td>3</td>
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<td></td>
<td>CSC 406 Algorithms and Data Structures</td>
<td>3</td>
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<tr>
<td><strong>Junior</strong></td>
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<tr>
<td><strong>Year (16 credits)</strong></td>
<td>Free Elective</td>
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<td>Free Elective</td>
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<td></td>
<td>CSC 219 Programming in C</td>
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<td><strong>Fall</strong></td>
<td>Free Elective</td>
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<tr>
<td><strong>Senior Year (15 credits)</strong></td>
<td>CSC Elective 2</td>
<td></td>
<td>3</td>
<td></td>
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<tr>
<td></td>
<td>CSC 427 Software Systems Engineering</td>
<td>1</td>
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<td></td>
<td>CSC 401 Prog. Languages</td>
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<td></td>
<td>CSC Elective 3</td>
<td></td>
<td></td>
<td>3</td>
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<tr>
<td><strong>Spring</strong></td>
<td>CSC 356 Life in the Digital Age (IW)</td>
<td>3</td>
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<tr>
<td><strong>Senior Year (15 credits)</strong></td>
<td>Free Elective</td>
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<td>CSC Elective 4</td>
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<td>CSC Elective 5</td>
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<td>Free Elective</td>
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<td><strong>TOTALS</strong></td>
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<td>3</td>
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</table>

A course carrying multiple codes will satisfy several general education requirements. Students should take note of restrictions that apply to general education courses, science courses, mathematics courses, and CSC electives.

Date: 10 February 2017

Dr. Sharon Allen, President
The College Senate
Dear Dr. Allen,

I write this regarding the curriculum revision proposal the Department of Computing Sciences is submitting to the College Senate pertaining to the following undergraduate degree programs.

- Computer Information Systems (CIS)
- Computer Science - Advanced Computing track (CSC-AC)
- Computer Science - Software Development track (CSC-SD)

At the outset, the proposed revisions represent the department’s effort to ensure that its degree programs are: (i) up-to-date insofar as trends in the discipline are concerned, (ii) in line with the SUNY Transfer Path in Computer Science, and (iii) in compliance with the anticipated changes that ABET – the body that has accredited two of the degree programs – would soon announce vis-à-vis curriculum requirements. I congratulate and thank my colleagues for their efforts.

While I think that the proposed revisions would reduce the options students would have in selecting General Education Program (GEP) and elective courses, I understood from the department that the number of required credits envisioned in the revisions is not dissimilar to other accredited programs and that the General Education Working Group of the Senate encouraged the department to “better integrate GEP with student’s majors.” Accordingly, the Dean’s Office has no further objections to the proposed changes and is, therefore, supportive of the revisions.

Sincerely,
Jose Maliekal

Dean, School of Science and Mathematics
February 4, 2017

Dr. Joan Lucas
Department of Computing Sciences
The College at Brockport

Dear Dr. Lucas,

Thank you for sharing with me your proposed changes in the course requirements in your academic programs and the move to increase CSC120 from a 3-credit course to a 4-credit course.

The Mathematics Department discussed the ramifications of these changes for both of our departments at our departmental meeting last week. Of particular concern to us was the proposed increase in credit hours for CSC120, which is a required prerequisite for our majors. I am pleased to report that we voted unanimously to support all of the changes in your proposal.

Good luck with your proposal as it moves on to the College Senate.

Dr. Sanford Miller
SUNY Distinguished Professor of Mathematics
Interim Chair, Department of Mathematics
SUNY Brockport

From: Radford, Stanley
Sent: Wednesday, January 18, 2017 2:41 PM
To: Mitra, Sandeep
Subject: RE: CSC Department Proposed Curriculum changes: Request for Letter of Support
Dr. Mitra,

I write this in response to your request for a letter of support for the proposed changes to the Computing Sciences curriculum. While we think the reduction in the exposure of your students to the natural sciences is unfortunate, the Department of Physics does not object to the proposed changes.

I would also like to point out that CSC 203 is not a required course for Physics majors.

Stanley F. Radford, Ph. D.
Professor and Chairm
Department of Physics
SUNY College at Brockport
Brockport, NY 14420
585-395-5576
To: Faculty Senate Undergraduate Curriculum Committee  
From: Dr. Lerong He, Chair, Department of Business Administration  
Date: 1/10/17  

Re: Proposal for Revision of the Undergraduate CIS Major  

I am writing to strongly support the revision of the Computer Information System major in the Department of Computing Science as the chair of the Department of Business Administration in the School of Business Administration & Economics. Dr. Sandeep Mitra, the Chair of Computing Science has consulted with me over the past few months to develop this proposal. I believe the proposed revision will provide CIS students better learning opportunity and even speed up their time to graduation. It will also better meet the requirements of ABET and facilitate the SUNY Transfer Path. The proposed revision does not impose additional resource requirement on my department. Please feel free to contact me if you have additional questions.

Sincerely,

Lerong He
I have read your email and letter explaining your proposed curriculum changes. We recognize that only a very few of your majors choose to satisfy their requirement in Healthcare Administration by completing 3 courses: HCS 410, 412, & 413. We also understand that your proposed revisions would eliminate course HCS 413 from the requirements.

These proposed changes are acceptable to us, and we do not anticipate any problems as a result of them. We support your proposed changes, and understand that if accepted, these changes would be effective Fall, 2018.
1. **Discipline:** CIS  **Course No.** 116  (To be assigned by Registrar)
   
   **Official Title:** Introduction to Excel
   
   **Abbreviated course title (limit to 18 spaces):** Intro to Excel
   
   - [ ] New Course
   - [ ] Current Content Revised  [ ] Topics Course (if checked, complete item 2)
   - [ ] Title Change (Previous Title)
   - [ ] Number Change (Previous No.)
   - [ ] Inactivation of existing course (course will not be offered in the near future)
   - [ ] Topics Course (if checked, complete item 2)
   - [ ] Other (describe)

2. **TOPICS COURSE ONLY:**
   
   **Discipline**  **Number**
   
   A. **Generic Course Title:**
   
   B. **Topics Course Title:**
   
   C. **Topics Course offered:** Semester  Year

3. **Semester hours of credit assigned to course (invariable):** 3
   
   **Variable Credit Range:** to  semester hours
   
   Is this course repeatable for credit? (Yes/No)  No

4. **Grading** (Check any that apply):
   
   a. [ ] Letter Grade  [ ] Pass/Fail (S/U) Only  [ ] PR grade (In Progress)
   
   b. [ ] Course requires minimum grade of for General Education/major/minor/certification.

5. **Is this a Liberal Arts course?** (Yes/No)  Yes

6. **General Education Information:** (Complete only for General Education courses) *See last item.
   
   a. General Education Knowledge Area (choose one if applicable):  None
   
   b. Additional student learning outcomes: (check all that are currently approved)
      
      [ ] Contemporary Issues (I)  [ ] Scholarship on Women (W)
      
      [ ] Diversity (D)  [ ] Other World Civilizations (Non-Western) (O)

7. **Frequency** (Check only one)
   
   - [ ] Every Term
   - [ ] Every Other Year
   - [ ] Every Fall
   - [ ] Irregularly
   - [ ] Every Spring
   - [ ] By Special Arrangement
   - [ ] Every Summer

8. **Cross Listed Course**  **Discipline**  **Number**

   Submitted by: _________  Date: _____Jan 30, 2017_____

   Chairperson’s Approval: _________  Date: _____Jan 30, 2017_____

   Dean’s Approval:  Date: ___________________________
10. Corequisite: Discipline Number

11. Swing Course Number
Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

12. Relationship to Degrees/Programs: Required □ Elective □

13. For all courses, please attach the following information:
   a. Objectives
      • Develop specific competencies using spreadsheets, in particular using Microsoft Excel.
      • Prepare for upper-level courses in the Business and CIS disciplines that rely on use of MS Excel
   b. Outline of Course
      • Spreadsheet concepts and fundamentals, basic formulas, formatting results, cross worksheet formulas, relative and absolute addresses, named ranges in formulas (5 hours)
      • Excel IF statements, conditional formatting, sorting and filtering (5 hours)
      • Pivot tables. Lookup tables, other useful functions (countif, sumif, sumproducts, frequency) (5 hours)
      • Vlookup and Hlookup (4 hours)
      • Excel charts. Chart Wizard. Modifying Excel charts, importing charts into Word and PowerPoint. Paste as Picture, Paste as Object, Paste-link (6 hours)
      • In-class examinations (3 hours)
   c. Methods of Assessing Student Performance
      • In-class lab exercises
      • Final exam
   d. Materials required (Films, Readings, Etc..)
   e. Other Needs

14. Is this course required in the major/minor: Describe how this course applies to degree requirements:
   • this course is pre-requisite to the CIS major

15. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

16. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers…and similar phrases.”
Develops students’ acumen in a key end-user computing technology, Microsoft Excel, to a level that will allow students to utilize it successfully in the workplace and to meet the contemporary expectations of employers. Requires extensive lab work.

For General Education courses only, attach also:
Supplemental General Education Course Registration Form
Student Learning Outcomes Checklist (for specific codes requested).
1. **Discipline:** CIS  
   **Course No.** 202  
   (To be assigned by Registrar)

   **Official Title:** Fundamentals of Information Systems

   **Abbreviated course title (limit to 18 spaces):** Fund Of Info Sys

   - [ ] New Course
   - [ ] Current Content Revised
   - [ ] Topics Course (if checked, complete item 2)
   - [ ] Title Change (Previous Title)
   - [ ] Number Change (Previous No.)
   - [ ] Inactivation of existing course (course will not be offered in the near future)
   - [ ] Topics Course (if checked, complete item 2)
   - [ ] Other (describe) change in pre-requisite

5. **TOPICS COURSE ONLY:**  
   **Discipline**  
   **Number**

   **A. Generic Course Title:**

   **D. Topics Course Title:**

   **E. Topics Course offered:** Semester  Year

6. **Semester hours of credit assigned to course (invariable)** 3

   **Variable Credit Range**  to  semester hours

   Is this course repeatable for credit (Yes/No)  No

7. **Grading (Check any that apply):**
   - [ ] Letter Grade
   - [ ] Pass/Fail (S/U) Only
   - [ ] PR grade (In Progress)
   - [ ] Course requires minimum grade of for General Education/major/minor/certification.

17. **Is this a Liberal Arts course? (Yes/No)** Yes

18. **General Education Information:** (Complete only for General Education courses) *See last item.*
   - a. General Education Knowledge Area (choose one if applicable): None
   - b. Additional student learning outcomes: (check all that are currently approved)
     - [ ] Contemporary Issues (I)
     - [ ] Scholarship on Women (W)
     - [ ] Diversity (D)
     - [ ] Other World Civilizations (Non-Western) (O)

19. **Frequency (Check only one):**
   - [ ] Every Term
   - [ ] Every Other Year
   - [ ] Every Fall
   - [ ] Irregularly
   - [ ] Every Spring
   - [ ] By Special Arrangement
   - [ ] Every Summer

20. **Cross Listed Course**  
   **Discipline**  
   **Number**

   **Submitted by:**  
   **Date:** Jan 30, 2017

   **Chairperson’s Approval:**  
   **Date:** Jan 30, 2017

   **Dean’s Approval:**  
   **Date:**

21. **Prerequisites:**  
   **Discipline:** CIS  
   **Number** 116
22. Corequisite: Discipline Number

23. Swing Course Number Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

24. Relationship to Degrees/Programs: Required ☒ Elective ☐

25. For all courses, please attach the following information:
   a. Objectives
      • Explain the strategic role of information systems in organizations and how IS enhances competitive position; IS planning goals and processes; and the role of outsourcing
      • Explain information systems development and organizational process redesign
      • Discuss how general systems theory is applicable to the analysis and development of an information system; discuss and explain systems components and relationships
      • Explain the elements and functional relationships of major hardware, software, and communications elements of information systems consisting of single PCs, LANs, WANs, security issues, privacy and identity theft.
      • Use professional code of ethics to evaluate specific IS actions
      • Describe ethical and legal issues; discuss and explain ethical considerations of software usage, sales, distribution, operation and maintenance
      • Demonstrate the ability to research and explain concepts in an effective reporting manner
   
   b. Outline of Course
      • Underlying IS Concepts (2 hrs)
      • **IS Planning in an Organization. The Strategic Role of IS (2 hrs)**
      • Simon’s Organizational Model, IS at the strategic, tactical and operational levels (3 hrs)
      • **IS Application to Business Processes (2 hrs)**
      • **IS Personnel Functions — CIO, project manager, information analyst (2 hrs)**
      • Decision Theory, the Decision Process and Decision Making (2 hrs)
      • **IS in Control of Organizational Activity, Database Modeling (3 hrs)**
      • General Systems Theory in IS Development (3 hrs)
      • Transaction Processing Systems (TPS) (3 hrs)
      • Decision Support Systems (DSS) (2 hrs)
      • Executive Support Systems (ESS) (1 hr)
      • Enterprise Information Systems (EIS) (1 hrs)
      • Expert Systems (ES) (2 hrs)
      • Knowledge Management Systems (KMS) (2 hrs)
      • Work Flow Systems (2 hrs)
- Object-oriented Systems Analysis and Design, the Software Development Lifecycle (3 hrs)
- Hardware, Software, and Telecommunications Components (3 hrs)
- Measurement with CM and ISO9000 (1 hr)
- Personal and Organizational Ethics and Legal Issues (1 hr)
- In class exams (2 hrs)

c. Methods of Assessing Student Performance

- Homework assignments
- Short essay assignments
- Midterm exams
- Final exam

d. Materials required (Films, Readings, Etc.)


e. Other Needs

26. Is this course required in the major/minor: Describe how this course applies to degree requirements:
   required in the CIS major

27. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

28. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers...and similar phrases.”

Introduces the use of information systems and information technology in organizations. Considers concepts of information management, systems theory, quality, enhanced decision making, and added value in products and services. Stresses information technology, including computing and telecommunications systems. Teaches students to analyze requirements, define an information system, and develop custom solutions to enhance productivity

For General Education courses only, attach also:

Supplemental General Education Course Registration Form
Student Learning Outcomes Checklist (for specific codes requested).
The College at Brockport
Course Registration Form

1. **Discipline**: CIS  **Course No.**: 206  (To be assigned by Registrar)
   
   **Official Title**: IT Tools
   
   **Abbreviated course title (limit to 18 spaces)**: IT Tools

   - [ ] New Course
   - [ ] Current Content Revised  [ ] Topics Course (if checked, complete item 2)
   - [ ] Title Change (Previous Title)
   - [ ] Number Change (Previous No.)
   - [ ] Inactivation of existing course (course will not be offered in the near future)
   - [ ] Topics Course (if checked, complete item 2)
   - [ ] Other (describe) change in pre-requisite

8. **TOPICS COURSE ONLY**:  Discipline  Number
   
   **A. Generic Course Title**:
   
   **F. Topics Course Title**:
   
   **G. Topics Course offered**: Semester  Year

9. **Semester hours of credit assigned to course (invariable)**: 1

   **Variable Credit Range**: to  semester hours

   Is this course repeatable for credit (Yes/No): No

10. **Grading** (Check any that apply):

    a. [ ] Letter Grade  [ ] Pass/Fail (S/U) Only  [ ] PR grade (In Progress)
    
    b. [ ] Course requires minimum grade of for General Education/major/minor/certification.

29. Is this a Liberal Arts course? (Yes/No): Yes

30. **General Education Information**: (Complete only for General Education courses) *See last item.*

    a. General Education Knowledge Area (choose one if applicable): None
    
    b. Additional student learning outcomes: (check all that are currently approved)
    
    - [ ] Contemporary Issues (I)
    - [ ] Scholarship on Women (W)
    - [ ] Diversity (D)
    - [ ] Other World Civilizations (Non-Western) (O)

31. **Frequency** (Check only one)

    - [ ] Every Term
    - [ ] Every Other Year
    
    - [ ] Every Fall
    - [ ] Irregularly
    
    - [ ] Every Spring
    - [ ] By Special Arrangement
    
    - [ ] Every Summer

32. **Cross Listed Course**  Discipline  Number

   Submitted by: ___________________________  Date: ___Jan 30, 2017______

Chairperson’s Approval: ___________________________  Date: ___Jan 30, 2017______

Dean’s Approval: ___________________________  Date: ______________________

33. **Prerequisites**: Discipline  CIS  Number 116
34. Corequisite: Discipline Number

35. Swing Course Number
   Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)
   
   Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

36. Relationship to Degrees/Programs: Required ☒ Elective ☐

37. For all courses, please attach the following information:
   
a. Objectives
   
   • Develop skills in designing effective documents and develop intermediate level competency in the use of Microsoft Word
   • Develop skills in designing effective charts and develop intermediate level competency in the use of Microsoft Excel
   • Develop intermediate level competency in the use of Microsoft Access
   • Develop skills in designing effective presentations and develop intermediate level competency in the use of Microsoft PowerPoint
   • Develop skills in the use of the Internet as an information resource (search engines)
   • Develop problem solving and help-desk skills in the use of office productivity tools

   b. Outline of Course
   
   • Microsoft Word: Desktop Publishing, Creating a Newsletter, Inserting and Manipulating Graphical Objects, Object Linking and Embedding, Document Templates, Multiple Documents; Forms, Macros, Document Protection and Authentication, HTML, Web Pages, XML (4 hours)
   • Microsoft Excel: Outlines and Subtotals, Pivot Tables, Pivot Charts, Data Tables; What-if Analysis, Goal Seek and Scenario Manager, LP Solver, Math and Statistical Functions, Logical and Lookup Functions; Database Filtering and Functions, Financial Functions, Multiple Worksheets, Linked Workbooks, Formula Audits and Data Validation (6 hours)
   • Microsoft Access: Pivot Tables, Pivot Charts, Data Validation in Tables and Forms, Data Validation with Queries and Reports; Action Queries, Queries for Special Conditions, Normalizing Database Tables, Safeguarding Database Applications; Using Macros and Structured Query Language (6 hours)
   • Microsoft PowerPoint: Text-based Charts, Table Design, Statistical Charts, Hyperlinks and Action Buttons, Animation; Slide Master, Slideshow, Sharing, Presentation Security (4 hours)
   • In-lab hands-on examinations (8 hours)

   c. Methods of Assessing Student Performance
   
   • In-class lab exercises
   • Final exam

   d. Materials required (Films, Readings, Etc..)
   
e. Other Needs

38. Is this course required in the major/minor? Describe how this course applies to degree requirements:
   Required in the CIS major

39. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

40. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers...and similar phrases.

   Develops intermediate level proficiency in key office productivity and information technology tools. Includes these topics: operating systems, graphical user interfaces, word processing, desktop publishing, grammar and style checkers, office presentations, multimedia documents, spreadsheets and advanced applications, business charts, Internet and intranet, e-mail, World Wide Web, search engines, and Web publishing. Requires extensive hands-on laboratory exercises.

For General Education courses only, attach also:
Supplemental General Education Course Registration Form
Student Learning Outcomes Checklist (for specific codes requested).
The College at Brockport
Course Registration Form

1. **Discipline:** CIS  **Course No.** 309  (To be assigned by Registrar)
   **Official Title:** IT Hardware and Networking Lab
   **Abbreviated course title (limit to 18 spaces):** IT HW&Netwrk Lab
   - [X] New Course
   - [ ] Current Content Revised  [ ] Topics Course (if checked, complete item 2)
   - [ ] Title Change (Previous Title)
   - [ ] Number Change (Previous No.)
   - [ ] Inactivation of existing course (course will not be offered in the near future)
   - [ ] Topics Course (if checked, complete item 2)
   - [ ] Other (describe)

11. **TOPICS COURSE ONLY:**  
    **Discipline**  
    **Number**  
    A. **Generic Course Title:**  
    H. **Topics Course Title:**
    I. **Topics Course offered:** Semester  Year  

12. **Semester hours of credit assigned to course (invariable):** 1  
    **Variable Credit Range** to semester hours  
    [ ] Is this course repeatable for credit (Yes/No) No

13. **Grading (Check any that apply):**  
    a. [X] Letter Grade  [ ] Pass/Fail (S/U) Only  [ ] PR grade (In Progress)
    b. [ ] Course requires minimum grade of for General Education/major/minor/certification.

41. **Is this a Liberal Arts course?** (Yes/No) Yes

42. **General Education Information:** (Complete only for General Education courses) *See last item.*  
    a. **General Education Knowledge Area** (choose one if applicable):  
       [ ] None  
    b. **Additional student learning outcomes:** (check all that are currently approved)  
       [ ] Contemporary Issues (I)  [ ] Scholarship on Women (W)  
       [ ] Diversity (D)  [ ] Other World Civilizations (Non-Western) (O)

43. **Frequency (Check only one):**  
    [ ] Every Term  [ ] Every Other Year  
    [X] Every Fall  [ ] Irregularly  
    [ ] Every Spring  [ ] By Special Arrangement  
    [ ] Every Summer

44. **Cross Listed Course**  
    **Discipline**  
    **Number**  

    **Submitted by:** ________________________________  
    **Date:** Jan 30, 2017

    **Chairperson’s Approval:** ________________________________  
    **Date:** Jan 30, 2017

    **Dean’s Approval:** ________________________________  
    **Date:** ________________________________

45. **Prerequisites:**  
    **Discipline** CIS  **Number** 303  **EITHER** 303 OR 311 is required  
    **Discipline** CSC  **Number** 311

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19_16-17UC Revision of the Computer Information Systems and Computer Science majors.docx
46. Corequisite: Discipline Number

47. Swing Course Number Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

48. Relationship to Degrees/Programs: Required ☑ Elective ☐

49. For all courses, please attach the following information:

a. Objectives
   - Students will understand power supply and CMOS Setup, Hardware and OS Installation, Memory, CMOS, Secondary storage, External Interfaces, Networking topics

b. Outline of Course
   - Overview and Safety (2hr)
   - Power Supply and CMOS Setup (2hr)
   - Hardware and OS Installation (2hr)
   - Memory, CMOS (2hr)
   - Secondary storage (2hr)
   - External Interfaces (2hr)
   - Networking topics (16hr)

c. Methods of Assessing Student Performance
   - Hands-on in lab exercises
   - Final exam

d. Materials required (Films, Readings, Etc.)

e. Other Needs

50. Is this course required in the major/minor: Describe how this course applies to degree requirements:
   - Required in the CIS major

51. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided
   - Will be schedule in the Department’s dedicated hardware lab

52. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers...and similar phrases.

   This laboratory course provides an introduction to computer hardware technology, operating systems, networking. The student will learn how components work together in a computer and network, how to take measurements, master industry-standard operating systems, and learn basic system and network troubleshooting. The student will gain experience solving real hardware, networking and software
For General Education courses only, attach also:
Supplemental General Education Course Registration Form
Student Learning Outcomes Checklist (for specific codes requested).
1. Discipline: CIS  Course No. 421  (To be assigned by Registrar)
   Official Title: Computer and Network Security
   Abbreviated course title (limit to 18 spaces) Cmptr & Net Sec
   □ New Course
   □ Current Content Revised  □ Topics Course (if checked, complete item 2)
   □ Title Change (Previous Title)
   □ Number Change (Previous No.)
   □ Inactivation of existing course (course will not be offered in the near future)
   □ Topics Course (if checked, complete item 2)
   □ Other (describe) change in pre-requisites

14. TOPICS COURSE ONLY:  Discipline Number
   A. Generic Course Title:
   J. Topics Course Title:
   K. Topics Course offered: Semester Year

15. Semester hours of credit assigned to course(invariable) 3
   Variable Credit Range to semester hours
   Is this course repeatable for credit (Yes/No) No

16. Grading (Check any that apply):
   a.  □ Letter Grade  □ Pass/Fail (S/U) Only  □ PR grade (In Progress)
   b.  □ Course requires minimum grade of for General Education/major/minor/certification.

53. Is this a Liberal Arts course? (Yes/No) Yes

54. General Education Information: (Complete only for General Education courses) *See last item.
   a. General Education Knowledge Area (choose one if applicable):  None
   b. Additional student learning outcomes: (check all that are currently approved)
      □ Contemporary Issues (I)  □ Scholarship on Women (W)
      □ Diversity (D)  □ Other World Civilizations (Non-Western) (O)

55. Frequency (Check only one)
   □ Every Term  □ Every Other Year
   □ Every Fall  □ Irregularly
   □ Every Spring  □ By Special Arrangement
   □ Every Summer

56. Cross Listed Course  Discipline  Number
   Submitted by:__________________________ Date: __Jan 30, 2017________

Chairperson's Approval: ______________________ Date: __Jan 30, 2017________

Dean's Approval: ___________________________ Date: ______________________

57. Prerequisites: Discipline  CIS  Number 419
    Discipline  CSC  Number 312
58. Corequisite: Discipline Number

59. Swing Course Number Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

60. Relationship to Degrees/Programs: Required ☐ Elective ☑

61. For all courses, please attach the following information:
   a. Objectives
      - Understand the meaning of computers and information security and the terms Threats, Vulnerabilities and Controls
      - Understand the various operating system features that are provided to maintain a secure multi-user multiprogramming environment – in particular the students should understand in detail how UNIX and Windows provide security
      - Understand the essential of computer networking and why a networked environment makes attacks more feasible and dangerous
      - Understand the various attacks that can be launched on a network of computers and the various security features that have been developed in software and protocols to protect networked computing
      - Understand the principles of cryptography – public and private key cryptography, digital signatures and certificates
      - Understand the various social and ethical issues involved in information and computer security, and what laws are in place for the same
   
   b. Outline of Course
      - Operating System and Software Security. Single programming, multi programming environments, concurrency, process, user and system modes and privileges, Memory and address protection, Access control to objects, User authentication – use of passwords, attacks on passwords, password
      - UNIX and Windows OS Security. Adding, removing users and groups, and changing access for users and groups on a UNIX and Windows system, editing password and shadow files, creating security logs and audits, password policies
      - Network security controls – segmentation, redundancy, encryption, virtual private networks (VPN), secure shell, IP security, secure socket and transport layer security, Firewalls and virus scanners
- Cryptography. History of cryptography and cryptography principles. Public and private key systems, use of public keys to exchange private keys, Kerberos based key exchange. Use of hash functions in cryptography, digital signatures using public and private keys and hash, certificates and certificate authorities, public key infrastructure (PKI)
- Legal, Privacy and Ethical Issues. Protecting programs and data – copyrights, patents. Rights of employees and employers, Computer crime, information and legal issues

c. Methods of Assessing Student Performance
- Out-of-class assignments and Labs
- Midterms and final examination
- Presentation and term paper

d. Materials required (Films, Readings, Etc..)
T.B.D

e. Other Needs
62. Is this course required in the major/minor: Describe how this course applies to degree requirements:
   Elective in the CIS major
63. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

64. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers... and similar phrases.

   Studies concepts, techniques, and tools in computer and network security. Includes these topics: security, privacy, information assurance, threats, user authentication and access control; UNIX and Windows examples; logs and intrusion detection; cryptography, public-key and private-key systems, Kerberos, IP security, firewalls, Web and database access control and security issues; ethical issues. Includes hands-on experience with security hardware and software.

For General Education courses only, attach also:
Supplemental General Education Course Registration Form
Student Learning Outcomes Checklist (for specific codes requested)
The College at Brockport
Course Registration Form

1. Discipline: CIS Course No. 442 (To be assigned by Registrar)
   Official Title: E-commerce Systems
   Abbreviated course title (limit to 18 spaces) E-Commerce Systems
   ☐ New Course
   ☐ Current Content Revised ☐ Topics Course (if checked, complete item 2)
   ☐ Title Change (Previous Title)
   ☐ Number Change (Previous No.)
   ☐ Inactivation of existing course (course will not be offered in the near future)
   ☐ Topics Course (if checked, complete item 2)
   ☑ Other (describe) pre-requisite change

17. TOPICS COURSE ONLY: Discipline Number
   A. Generic Course Title:
   L. Topics Course Title:
   M. Topics Course offered: Semester Year

18. Semester hours of credit assigned to course (invariable) 3
   Variable Credit Range to semester hours
   Is this course repeatable for credit (Yes/No) No

19. Grading (Check any that apply):
   a. ☑ Letter Grade ☐ Pass/Fail (S/U) Only ☐ PR grade (In Progress)
   b. ☐ Course requires minimum grade of for General Education/major/minor/certification.

65. Is this a Liberal Arts course? (Yes/No) Yes

66. General Education Information: (Complete only for General Education courses) *See last item.
   a. General Education Knowledge Area (choose one if applicable): None
   b. Additional student learning outcomes: (check all that are currently approved)
      ☐ Contemporary Issues (I) ☐ Scholarship on Women (W)
      ☐ Diversity (D) ☐ Other World Civilizations (Non-Western) (O)

67. Frequency (Check only one)
   ☑ Every Term ☐ Every Other Year
   ☑ Every Fall ☐ Irregularly
   ☐ Every Spring ☐ By Special Arrangement
   ☐ Every Summer

68. Cross Listed Course Discipline Number

Submitted by: ___________________________ Date: Jan 30, 2017

Chairperson’s Approval: ___________________________ Date: Jan 30, 2017

Dean’s Approval: ___________________________ Date: ___________________________

69. Prerequisites: Discipline CIS Number 117
    Discipline CIS Number 422
Discipline: CSC  Number: 209

70. Corequisite: Discipline  Number

71. Swing Course Number: Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

72. Relationship to Degrees/Programs: Required [ ] Elective [ ]

73. For all courses, please attach the following information:

a. Objectives
   • Understand electronic commerce concepts and organizational models.
   • Apply electronic commerce practices by producing and presenting an e-business plan
   • Apply electronic commerce practices by designing and implementing a web site for an online creative venture.
   • Demonstrate competency in Web-based markup and programming languages such as XHTML, XML, JavaScript, PHP, and PERL
   • Obtain a thorough understanding of the infrastructure and application technologies that comprise the building blocks of e-commerce.
   • Obtain an understanding of appropriate encryption technologies for securing e-commerce applications.
   • Demonstrate an understanding of legal issues, copyright, intellectual property, and software piracy

b. Outline of Course
   • Introduction to Electronic Commerce (2 hrs)
   • Developing E-business/Technology Plan (6 hrs)
   • Technology Infrastructure for Ecommerce (12 hrs)
   • Electronic Payment Systems (2 hrs)
   • Security and Encryption (3 hrs)
   • Electronic Markets (2 hrs)
   • B2B Ecommerce: Eprocurement, Supply Networks (2 hrs)
   • Customer Relationship Management (2 hrs)
   • Portals and Auctions (2 hrs)
   • Virtual Communities (1 hr)
   • Collaborative Commerce and Electronic Collaboration (1 hr)
   • Ethical, Social, and Political issues in Ecommerce (2 hrs)
   • Ecommerce Future Directions (2 hrs)
   • In class exams (3 hrs)

c. Methods of Assessing Student Performance
   • Homework assignments
   • Programming assignments
d. Materials required (Films, Readings, Etc.)

e. Other Needs

74. Is this course required in the major/minor: Describe how this course applies to degree requirements:
   Required in the CIS major

75. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

76. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers…” and similar phrases.

Covers defining tools of e-business, to understand the manner in which users, tools, needs and opportunities interact. Includes these topics: the infrastructure of e-commerce, e-commerce Web site design and implementation, social, political and ethical issues associated with e-commerce, and business plans for technology ventures. Real world applications and cases are studied to introduce concepts related to the analysis, design, implementation and maintenance of e-commerce systems.

For General Education courses only, attach also:
Supplemental General Education Course Registration Form
Student Learning Outcomes Checklist (for specific codes requested).
1. **Discipline:** CIS  **Course No. 472** (To be assigned by Registrar)
   
   **Official Title:** Enterprise Architecture and IS Strategy
   
   Abbreviated course title (limit to 18 spaces) Enterprise Arch

   - [ ] New Course
   - [ ] Current Content Revised  [ ] Topics Course (if checked, complete item 2)
   - [ ] Title Change (Previous Title)
   - [ ] Number Change (Previous No.)
   - [ ] Inactivation of existing course (course will not be offered in the near future)
   - [ ] Topics Course (if checked, complete item 2)
   - [ ] Other (describe) change in pre-requisites, and required in CIS major

20. **TOPICS COURSE ONLY:**
   
   - **Discipline**
   - **Number**

   A. **Generic Course Title:**
   
   N. **Topics Course Title:**
   
   O. **Topics Course offered:** Semester  Year

21. **Semester hours of credit assigned to course (invariable) 3**

   Variable Credit Range  to  semester hours

   Is this course repeatable for credit (Yes/No) **No**

22. **Grading** (Check any that apply):

   a. [ ] Letter Grade  [ ] Pass/Fail (S/U) Only  [ ] PR grade (In Progress)
   
   b. [ ] Course requires minimum grade of for General Education/major/minor/certification.

77. **Is this a Liberal Arts course?** (Yes/No) **Yes**

78. **General Education Information:** (Complete only for General Education courses) *See last item.*

   a. **General Education Knowledge Area** (choose one if applicable):  **None**
   
   b. **Additional student learning outcomes:** (check all that are currently approved)

      - [ ] Contemporary Issues (I)
      - [ ] Diversity (D)
      - [ ] Other World Civilizations (Non-Western) (O)

79. **Frequency** (Check only one)

   - [ ] Every Term  [ ] Every Other Year
   
   - [ ] Every Fall  [ ] Irregularly
   
   - [ ] Every Spring  [ ] By Special Arrangement
   
   - [ ] Every Summer

80. **Cross Listed Course**  

   **Discipline**  

   **Number**

   Submitted by:  

   Date: **Jan 30, 2017**

   Chairperson’s Approval:  

   Date: **Jan 30, 2017**

   Dean’s Approval:  

   Date: **Jan 30, 2017**

81. **Prerequisites:**

   **Discipline**  **CIS**  **Number** 317

   **Discipline**  **CIS**  **Number** 419
82. Corequisite: Discipline IS Number 422
    Discipline IS Number 427

83. Swing Course Number Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

84. Relationship to Degrees/Programs: Required ☒ Elective ☐

85. For all courses, please attach the following information:
   a. Objectives
      - Students will learn a variety of frameworks for enterprise architecture analysis and decision making.
      - Students will learn techniques for assessing and managing risk across the portfolio of the enterprise.
      - Students will learn to evaluate and plan for the integration of emerging technologies.
      - Students will learn how to administer systems, including the use of virtualization and monitoring, power and cooling issues.
      - Students will learn how to manage proliferating types and volume of content.
      - Students will learn to plan for business continuity.
      - Students will learn the benefits and risks of service oriented architecture.
      - Students will learn the role of audit and compliance in enterprise architecture.
   
   b. Outline of Course
      - Enterprise Engineering and Design Theory: Establish the foundation for enterprise engineering, history of enterprise engineering, describes the knowledge required to do enterprise engineering, classification of enterprises, types of enterprise engineering projects, systems theory to understand, analysis, and design enterprises (6 hours)
      - Modeling Concepts and Design: Model features, viewpoints, languages and processes, model verification and validation and reuse, design theory and methodologies, enterprise architecture frameworks, developing an enterprise architecture, cross life-cycle activities (9 hours)
      - Enterprise Projects: Initiating an enterprise project, strategy theory and formulation, using strategy to guide enterprise design (3 hours)
      - Problem Formulation and Alternatives: Data gathering, issue and problem analysis and formulation, requirements engineering, definition, statements, documentation and best practices, alternative generation and evaluation, methodologies to generate alternatives, alternative documentation and evaluation, best alternative selection (6 hours)
      - Process View: How-to model processes, process definition, decomposition and classification, queueing theory, systems, performance, networks and costs, waiting, using service time variation and capacity utilization to analyze and design processes (6 hours)
      - Information View: modeling the information structure of an enterprise, the three-schema architecture, Standardization and semantics, design methodologies (3 hours)
      - Organization View: Organizational theory and structure approaches to organizational design, decision processes, job design, reward systems, organizational people and culture (3 hours)
- View Integration: The integration of the process, information, and organizational views, integration challenges, systems architecture, enterprise integration levels, infrastructure, information, application, process, organization, standardization, data and application integration technologies, data and process integration, interface analysis, human system interaction, testing (6 hours)

c. Methods of Assessing Student Performance
- Homework assignments
- Research paper
- Midterm exam
- Final exam

d. Materials required (Films, Readings, Etc..)

e. Other Needs

86. Is this course required in the major/minor: Describe how this course applies to degree requirements:
   Required in the CIS major

87. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

88. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers...and similar phrases.

Covers strategies for infrastructure management, system administration, content management, distributed computing, middleware, legacy system integration, system consolidation, software selection, IT investment analysis, and emerging technologies. Students will be able to hone their ability to communicate technology architecture strategies concisely to a general organizational audience.

For General Education courses only, attach also:
Supplemental General Education Course Registration Form
Student Learning Outcomes Checklist (for specific codes requested).
1. Discipline: CSC Course No.120 (To be assigned by Registrar)
   Official Title: Introduction to Programming
   Abbreviated course title (limit to 18 spaces) Intro Programming
   □ New Course
   ✔ Current Content Revised □ Topics Course (if checked, complete item 2)
   □ Title Change (Previous Title) Introduction to Computer Science
   □ Number Change (Previous No.)
   □ Inactivation of existing course (course will not be offered in the near future)
   □ Topics Course (if checked, complete item 2)
   □ Other (describe) change in credits from 3 to 4

23. TOPICS COURSE ONLY: Discipline Number
   A. Generic Course Title:
   P. Topics Course Title:
   Q. Topics Course offered: Semester Year

24. Semester hours of credit assigned to course (invariable) 4
    Variable Credit Range to semester hours
    Is this course repeatable for credit (Yes/No) No

25. Grading (Check any that apply):
    a. □ Letter Grade □ Pass/Fail (S/U) Only □ PR grade (In Progress)
    b. □ Course requires minimum grade of for General Education/major/minor/certification.

89. Is this a Liberal Arts course? (Yes/No) Yes

90. General Education Information: (Complete only for General Education courses) *See last item.
    a. General Education Knowledge Area (choose one if applicable): None
    b. Additional student learning outcomes: (check all that are currently approved)
       □ Contemporary Issues (I) □ Scholarship on Women (W)
       □ Diversity (D) □ Other World Civilizations (Non-Western) (O)

91. Frequency (Check only one)
    ☒ Every Term □ Every Other Year
    □ Every Fall □ Irregularly
    □ Every Spring □ By Special Arrangement
    □ Every Summer

92. Cross Listed Course Discipline Number

Submitted by: ______________________________ Date: Jan 30, 2017

Chairperson’s Approval: ______________________________ Date: Jan 30, 2017

Dean’s Approval: ______________________________ Date:

93. Prerequisites: Discipline MTH Number 111
Discipline Number

94. Corequisite: Discipline Number

95. Swing Course Number Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

96. Relationship to Degrees/Programs: Required □ Elective □

97. For all courses, please attach the following information:
   a. Objectives
      • Recognize hardware and software components of a digital computer
      • Represent positive and negative integers in binary; represent character information
      • Use BlueJ (or a similar IDE) to create, compile, debug and execute Java programs
      • Understand the difference between object-oriented, procedural and functional programming methodologies
      • Understand the phases of program translation – compiling, interpreting, executing, and the error conditions associated with each phase
      • Trace the functioning of simple algorithms; understand the need to generate proper test data to trace multiple paths through algorithms
      • Design simple algorithms and encode them, compile, debug, execute and test Java programs involving assignments, if-statements, loops, methods, and simple I/O
      • Understand secure coding techniques such as criteria for selection of a specific type and input data validation
      • Understand ethical, social and legal issues in computing.
   b. Outline of Course
      • Computer hardware and software (3 hours)
      • Algorithms, their properties, designing, tracing and analyzing (4 hours)
      • Memory representation, two’s complement notation, ASCII code (2 hours)
      • Introduction to programming languages, compilers, interpreters (4 hours)
      • Components of a Java program, Java style conventions (2 hours)
      • Introduction to Java data types, expressions and statements (5 hours)
      • Selection statements (4 hours)
      • Loops (4 hours)
      • Java input and output (2 hours)
      • Introduction to Java classes (Math and String), methods and parameters (5 hours)
      • Secure coding techniques (2 hours)
      • Social, ethical and legal issues in computing (2 hour)
      • In-class examinations (3 hours)
   c. Methods of Assessing Student Performance
      • Homework and programming assignments
      • Midterm exams
      • Final exam
d. Materials required (Films, Readings, Etc.)


e. Other Needs

98. Is this course required in the major/minor? Describe how this course applies to degree requirements:
This course is pre-requisite to required courses in the CIS and CSC majors.

99. If this course requires any special scheduling arrangements with regard to time or room-space, please explain in the space provided

100. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers…” and similar phrases.

Covers fundamentals of computer problem solving and programming. Includes these topics: computer hardware and software, data representation, program development process, comparison of object-oriented, structured and functional programming methodologies, program translation phases, Java programming (data types, variables, expressions, assignment, selection, iteration, methods, parameter passing and I/O), simple algorithms, secure coding techniques, and ethical, legal and social issues of computing. Requires extensive programming and supervised laboratory sessions.

For General Education courses only, attach also:
Supplemental General Education Course Registration Form
Student Learning Outcomes Checklist (for specific codes requested).
The College at Brockport
Course Registration Form

1. Discipline: CSC Course No.203 (To be assigned by Registrar)
   Official Title: Problem Solving with Objects
   Abbreviated course title (limit to 18 spaces) Prob Solving O bjts
   □ New Course
   □ Current Content Revised □ Topics Course (if checked, complete item 2)
   □ Title Change (Previous Title) Fundamentals of CS I
   □ Number Change (Previous No.)
   □ Inactivation of existing course (course will not be offered in the near future)
   □ Topics Course (if checked, complete item 2)
   □ Other (describe)

26. TOPICS COURSE ONLY: Discipline Number
   A. Generic Course Title:
   R. Topics Course Title:
   S. Topics Course offered: Semester Year

27. Semester hours of credit assigned to course (invariable) 4
   Variable Credit Range  to  semester hours
   Is this course repeatable for credit (Yes/No) No

28. Grading (Check any that apply):
   a. □ Letter Grade □ Pass/Fail (S/U) Only □ PR grade (In Progress)
   b. □ Course requires minimum grade of for General Education/major/minor/certification.

101. Is this a Liberal Arts course? (Yes/No) Yes

102. General Education Information: (Complete only for General Education courses) *See last item.
   a. General Education Knowledge Area (choose one if applicable): None
   b. Additional student learning outcomes: (check all that are currently approved)
      □ Contemporary Issues (I) □ Scholarship on Women (W)
      □ Diversity (D) □ Other World Civilizations (Non-Western) (O)

103. Frequency (Check only one)
   □ Every Term □ Every Other Year
   □ Every Fall □ Irregularly
   □ Every Spring □ By Special Arrangement
   □ Every Summer

104. Cross Listed Course Discipline Number

Submitted by: ________________________________ Date: Jan 30, 2017

Chairperson’s Approval: __________________________ Date: Jan 30, 2017

Dean’s Approval: ________________________________ Date: ________________

105. Prerequisites: Discipline CSC Number 120
106. Corequisite: Discipline Number

107. Swing Course Number Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

108. Relationship to Degrees/Programs: Required ☒ Elective ☐

109. For all courses, please attach the following information:

a. Objectives
   - Design solutions to simple programming problems in a systematic way: make lists of variables and constants, design top-level algorithm, use step-wise refinement to produce detailed algorithms, translate algorithms into Java code.
   - Develop systematic test cases for simple Java programs and test them.
   - Use decision and repetition control structures, methods and recursion as appropriate in programs.
   - Design and implement classes containing constructors and other methods; understand parameter passing of primitives and objects.
   - Write programs involving inheritance and polymorphism.
   - Write simple programs involving arrays and graphical user interfaces.
   - Write well-documented programs that have more than one class, follow Java documentation standards.
   - Use common built-in classes and their methods, such as String, and ArrayList.
   - Write collection processing programs (e.g., linear and binary search, sort, selection programs) involving arrays of primitive types, and arrays of objects; analyze simple algorithms: $O(n)$, $O(\log n)$, $O(n^2)$.
   - Understand copyright and software piracy issues

b. Outline of Course
   - Review of basic components of a Java program (nature of identifiers, naming conventions, primitive data types, reference data types, expressions, selection and loops) (2 hours)
   - Arrays (3 hours)
   - Concepts of classes and objects – defining a class, its constructor, instance variables and method signatures (3 hours)
   - Passing parameters to methods, both primitive types and objects (including arrays) (4 hours)
   - Recursive algorithms and methods (4 hours)
   - Exception handling in Java (2 hours)
   - Developing algorithms with Collections and coding them (e.g., using array, Vector, ArrayList, search and traversal programs) (6 hours)
   - Develop algorithms with multi-dimensional arrays (2 hours)
   - Introduction to search and sort algorithms (2 hours)
   - File input and output in Java (2 hours)
   - Programming simple GUIs with event handling (3 hours)
   - Inheritance and its use in programs with Java abstract classes and interfaces (6 hours)
• Societal impacts related to computing and software (2 hours)
• In-class examinations (3 hours)

**c. Methods of Assessing Student Performance**
• Homework assignments
• Laboratory programming assignments
• Midterm exams
• Final exam

**d. Materials required (Films, Readings, Etc..)**

**e. Other Needs**

110. **Is this course required in the major/minor:** Describe how this course applies to degree requirements:
Required in the CSCI and CIS majors

111. **If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided**

112. **Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers...and similar phrases.”**

Covers fundamentals of algorithms and object-oriented software development. Includes these topics: primitive and reference data types, selection, iteration, arrays, classes, methods, encapsulation/information hiding, parameters, recursion, exception handling, file I/O, inheritance, polymorphism, program testing/debugging and documentation, introduction to GUIs, and introduction to sorting and searching techniques and other basic algorithms. Requires extensive programming and supervised laboratory sessions.
1. **Discipline:** CSC Course No. 205 (To be assigned by Registrar)  
   **Official Title:** Fundamental Data Structures  
   **Abbreviated course title (limit to 18 spaces):** Data Structures

   - [ ] New Course  
   - [ ] Current Content Revised  
   - [ ] Topics Course (if checked, complete item 2)  
   - [ ] Title Change (Previous Title)  
   - [ ] Number Change (Previous No.)  
   - [ ] Inactivation of existing course (course will not be offered in the near future)  
   - [ ] Topics Course (if checked, complete item 2)  
   - [ ] Other (describe)  

29. **TOPICS COURSE ONLY:**  
   **Discipline**  
   **Number**  
   A. **Generic Course Title:**  
   T. **Topics Course Title:**  
   U. **Topics Course offered:** Semester Year  

30. **Semester hours of credit assigned to course (invariable):** 4  
   **Variable Credit Range to semester hours**  
   Is this course repeatable for credit (Yes/No) No  

31. **Grading (Check any that apply):**  
   a. [ ] Letter Grade  
   [ ] Pass/Fail (S/U) Only  
   [ ] PR grade (In Progress)  
   b. [ ] Course requires minimum grade of for General Education/major/minor/certification.  

113. Is this a Liberal Arts course? (Yes/No) Yes  

114. **General Education Information:** (Complete only for General Education courses) *See last item.*  
   a. **General Education Knowledge Area (choose one if applicable):** None  
   b. **Additional student learning outcomes:** (check all that are currently approved)  
   [ ] Contemporary Issues (I)  
   [ ] Scholarship on Women (W)  
   [ ] Diversity (D)  
   [ ] Other World Civilizations (Non-Western) (O)  

115. **Frequency (Check only one):**  
   [ ] Every Term  
   [ ] Every Other Year  
   [ ] Every Fall  
   [ ] Irregularly  
   [ ] Every Spring  
   [ ] By Special Arrangement  
   [ ] Every Summer  

116. **Cross Listed Course Disciplines and Numbers:**

Submitted by: ____________________________ Date: __Jan 30, 2016__

Chairperson’s Approval: _________________ Date: __Jan 30, 2016__

Dean’s Approval: _________________________ Date: ________________

117. **Prerequisites:** Disciplines: CSC Number 203
118. **Swing Course Number** Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

**Note:** If this is a ‘Swing Course’ list additional requirements required for graduate level.

119. **Relationship to Degrees/Programs:** Required ☑ Elective □

120. For all courses, please attach the following information:

a. **Objectives**
   
   - Use an advanced integrated development environment (IDE), such as Eclipse, for software development.
   - Demonstrates an understanding of software design using the object-oriented language Java, using advanced features such as interfaces, abstract classes and polymorphism.
   - Demonstrates an understanding of data structures such as stacks, queues, linked lists, heaps, binary search trees, and hash tables and their implementation in Java.
   - Applies the concepts of complexity analysis to compare different algorithms and data structures.
   - Knows a variety of sorting algorithms such as merge sort, quicksort, heap sort, and their advantages and disadvantages; demonstrates competency in comparing alternative solutions.
   - Writes recursive algorithms for list and tree structures.
   - Uses Java GUI components to create event-driven programs.
   - Demonstrates competency in using software development lifecycle methodology to design a solution for a medium-scale project and can use data structures in larger programs.
   - Writes good documentation, following Java documentation standards, for Java programs containing multiple classes.
   - Demonstrates competency in creating and executing test plans, and discovering and eliminating errors shown by test results. Understands Java’s exception handling mechanism.
   - Contributes as a team member to the design and implementation of a system. Demonstrates a commitment to fulfilling assigned responsibilities. Demonstrates an ability to communicate with team members.

b. **Outline of Course**
   
   - Software modelling (class diagram, use case, CRC card) (2 hours)
   - Analysis of algorithms: big-oh notation, time efficiency versus space efficiency, algorithm verification (pre-conditions, post-conditions, invariants) (4 hours)
   - Object-oriented program design, including inheritance, polymorphism, Java abstract classes and interfaces (2 hours)
   - Abstract data structures (stacks, queues, linked-lists), conceptual level – utilizing Java interface features, using existing library classes, implementation issues (complexity), applications (12 hours)
   - Algorithm design: searching-sorting algorithms (hash tables, quick sort, merge sort, heap sort) (6 hours)
   - Binary trees and their applications, tree traversals, binary search tree, heap, expression tree (11 hours)
   - Professional responsibilities and liabilities associated with software development (2 hours)
   - In-class examinations (3 hours)
c. Methods of Assessing Student Performance

- Homework assignments
- Laboratory programming assignments
- Midterm exams
- Final exam

d. Materials required (Films, Readings, Etc..)


e. Other Needs

121. Is this course required in the major/minor: Describe how this course applies to degree requirements:
Required in the CSC and CIS majors

122. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

123. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers...and similar phrases.

Covers the fundamentals of abstract data structures. Includes these topics: software modeling, program development, testing; implementation and use of stacks, queues, linked lists, binary trees, heaps, binary search trees and hash tables. Covers recursion (mergesort and quicksort), introduction to analysis of algorithms and program verification, event-driven programming with graphical user interfaces. Requires extensive programming and supervised laboratory sessions.
Discipline: CSC  Course No. 311  (To be assigned by Registrar)

Official Title: Computer Organization and Architecture

Abbreviated course title (limit to 18 spaces) Comp Org & Arch

☐ New Course
☒ Current Content Revised ☐ Topics Course (if checked, complete item 2)
☒ Title Change (Previous Title)  Computer Org and Software Interface
☐ Number Change (Previous No.)
☐ Inactivation of existing course (course will not be offered in the near future)
☐ Topics Course (if checked, complete item 2)
☒ Other (describe) pre-requisite changes

32. TOPICS COURSE ONLY:  Discipline Number
A. Generic Course Title:
V. Topics Course Title:
W. Topics Course offered: Semester Year

33. Semester hours of credit assigned to course (invariable) 4
Variable Credit Range to semester hours

Is this course repeatable for credit (Yes/No) No

34. Grading (Check any that apply):
  a. ☒ Letter Grade ☐ Pass/Fail (S/U) Only ☐ PR grade (In Progress)
  b. ☐ Course requires minimum grade of for General Education/major/minor/certification.

124. Is this a Liberal Arts course? (Yes/No) Yes

125. General Education Information: (Complete only for General Education courses) *See last item.
  a. General Education Knowledge Area (choose one if applicable): None
  b. Additional student learning outcomes: (check all that are currently approved)
□ Contemporary Issues (I) □ Scholarship on Women (W)
□ Diversity (D) □ Other World Civilizations (Non-Western) (O)

126. Frequency (Check only one)
☒ Every Term ☐ Every Other Year
☐ Every Fall ☐ Irregularly
☐ Every Spring ☐ By Special Arrangement
☐ Every Summer

127. Cross Listed Course  Discipline Number

Submitted by: ___________________________ Date: __Jan 30, 2017__

Chairperson’s Approval: ___________________________ Date: __Jan 30, 2017__

Dean’s Approval: ___________________________ Date: ____________________

128. Prerequisites: Discipline CSC Number 203

☐ Discipline MIH Number 281
Discipline Number

129. Corequisite: Discipline Number

130. Swing Course Number Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

131. Relationship to Degrees/Programs: Required ☒ Elective ☐

132. For all courses, please attach the following information:
   a. Objectives
      • Understand the essential components and organization of a computer and the working of the fetch-decode-execute cycle.
      • Represent and manipulate data in a binary form.
      • Diagram digital logic systems and solve simple problems.
      • Understand the design/types of instruction and what impact the ISA of a computer has on the computer as a whole.
      • Understand the various registers and addressing modes.
      • Understand the differences between the CISC and RISC based computer design principles.
      • Understand low-level programming, and its essential difference from high-level programming.
      • Understand the concept of pointers be able to effectively manage memory in assembly language programs with them.
      • Understand the role of the stack in the operation of programs with subroutines.
      • Effectively write non-trivial programs in assembly language.

   b. Outline of Course
      • Overview, history and components of the computer system (2 hours)
      • Digital systems and binary numbers (2 hours)
      • Boolean algebra and logic gates (4 hours)
      • Design of digital circuits and ALU design (4 hours)
      • Introduction to sequential circuits and design (4 hours)
      • Introduction to assembly language programming and MIPS architecture (6 hours)
      • CPU organization and fetch-decode-execute cycle (6 hours)
      • Memory organization and addressing (5 hours)
      • CISC and RISC based design of computers, use of registers, register allocation (3 hours)
      • Memory units, organization and circuits, memory hierarchy – RAM, ROM, PROM, hard disk, tapes (3 hours)
      • In-class examinations (3 hours)
      • (NOTE) Other than an introduction to MIPS in the classroom, most topics of MIPS will be covered in the laboratory session

   c. Methods of Assessing Student Performance
      • Homework assignments
      • Programming assignments
      • Midterm exams
d. Materials required (Films, Readings, Etc.)


e. Other Needs

133. Is this course required in the major/minor: Describe how this course applies to degree requirements:
   Required in the CSCmajor (both ACand SDtracks)

134. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

135. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers…and similar phrases.

Covers fundamentals of computer architecture and organization. Includes the following topics: digital logic and circuit design, data representation, CPU and ALU architectures, instruction set encoding, fetch-decode-execute cycle, addressing modes, memory management, handling of subprograms and assembly language programming. Requires extensive programming and supervised laboratory sessions.

For General Education courses only, attach also:

Supplemental General Education Course Registration Form
Student Learning Outcomes Checklist (for specific codes requested).
1. **Discipline:** CSC  **Course No.** 401  *(To be assigned by Registrar)*  
**Official Title:** Programming Languages  
**Abbreviated course title (limit to 18 spaces):** Prog Languages  
☐ New Course  
☐ Current Content Revised ☐ Topics Course (if checked, complete item 2)  
☐ Title Change (Previous Title)  
☐ Number Change (Previous No.)  
☐ Inactivation of existing course (course will not be offered in the near future)  
☐ Topics Course (if checked, complete item 2)  
☒ Other (describe) change in pre-requisites  

35. **TOPICS COURSE ONLY:**  
**Discipline**  
**Number**  
A. **Generic Course Title:**  
X. **Topics Course Title:**  
Y. **Topics Course offered:** Semester Year  

36. **Semester hours of credit assigned to course (invariable):** 3  
**Variable Credit Range** to **semester hours**  
Is this course repeatable for credit (Yes/No) No  

37. **Grading (Check any that apply):**  
a. ☒ Letter Grade ☐ Pass/Fail (S/U) Only ☐ PR grade (In Progress)  
b. ☐ Course requires minimum grade of for General Education/major/minor/certification.  

136. Is this a Liberal Arts course? (Yes/No) Yes  

137. **General Education Information:** (Complete only for General Education courses) *See last item.*  
a. General Education Knowledge Area (choose one if applicable):  None  
b. Additional student learning outcomes: (check all that are currently approved)  
☐ Contemporary Issues (I) ☐ Scholarship on Women (W)  
☐ Diversity (D)  ☐ Other World Civilizations (Non-Western) (O)  

138. **Frequency (Check only one):**  
☐ Every Term ☐ Every Other Year  
☒ Every Fall ☐ Irregularly  
☐ Every Spring ☐ By Special Arrangement  
☐ Every Summer  

139. **Cross Listed Course Discipline**  
**Number**  

Submitted by: __________ Date: Jan 30, 2017  

Chairperson’s Approval: __________ Date: Jan 30, 2017  

Dean’s Approval: __________________ Date: __________________  

140. **Prerequisites:**  
Discipline CSC  **Number** 205  
Discipline CSC  **Number** 219
141. Corequisite: Discipline Number

142. Swing Course Number Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

143. Relationship to Degrees/Programs: Required ☒ Elective ☐

144. For all courses, please attach the following information:
   a. Objectives
      • Understand the role of a programming language as a component of software development environment; how computer architecture and software design methodology influence what features a language supports; how languages are implemented: compiled Vs interpreted.
      • Understand the historical evolution of programming languages.
      • Understand the formalisms to specify syntax and semantics of a language.
      • Understand the concepts of data types: variables, binding, scope, lifetime, type, value and address; run-time representation of programming languages; implementation of arrays and records.
      • Understand the concepts of control structures: procedures and parameter passing methods, exception handling, and the use of these features in different languages.
      • Understand different paradigms in programming: procedural, OOP, functional, logic, scripting, etc.; Write simple programs using these paradigms.
      • Understand the writing style in a computer science journal and write a well-researched technical paper on a topic related to programming languages.
   
   b. Outline of Course
      • Brief history of programming languages.
      • Language as a part of software development environment.
      • Language Design Principles: Simplicity, Readability, expressiveness, etc.
      • Factors that influence language design: Computer Architecture, Software design methodology.
      • Language Implementation: Compiled, Interpreted, Hybrid.
      • Formal Syntax: BNF, EBNF, Syntax Charts, COBOL-style notation.
      • Parsing techniques: top-down, bottom-up, LL(k), etc.
      • Semantics: Operational Semantics, Preconditions, Post-conditions, Loop Invariants, Axiomatic Semantics.
      • Concept of binding: scope, lifetime, type, value, address.
      • Classification of variables: static, semi-static, dynamic, static scope, dynamic scope, static type, dynamic type.
      • Run-time representation of variables: activation records, run-time stack.
      • Arrays, records and their implementation.
- Parameter passing techniques: call by reference; call by copy (value, result, value-result). Dereferencing.
- Exception handling, I/O processing.
- Procedural/Imperative vs object-oriented paradigm - illustrated via small examples.
- Functional paradigm: A brief introduction to the syntax of a functional language such as Lisp, Haskell or ML, and exposure to elementary programming in it.
- Logic paradigm: A brief introduction to the syntax of a logic programming language such as Prolog and exposure to elementary programming in it.
- Scripting Languages: A brief introduction to the syntax of a scripting language such as Javascript or PERL and exposure to elementary programming in it.

c. Methods of Assessing Student Performance

- Programming homework assignments in the different languages covered.
- Term paper on a chosen language
- Midterm exams
- Final exam

d. Materials required (Films, Readings, Etc..)


e. Other Needs

145. Is this course required in the major/minor: Describe how this course applies to degree requirements:
   Required in the CSC major (both AC and SD tracks)
146. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

147. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers...” and similar phrases.

Studies the concepts of various programming languages. Includes these topics: history of languages, design principles, formal syntax and semantics, implementation: compilation and interpretation, comparative study of features in various languages considering criteria such as binding, scope, type conversion, data abstraction, parameter passing techniques, exceptions and I/O Covers various programming paradigms such as procedural, object-oriented, functional, logic and scripting.

For General Education courses only, attach also:
Supplemental General Education Course Registration Form
Student Learning Outcomes Checklist (for specific codes requested).
1. **Discipline**: CSC Course No.411 (To be assigned by Registrar)

**Official Title**: Computer Architecture

*Abbreviated course title (limit to 18 spaces) Computer Archit*

- [ ] New Course
- [ ] Current Content Revised
- [ ] Topics Course (if checked, complete item 2)
- [ ] Title Change (Previous Title)
- [ ] Number Change (Previous No.)
- [ ] Inactivation of existing course (course will not be offered in the near future)
- [ ] Topics Course (if checked, complete item 2)
- [ ] Other (describe) pre-requisite change, become ELECTIVE

38. **TOPICS COURSE ONLY**

A. **Generic Course Title**:

Z. **Topics Course Title**:

AA. **Topics Course offered**: Semester Year

39. **Semester hours of credit assigned to course (invariable)** 3

**Variable Credit Range** to **semester hours**

Is this course repeatable for credit (Yes/No) No

40. **Grading** (Check any that apply):

a. [ ] **Letter Grade**  [ ] **Pass/Fail (S/U)** Only  [ ] **PR grade (In Progress)**
b. [ ] **Course requires minimum grade of** for General Education/major/minor/certification.

148. Is this a Liberal Arts course? (Yes/No) **Yes**

149. General Education Information: (Complete only for General Education courses) *See last item.*

- a. **General Education Knowledge Area** (choose one if applicable): **None**
- b. **Additional student learning outcomes** (check all that are currently approved)
  - [ ] **Contemporary Issues (I)**
  - [ ] **Diversity (D)**
  - [ ] **Scholarship on Women (W)**
  - [ ] **Other World Civilizations (Non-Western) (O)**

150. **Frequency** (Check only one)

[ ] **Every Term**  [ ] **Every Other Year**
[ ] **Every Fall**  [ ] **Irregularly**
[ ] **Every Spring**  [ ] **By Special Arrangement**
[ ] **Every Summer**

151. **Cross Listed Course**

**Discipline**

**Number**

Submitted by: ___________________________ Date: __Jan 30, 2017_____

Chairperson’s Approval: ___________________________ Date: __Jan 30, 2017_____

Dean’s Approval: ___________________________ Date: __________________

152. **Prerequisites**: Discipline CSC **Number** 311
153. Corequisite: Discipline Number

154. Swing Course Number Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

155. Relationship to Degrees/Programs: Required ☐ Elective ☑

156. For all courses, please attach the following information:

a. Objectives
   - Understand how computers and computer families have evolved
   - Understand the essential components and organization of a computer and the working of the fetch-decode-execute cycle
   - Understand the design/types of instructions and what impact the ISA of a computer has on the computer as a whole
   - Understand the principle and working/use of various registers and addressing modes
   - Understand how to compare the performance of different computer system architectures
   - Understand the differences between the CISC and RISC based computer design principles
   - Understand hardwired and microprogrammed based control unit design
   - Understand the various types of memories (including the working and use of cache and virtual memory) in the computer and how they are designed
   - Understand how processor level parallelism and instruction level parallelism (pipelining) can be used to increase speed of the computer
   - Understand the working of various input/output schemes and memory devices

b. Outline of Course
   - Evolution of computers and computer families. (2 hours)
   - Abstraction and virtual machines, compilation and interpretation. (2 hours)
   - Working of a transistor, semiconductors technologies and chip design. (3 hours)
   - Computer organization and fetch-decode-execute cycle, Register Transfer Language, data path design. (3 hours)
   - Control unit design and microprogramming. (2 hours)
   - Performance analysis and Benchmarking. (4 hours)
   - Data Representation and instruction set architecture (ISA) design and addressing modes. (4 hours)
   - CISC and RISC based design of computers, use of registers, register allocation. (3 hours)
   - Bus structures, input/output units and instructions for i/o. (3 hours)
   - Parallelism, pipelining, design and hazards. (3 hours)
   - Digital circuits, PLA, FPGA and ALU design. (2 hours)
   - Introduction to sequential circuits and design (3 hours)
   - Memory units, organization and circuits, memory hierarchy – RAM, ROM, PROM, Hard disk, Tapes. (3 hours)
• Working, design and analysis of Cache. (2 hours)
• In-class tests. (3 hours)

c. Methods of Assessing Student Performance
• Homework assignments
• Midterm exam
• Final exam

d. Materials required (Films, Readings, Etc.)

e. Other Needs

157. Is this course required in the major/minor: Describe how this course applies to degree requirements:
This course will become elective in the CSC major, and no longer be required

158. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

159. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers...” and similar phrases.

Covers design and organization of digital computers. Includes these topics: digital logic and circuit design, data representation, computer history, performance evaluation, CISC/RISC architectures, registers, memories and memory management, CPU and ALU architectures, instruction sets, busses and I/O systems, interrupt structure, microprogramming and control unit design. Covers additional topics such as virtual machines, parallelism and pipelining.
The College at Brockport
Course Registration Form

1.  Discipline:  CSC Course No. 412  (To be assigned by Registrar)

   Official Title: Operating Systems

   Abbreviated course title (limit to 18 spaces) Operating Systems

   □ New Course
   □ Current Content Revised □ Topics Course (if checked, complete item 2)
   □ Title Change (Previous Title)
   □ Number Change (Previous No.)
   □ Inactivation of existing course (course will not be offered in the near future)
   □ Topics Course (if checked, complete item 2)
   ☒ Other (describe) change in pre-requisites

41. TOPICS COURSE ONLY:  Discipline Number
   A. Generic Course Title:
   B. Topics Course Title:
   C. Topics Course offered: Semester Year

42. Semester hours of credit assigned to course (invariable) 3

43. Grading (Check any that apply):
   a. ☒ Letter Grade  ☐ Pass/Fail (S/U) Only  ☐ PR grade (In Progress)
   b. □ Course requires minimum grade of for General Education/major/minor/certification.

160. Is this a Liberal Arts course? (Yes/No) Yes

161. General Education Information: (Complete only for General Education courses) *See last item.
   a. General Education Knowledge Area (choose one if applicable):  None
   b. Additional student learning outcomes: (check all that are currently approved)
      ☐ Contemporary Issues (I)  ☐ Scholarship on Women (W)
      ☐ Diversity (D)  ☐ Other World Civilizations (Non-Western) (O)

162. Frequency (Check only one)
   □ Every Term  □ Every Other Year
   □ Every Fall  □ Irregularly
   ☒ Every Spring  □ By Special Arrangement
   □ Every Summer

163. Cross Listed Course  Discipline Number

   Submitted by: __________________________  Date: __Jan 30, 2017________

   Chairperson’s Approval: __________________________  Date: __Jan 30, 2017________

   Dean’s Approval: __________________________  Date: __________________________

164. Prerequisites:  Discipline CSC Number 205
                    Discipline CSC Number 209
Discipline CSC Number 219
Discipline CSC Number 311

165. Corequisite: Discipline Number

166. Swing Course Number Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

167. Relationship to Degrees/Programs: Required ☐ Elective ☒

168. For all courses, please attach the following information:
   a. Objectives
      - Understand the evolution of operating systems with respect to the development of computer organization and architecture; explain how resources are managed in computer systems by applying operating system terminology
      - Analyze and design appropriate solutions for concurrent programming problems by applying knowledge of concurrent process, interprocess communication mechanisms, and synchronization tools
      - Identify multithreading models in popular operating systems
      - Explain why a specific operating system chooses to implement certain CPU scheduling algorithms in favor of other algorithms
      - Understand why and analyze how deadlock occurs or may occur under a certain situation; apply appropriate algorithms to detect, prevent, or avoid it.
      - Illustrate how different memory management mechanisms perform the mapping between logical, physical, and virtual memory addresses
      - Illustrate how files and free spaces are managed in popular operating systems
      - Understand operating system services provided for mass-storage
      - Understand structures of I/O systems
   b. Outline of Course
      - OS structures and design principles: components of operating systems, system calls
      - Concurrent processes and programming: process scheduling and interprocess communication
      - Threads and multithreading models
      - CPUscheduling: criteria and algorithms
      - Memory management and virtual memory: swapping, paging, segmentation, and memory allocation algorithms.
      - File systems: file system interface and implementation.
      - Mass-storage structure: disk structure, disk scheduling, and disk management.
      - I/O systems: I/O hardware, application I/O interface, and Kernel I/O
      - Case study of UNIX/LINUX
   c. Methods of Assessing Student Performance
• Take-home written and programming assignments
• In-class mid-term and comprehensive final examinations

d. Materials required (Films, Readings, Etc..)
• Reading provided by the instructor.

e. Other Needs

169. Is this course required in the major/minor: Describe how this course applies to degree requirements:
All CSC(Advanced Computing track) students are required to complete two course from CSC412, CSC419, CSC422

170. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

171. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers...and similar phrases.

Covers basic principles of operating systems. Includes these topics: OS structures and design principles, concurrent processes and programming, threads, CPU scheduling, memory management and virtual memory, process synchronization and deadlock, file systems, mass-storage structure, I/O systems, and case study of UNIX/Linux operating system. Requires extensive programming.
The College at Brockport
Course Registration Form

1. Discipline: CSC Course No. 419 (To be assigned by Registrar)
   Official Title: Computer Networks
   Abbreviated course title (limit to 18 spaces) Computer Netwrk
   [ ] New Course
   [ ] Current Content Revised [ ] Topics Course (if checked, complete item 2)
   [ ] Title Change (Previous Title)
   [ ] Number Change (Previous No.)
   [ ] Inactivation of existing course (course will not be offered in the near future)
   [ ] Topics Course (if checked, complete item 2)
   [ ] Other (describe) change in pre-requisites

44. TOPICS COURSE ONLY: Discipline Number
   A. Generic Course Title:
   DD. Topics Course Title:
   EE. Topics Course offered: Semester Year

45. Semester hours of credit assigned to course (invariable) 3
   Variable Credit Range to semester hours
   Is this course repeatable for credit (Yes/No) No

46. Grading (Check any that apply):
   a. [ ] Letter Grade [ ] Pass/Fail (S/U) Only [ ] PR grade (In Progress)
   b. [ ] Course requires minimum grade of for General Education/major/minor/certification.

172. Is this a Liberal Arts course? (Yes/No) Yes

173. General Education Information: (Complete only for General Education courses) *See last item.
   a. General Education Knowledge Area (choose one if applicable): None
   b. Additional student learning outcomes: (check all that are currently approved)
      [ ] Contemporary Issues (I) [ ] Scholarship on Women (W)
      [ ] Diversity (D) [ ] Other World Civilizations (Non-Western) (O)

174. Frequency (Check only one)
   [ ] Every Term [ ] Every Other Year
   [X] Every Fall [ ] Irregularly
   [ ] Every Spring [ ] By Special Arrangement
   [ ] Every Summer

175. Cross Listed Course Discipline Number

Submitted by: ___________________________ Date: __Jan 30, 2017______

Chairperson’s Approval: ___________________________ Date: __Jan 30, 2017______

Dean’s Approval: ___________________________ Date: ___________________________

176. Prerequisites: Discipline CSC Number 205
   Discipline CSC Number 209

19_16-17UC Revision of the Computer Information Systems and Computer Science majors.docx
Development of networking, reference models, and role of standards
- Understand business requirements for communication and explore network technology as an enabler of organizational performance
- Perform computations relating to multimedia file sizes, raw and effective data rates, propagation time, etc
- Understand characteristics of various communication media, physical and data link layer issues, error detecting/correcting codes and related tradeoffs
- Understand IEEE 802.03 (Ethernet) and IEEE 802.11 (wireless) protocols
- Understand Internet addressing, subnets, and TCP/IP protocol characteristics
- Understand network hardware such as hubs, switches, routers (both wired and wireless), NAT devices, and DHCP servers
- Learn to configure LAN and TCP/IP networks; explore network troubleshooting commands such as ping, traceroute, nslookup, netstat, etc
- Analyze network traffic using Wireshark software
- Understand and implement client-server code in Java
- Understand network security issues

b. Outline of Course
- Introduction to networking and standards (2 hours)
- Essential terms and concepts, determining business requirements (3 hours)
- Reference models and standards – OSI, TCP/IP, IEEE (3 hours)
- Communication media and characteristics (2 hours)
- Data communication issues – physical layer (3 hours)
- Error and flow control issues, PPP, HDLC (3 hours)
- Local area network issues, handling collisions (2 hours)
- Ethernet and IEEE 802.3, token ring and FDDI (3 hours)
- Wireless and switched Ethernet, network hardware (2 hours)
- WAN Issues and Internet (2 hours)
- Internet addressing and protocols (3 hours)
- Network programming and Wireshark software (3 hours)
Hands-on laboratory work with network hardware and software, both wired and wireless networks; configuring switches, DHCP server, firewall router, ad-hoc networks (3 hours)
Internet applications – telnet, ftp, email, web (2 hours)
Home networking and security issues (3 hours)
Tests (3 hours)

c. Methods of Assessing Student Performance
- Homework assignments.
- Laboratory assignments.
- Quizzes, midterm and final examinations.

d. Materials required (Films, Readings, Etc..)
- Textbook to be selected by the instructor.

e. Other Needs

181. Is this course required in the major/minor? Describe how this course applies to degree requirements:
Students in the CSC(Advanced Computing track) are required to complete two courses from CSC 412, CSC419 and CSC422

182. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

183. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers... and similar phrases.

Provides a comprehensive study of the field of computer communications, local area networks, and internetworking. Includes these topics: the OSI and TCP/IP models, protocols, topologies, data communication issues, error detection and correction, local area networks, network hardware, Ethernet and wireless technologies, WAN packet-switching, routing, datagrams, Internet addressing, home networking and security. Includes hands-on experience with network hardware and software. Closed to students who have received credit for CIS 419.

For General Education courses only, attach also:
Supplemental General Education Course Registration Form
Student Learning Outcomes Checklist (for specific codes requested).
1. Discipline: CSC Course No. 421 (To be assigned by Registrar)
   Official Title: Computer and Network Security
   Abbreviated course title (limit to 18 spaces) Cmptr & Net Sec

☐ New Course
☐ Current Content Revised ☐ Topics Course (if checked, complete item 2)
☐ Title Change (Previous Title)
☐ Number Change (Previous No.)
☐ Inactivation of existing course (course will not be offered in the near future)
☐ Topics Course (if checked, complete item 2)
☒ Others (describe) change in pre-requisites

47. TOPICS COURSE ONLY: Discipline Number
   A. Generic Course Title:
   FF. Topics Course Title:
   GG. Topics Course offered: Semester Year

48. Semester hours of credit assigned to course (invariable) 3
   Variable Credit Range to semester hours
   Is this course repeatable for credit (Yes/No) No

49. Grading (Check any that apply):
   a. ☒ Letter Grade ☐ Pass/Fail (S/U) Only ☐ PR grade (In Progress)
   b. ☐ Course requires minimum grade of for General Education/major/minor/certification.

184. Is this a Liberal Arts course? (Yes/No) Yes

185. General Education Information: (Complete only for General Education courses) *See last item.
   a. General Education Knowledge Area (choose one if applicable): None
   b. Additional student learning outcomes (check all that are currently approved)
      ☐ Contemporary Issues (I) ☐ Scholarship on Women (W)
      ☐ Diversity (D) ☐ Other World Civilizations (Non-Western) (O)

186. Frequency (Check only one)
   ☐ Every Term ☐ Every Other Year
   ☐ Every Fall ☐ Irregularly
   ☒ Every Spring ☐ By Special Arrangement
   ☐ Every Summer

187. Cross Listed Course Discipline Number

Submitted by: __________________________ Date: __Jan 30, 2017____

Chairperson’s Approval: __________________________ Date: __Jan 30, 2017____

Dean’s Approval: __________________________ Date: __________________________

188. Prerequisites: Discipline CSC Number 312
              Discipline CSC Number 419
189. Corequisite: Discipline Number

190. Swing Course Number Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

191. Relationship to Degrees/Programs: Required ☐ Elective ☒

192. For all courses, please attach the following information:

   a. Objectives
   - Understand and present (orally and in writing) the meaning of security in the context of computers and information
   - Understand/identify the meaning of the terms threat, vulnerabilities and controls
   - Understand the various operating system features that are provided to maintain a secure multi-user multiprogramming environment – in particular UNIX and Windows environments
   - Understand the essentials of computer networking and why a networked environment makes attacks more feasible and dangerous
   - Understand the various forms of attacks on a network of computers
   - Understand the various security features that have been developed in software and protocols to protect networked computing
   - Understand the principles of cryptography
   - Understand how private and public key cryptography work and how they can be used in combination to exchange keys securely in an insecure network
   - Understand the use of digital signatures and certificates over the Internet
   - Understand the various social and ethical issues involved in information and computer security, and what laws are in place for the same

   b. Outline of Course
   - The need for security in computing and implications. Security goals and vulnerabilities. Privacy and information assurance, risk and risk analysis (2 hrs)
   - Threat situations, security principles, controls and effectiveness. (2 hrs)
   - Computer architecture and OS concepts and protection features. (3 hrs)
   - The UNIX OS and security. (3 hrs)
   - Directory, access control lists, access control matrix, user authentication. (2 hrs)
   - OS booting, file systems, NTFS, FAT and security features, Windows security. (3 hrs)
   - Program security, buffer overflow, malicious code, viruses, worms, Morris worm. (3 hrs)
   - Computer network basics, LAN, TCP/IP, IP addresses subnetting, masks. (3 hrs)
   - Threats in networks, network security controls. (3 hrs)
   - Firewalls, secure email, intrusion detection, honeypots, IPsec, SSH, VPNs, TLS. (3 hrs)
   - Cryptography basics, public & private key encryption, digital signatures, certificate authorities, data encryption standard (DES) and advanced encryption standard (AES). (4.5 hrs)
   - In class student presentations. (7.5 hrs)
   - In class exams (3 hrs)
c. Methods of Assessing Student Performance
   - Homework assignments
   - Midterm exam
   - Final exam

d. Materials required (Films, Readings, Etc..)
   - Textbook selected by the instructor

e. Other Needs

193. Is this course required in the major/minor: Describe how this course applies to degree requirements:
   This is an elective course in the CSCI major

194. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

195. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers...and similar phrases.

   Studies concepts, techniques, and tools in computer and network security. Includes these topics: security, privacy, information assurance, threats, user authentication and access control; UNIX and Windows examples; logs and intrusion detection; cryptography, public-key and private-key systems, Kerberos, IP security, firewalls, Web and database access control and security issues; ethical issues. Includes hands-on experience with security hardware and software. Closed to students who have received credit for CIS 421.
The College at Brockport
Course Registration Form

1. **Discipline:** CSC  **Course No.** 423  (To be assigned by Registrar)
   
   **Official Title:** Web Application Development
   
   **Abbreviated course title (limit to 18 spaces):** Web App Dev
   
   - [ ] New Course
   - [ ] Current Content Revised  [ ] Topics Course (if checked, complete item 2)
   - [ ] Title Change (Previous Title)
   - [ ] Number Change (Previous No.)
   - [ ] Inactivation of existing course (course will not be offered in the near future)
   - [ ] Topics Course (if checked, complete item 2)
   - [ ] Other (describe) change in pre-requisites

50. **TOPICS COURSE ONLY:**

   - **Discipline Number**

   A. **Generic Course Title:**
   
   B. **Topics Course Title:**

   II. **Topics Course offered:** Semester  Year

51. **Semester hours of credit assigned to course (invariable):** 3

   **Variable Credit Range to semester hours**

   Is this course repeatable for credit (Yes/No) No

52. **Grading (Check any that apply):**

   a. [ ] Letter Grade  [ ] Pass/Fail (S/U) Only  [ ] PR grade (In Progress)
   b. [ ] Course requires minimum grade of for General Education/major/minor/certification.

196. **Is this a Liberal Arts course? (Yes/No)** Yes

197. **General Education Information:** (Complete only for General Education courses) *See last item.

   a. **General Education Knowledge Area (choose one if applicable):**  None
   b. **Additional student learning outcomes:** (check all that are currently approved)

   [ ] Contemporary Issues (I)  [ ] Scholarship on Women (W)
   [ ] Diversity (D)  [ ] Other World Civilizations (Non-Western) (O)

198. **Frequency (Check only one):**

   [ ] Every Term  [ ] Every Other Year
   [ ] Every Fall  [ ] Irregularly
   [ ] Every Spring  [ ] By Special Arrangement
   [ ] Every Summer

199. **Cross Listed Course:**

   **Discipline Number**

   Submitted by: ___________________________  Date: __Jan 30, 2017__

   Chairperson’s Approval: ___________________________  Date: __Jan 30, 2017__

   Dean’s Approval: ___________________________  Date: ___________________________

200. **Prerequisites:**

   **Discipline** CSC  **Number** 117

   **Discipline** CSC  **Number** 209
201. Corequisite: Discipline Number

202. Swing Course Number Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

203. Relationship to Degrees/Programs: Required ☐ Elective ☑

204. For all courses, please attach the following information:

   a. Objectives
      - Understand the basic concepts of Web-based client-server systems. Gain a fundamental understanding of the HTTP protocol.
      - Gain experience in developing web pages with XHTML and Cascading Style Sheets (CSS).
      - Gain experience with a client-side scripting language like JavaScript.
      - Obtain extensive knowledge of, and experience with, a server-side application development language like PHP.
      - Obtain experience with developing web-based applications that enhance maintainability through the separation of business logic components from the presentation (model-view separation).
      - Gain knowledge of interfacing application to a relational database back-end (e.g., mySQL).
      - Know the issues involved in serializing/viewing a database using XML/XSLT, and the ability to export/import a database.
      - Be able to analyze a reasonably complex problem from stated requirements and design it as an application suitable for web-based implementation.
      - Work as a member of a team to analyze, design and implement such an application.

   b. Outline of Course
      - Introduction to Client-Server systems and the HTTP Protocol. Discuss the concepts of domain names, IP addresses, web browsers, web servers, and URLs. Discuss the basic 3-tier web application model (GUI front end, middle tier implementing business logic, database back end)
      - Basic web page development techniques: XHTML, CSS
      - Browser scripting techniques: JavaScript, and its role in validating user entered data on client side
      - Server-side software development: CGI, PHP, processing data from web forms, session management
      - Web database access: access to a popular web database (e.g., mySQL)
      - Database serialization and viewing using XML/XSLT: exporting a database into XML at one site and importing it into a compatible schema at another site that possibly uses a different vendor.
      - Providing secure (password-based) access to certain features of the web application.
      - Modeling a significantly large problem in a manner suitable for web-based implementation: ensuring separation of business and presentation logic in the design.
• Implementing and deploying a reasonably large application using appropriate software tools (e.g., PHPmyadmin, WinSCP)
• (Optional) Framework that ensures model-view-controller development (e.g., CakePHP)

c. Methods of Assessing Student Performance
• Homework assignments
• Large scale team-based programming project
• Midterm exams
• Final exam

d. Materials required (Films, Readings, Etc..)
• Textbook selected by the instructor

e. Other Needs

205. Is this course required in the major/minor: Describe how this course applies to degree requirements:
Students in the CSC major (Advanced computing track) must complete one of CSC423 OR CSC429

206. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

207. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers...and similar phrases.

Governs the basic principles involved in developing Web-based applications that operate with a back-end relational database. Includes these topics: basics of HTTP-based client-server systems, web page creation with XHTML/CSS, client-side scripting, server-side software development, interfacing to relational databases, model-view separation, and database serialization/viewing using XML/XSLT. Requires team project involving design/setup of database server and development of application interfacing to database.

For General Education courses only, attach also:
Supplemental General Education Course Registration Form
Student Learning Outcomes Checklist (for specific codes requested).
1. **Discipline**: CSC  Course No. 486  (To be assigned by Registrar)
   
   **Official Title**: Junior/Senior Seminar
   
   **Abbreviated course title (limit to 18 spaces)**: Jun/Sen Seminar
   
   - [ ] New Course
   - [ ] Current Content Revised
   - [ ] Topics Course (if checked, complete item 2)
   - [ ] Title Change (Previous Title)
   - [ ] Number Change (Previous No.)
   - [ ] Inactivation of existing course (course will not be offered in the near future)
   - [ ] Topics Course (if checked, complete item 2)
   - [ ] Other (describe)

53. **TOPICS COURSE ONLY**: Discipline Number
   
   A. **Generic Course Title**: 
   
   J.J. **Topics Course Title**: 
   
   K.K. **Topics Course offered**: Semester  Year

54. **Semester hours of credit assigned to course (invariable)**: 3
   
   **Variable Credit Range** to  semester hours
   
   Is this course repeatable for credit (Yes/No): No

55. **Grading** (Check any that apply):
   
   - [ ] Letter Grade
   - [ ] Pass/Fail (S/U)
   - [ ] PR grade (In Progress)
   
   - [ ] Course requires minimum grade of for General Education/major/minor/certification.

208. **Is this a Liberal Arts course? (Yes/No)**: Yes

209. **General Education Information**: (Complete only for General Education courses) *See last item.
   
   a. **General Education Knowledge Area** (choose one if applicable): None
   
   b. **Additional student learning outcomes**: (check all that are currently approved)
   
   - Contemporary Issues (I)
   - Diversity (D)
   - Scholarship on Women (W)
   - Oral Communication is currently approved (Y)

210. **Frequency** (Check only one)
   
   - [ ] Every Term
   - [ ] Every Other Year
   - [ ] Every Fall
   - [ ] Irregularly
   - [ ] Every Spring
   - [ ] By Special Arrangement
   - [ ] Every Summer

211. **Cross Listed Course Discipline Number**

   Submitted by: __________________________  Date: ___Jan 30, 2017______

   Chairperson’s Approval: __________________________  Date: ___Jan 30, 2017______

   Dean’s Approval: __________________________  Date: __________________________

212. **Prerequisites**: Discipline  CSC  Number 205
213. Corequisite: Discipline Number

214. Swing Course Number Only for courses offered in the same discipline at another level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

215. Relationship to Degrees/Programs: Required ☒ Elective ☐

216. For all courses, please attach the following information:

a. Objectives
   - Understands the ethical standards of the profession as articulated in the codes of ethics of the leading professional societies, e.g., ACM, AIS, IEEE
   - Demonstrates the ability to express concepts, ideas, and arguments effectively in writing. Can locate information from a variety of sources, and judge its credibility and value. Can formulate a logical argument supported by evidence.
   - Demonstrates an ability to express concepts, ideas, and arguments orally, using appropriate visual aids.
   - Is familiar with the professional societies and how they help one to maintain currency in the discipline. Demonstrates competency in advancing his or her own career through job hunting and resume writing skills. Appreciates the value of graduate education and industry certification.

b. Outline of Course
   - Introduction; specifications for papers; professional journals and other information sources, library facilities, research methods; writing guidelines and common errors. (3 hrs)
   - History of Computing: early calculators; stored-program computers; IBM and the industry; transistors and ICs; languages and software (3 hrs)
   - Professional ethics: ACM Code of Professional Conduct and Scenarios, and other readings on professional integrity, software ownership, licensing, and piracy, unauthorized access to data and resources, contemporary workplace issues, etc. (12 hrs)
   - Careers in computing: ACM career handbook and other readings; discussions with guests from industry on the job market, career paths, industry trends, professional activities, resume writing, interviewing skills, etc. (15 hrs)
   - Professional communications: written and oral communication within the profession, email etiquette, etc. (9 hrs)

c. Methods of Assessing Student Performance
   - Homework assignments
   - Research paper
   - Midterm exam
   - Final exam

d. Materials required (Films, Readings, Etc..)
   - Selected readings and media from current events.
e. Other Needs

217. Is this course required in the major/minor: Describe how this course applies to degree requirements:
   Required for CSC and CIS majors

218. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

219. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers...” and similar phrases.

Provides an overall view of the professional field of computing, emphasizing development of communication skills for the profession. Includes these topics: ethics in the field, history of computing technology, professional literature, organizations and related activities, finding and preparing for jobs and interviews, contemporary workplace issues, and career paths and opportunities. Requires extensive reading and writing, both technical and non-technical, as well as library research, and prepared group discussions and oral presentations.

For General Education courses only, attach also:

Supplemental General Education Course Registration Form

Student Learning Outcomes Checklist (for specific codes requested).
1. Discipline: CSC  Course No.312 (To be assigned by Registrar)

Official Title: Cybersecurity

Abbreviated course title (limit to 18 spaces) Cybersecurity

☐ New Course  
☐ Current Content Revised  ☐ Topics Course (if checked, complete item 2) 
☐ Title Change (Previous Title)  
☐ Number Change (Previous No.)  
☐ Inactivation of existing course (course will not be offered in the near future)  
☐ Topics Course (if checked, complete item 2)  
☐ Other (describe)

56. TOPICS COURSE ONLY: Discipline  Number

A. Generic Course Title:

B. Topics Course Title:

C. Topics Course offered: Semester Year

57. Semester hours of credit assigned to course (invariable) 3

Variable Credit Range to semester hours

Is this course repeatable for credit (Yes/No) No

58. Grading (Check any that apply):

a. ☒ Letter Grade  ☐ Pass/Fail (S/U) Only  ☐ PR grade (In Progress)

b. ☐ Course requires minimum grade of for General Education/major/minor/certification.

220. Is this a Liberal Arts course? (Yes/No) Yes

221. General Education Information: (Complete only for General Education courses) *See last item.

a. General Education Knowledge Area (choose one if applicable):  None

b. Additional student learning outcomes: (check all that are currently approved)
   ☐ Contemporary Issues (I)  ☐ Scholarship on Women (W)
   ☐ Diversity (D)  ☐ Other World Civilizations (Non-Western) (O)

222. Frequency (Check only one)

☐ Every Term  ☐ Every Other Year

☐ Every Fall  ☐ Irregularly

☐ Every Spring  ☐ By Special Arrangement

☐ Every Summer

223. Cross Listed Course  Discipline  Number

Submitted by: ___________________________  Date: __Jan 30, 2017____

Chairperson’s Approval: ___________________________  Date: __Jan 30, 2017____
224. Prerequisites: Discipline CIS Number 303  **OR** (one of 303 and 311 is req)
    Discipline CSC Number 311
    Discipline CSC Number 209

225. Corequisite:

226. Swing Course Number Only for courses offered in the same discipline at another
    level under another number, give number (i.e. 428/528)

Note: If this is a ‘Swing Course’ list additional requirements required for graduate level.

227. Relationship to Degrees/Programs: Required ☒ Elective ☐

228. For all courses, please attach the following information:

    a. Objectives
    
    - Understand the fundamental concepts in information security, including security policies, security models, and security mechanisms.
    - Explain the concepts of malicious code, including viruses, Trojan horses and worms.
    - Recognize and remediate common vulnerabilities in computer programs, including buffer overflow vulnerabilities, input validation issues, and numeric overflow errors.
    - Understand basic concepts of cryptography, including plain-text, cipher-text, crypto-analysis, symmetric cryptography, asymmetric cryptography, digital signatures.
    - Describe mechanisms for identification and authentication, including password issues such as dictionary attacks and one-time password techniques.
    - Compare and contrast security mechanisms for conventional operating systems, including memory, time, file, object protection requirements and techniques in contemporary operating systems.
    - Explain threats to networks, and use techniques for ensuring network security, including encryption, authentication, firewalls, and intrusion detection.
    - Describe the requirements and techniques for security management, including security policies, risk analysis, and physical threats and controls.

    b. Outline of Course
    
    - Introduction. Basic concepts: threats, vulnerabilities, controls; risk; confidentiality, integrity, availability; security policies, security mechanisms; assurance; prevention, detection, deterrence (3 hrs)
    - Cryptography. Basic terms, public key versus private key systems, cryptographic hash functions. (6 hrs).
    - Program Security. Malicious code (viruses, Trojan horses, worms), program flaws (buffer overflows, numeric overflow errors) (9 hrs).
    - Secure Software development. Testing techniques (3 hrs).
    - Operating System security. Identification and authentication, password management, memory and file protection techniques, trusted operating system design principles. (6 hrs).
• Network security. Threats such as eavesdropping, spoofing, modification, denial of service attacks and DDoS attacks. (9 hrs)
• Security Management. Security polices, risk analysis, physical threats and controls. (3 hrs)
• Legal issues of security, privacy and ethics. (3 hrs).

c. Methods of Assessing Student Performance

• Homework Assignments
• Midterm exams
• Final exam

d. Materials required (Films, Readings, Etc..)


e. Other Needs

229. Is this course required in the major/minor: Describe how this course applies to degree requirements:

Required in the CIS major. Required in the CSC major

230. If this course requires any special scheduling arrangements with regard to time or room/space, please explain in the space provided

231. Write a brief course description for the College Catalogs. Reflect content as accurately as possible using 65 words or less about 500 characters. Use action verbs and omit “This course covers… and similar phrases.

Covers fundamental issues and tools relating to insuring that computer systems are secure and reliable. Includes these topics: recognizing attackers, maintaining confidentiality, integrity and availability of computing systems, account control and access rights management, software vulnerability analysis, defense, and exploitation, reverse engineering, operating system security and malware, applied cryptography, and legal and ethical issue of security.

For General Education courses only, attach also:
Supplemental General Education Course Registration Form
Student Learning Outcomes Checklist (for specific codes requested).