Please type or select the requested information. Print completed forms, add appropriate paper attachments, and route through MSU's curricular process for recommendations and decisions.

<table>
<thead>
<tr>
<th>College: Science, Engineering and Technology</th>
<th>Proposal #: 131</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department: Computer and Information Sciences</td>
<td>Effective Date of Change: Academic Year 2006-07</td>
</tr>
<tr>
<td>Program: Computer Information Science</td>
<td>(For Office Use Only)</td>
</tr>
</tbody>
</table>

### Type of Change
- COLRSE PROPOSALS
- New Course

### Title
- Current: Software Quality Assurance and Testing
- Proposed: Software QA and Testing

<table>
<thead>
<tr>
<th>Course Designator</th>
<th>Number of Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT 480 / IT 580</td>
<td>4</td>
</tr>
</tbody>
</table>

Include a course or program description for the Bulletin (30-40 words maximum for courses, 100 for programs):

Topics include software quality assurance, software quality metrics, software configuration management, software verification and validation, reviews, inspections, and audits, configuration control boards and software process improvement models, black-box and white-box testing models.

Pre: IT 380 or ISYS 380

Variable

Rationale or Justification for change:
The CIS major is being redesigned and name changed to Information Technology (IT). This course is required for the software development elective sequence.

---

### ***For General Education or Cultural Diversity Courses Only***

#### General Education Course:

<table>
<thead>
<tr>
<th>GE Category #</th>
<th>GE Category Name</th>
<th>(Maximum of 3 Categories)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td></td>
<td></td>
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<tr>
<td>N/A</td>
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<tr>
<td>N/A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

? For Writing Intensive Courses, attach a description of the kind and quantity of writing.

? For Upper Division Courses, include a description of the respects in which it is broad and general rather than narrow and specific, and so suitable as GE.

Attach paper copies of the following:
- Syllabus or course outline.
- Course's student learning outcomes associated with each GE competency or CD designation.
- List of strategies to be used to assess students' achievement of each GE competency or CD designation.

### ***For New Courses***

<table>
<thead>
<tr>
<th>Instructional Type: Lecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grading Format: X Grade</td>
</tr>
<tr>
<td>P/N</td>
</tr>
<tr>
<td>Course is an elective.</td>
</tr>
<tr>
<td>Course is required for program: Information Technology (IT)</td>
</tr>
<tr>
<td>Pre- or Co-requisites: IT 380 or ISYS 380</td>
</tr>
</tbody>
</table>

Course will be offered:
- Fall Semester
- Spring Semester
- Summer Session

☐ Other courses are being changed or eliminated. (Explain.)

☐ Course content or title is similar to courses in other departments. (Attach copy of letter of agreement with other program(s) contacted. Indicate the nature of the discussions and/or resolution of differences or potential conflicts.)

Attach paper copies of the following:
- Syllabus or course outline.
- Course's student learning outcomes.
- A list of resources required to offer and support this course.
- A description of how teaching this course will affect department staffing.
- If 400/500 level course, an explanation of added expectations of graduate students.
Minnesota State University, Mankato
Curriculum Proposal

***Signature Page***

Department

\(\checkmark\) Recommended  (Category/ies________)

\(\_\) Not Recommended  (Category/ies________)

Comments:

\(\checkmark\) Date

Department Chair

College Curriculum Committee

\(\checkmark\) Recommended  (Category/ies________)

\(\_\) Not Recommended  (Category/ies________)

Comments:

\(\checkmark\) Date

Committee Chair

College Dean

\(\_\) Recommended  (Category/ies________)

\(\_\) Not Recommended  (Category/ies________)

Comments:

\(\checkmark\) Date

Dean

General Education Subcommittee

\(\_\) Recommended  (Category/ies________)

\(\_\) Not Recommended  (Category/ies________)

Comments:

General Education Subcommittee Chair  Date

Undergraduate Curriculum and Academic Policy Committee

\(\_\) Recommended  (Category/ies________)

\(\_\) Not Recommended  (Category/ies________)

Comments:

\(\checkmark\) Date

UCAP Faculty Chair

Faculty Association Graduate Committee

\(\_\) Recommended  (Category/ies________)

\(\_\) Not Recommended  (Category/ies________)

Comments:

Faculty Association Graduate Chair  Date

Graduate Dean

\(\_\) Recommended

\(\_\) Not Recommended

Comments:

Graduate Dean  Date

Academic Affairs Council

\(\_\) Recommended  (Category/ies________)

\(\_\) Not Recommended  (Category/ies________)

Comments:

\(\checkmark\) Date

Assistant Vice President

Senior Vice President and Vice President for Academic Affairs

\(\checkmark\) Approved  (Category/ies________)

\(\_\) Not Approved  (Category/ies________)

Comments:

\(\checkmark\) Date

Sr. Vice President / Vice Pres. Academic Affairs
IT 480 / IT 580 (4) Software Quality Assurance and Testing

Three hours of lecture and one hour of discussion per week. Prerequisite: COMP 380. Examination of how software quality assurance and configuration management are performed and how software process improvement is maintained in order to assure the highest possible quality. Topics include software quality assurance, software quality metrics, software configuration management, software verification and validation, reviews, inspections, and audits, configuration control boards and software process improvement models, black-box and white-box testing models.

Expanded description

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

Course Number: IT 480 / IT 580
Course Title: Software Quality Assurance and Testing
Number of Credits: 4
Schedule: Three hours of lecture and one hour of discussion per week.
Prerequisite: IT 380 or ISYS 380

Catalog Description
Topics include software quality assurance, software quality metrics, software configuration management, software verification and validation, reviews, inspections, and audits, configuration control boards and software process improvement models, black-box and white-box testing models.

Expanded Description

Course Content:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Coverage Models for Object-Oriented Testing</td>
</tr>
<tr>
<td>2</td>
<td>Test Design and Test Models</td>
</tr>
<tr>
<td>3</td>
<td>State Machines</td>
</tr>
<tr>
<td></td>
<td>UML Artifacts and Their Relation to Software Testing</td>
</tr>
<tr>
<td>4</td>
<td>Test Strategies</td>
</tr>
<tr>
<td>5</td>
<td>Object-oriented Class Testing and Integration</td>
</tr>
<tr>
<td>6</td>
<td>Testing Subsystems</td>
</tr>
<tr>
<td>7</td>
<td>System Integration</td>
</tr>
<tr>
<td></td>
<td>Testing Application Systems</td>
</tr>
<tr>
<td>8</td>
<td>Regression Testing</td>
</tr>
<tr>
<td>9</td>
<td>Test Automation</td>
</tr>
<tr>
<td>10</td>
<td>Use of Assertions in Testing</td>
</tr>
<tr>
<td>11</td>
<td>Test Harness Design</td>
</tr>
<tr>
<td></td>
<td>Testing Distributed Systems</td>
</tr>
<tr>
<td>12</td>
<td>Implementation</td>
</tr>
<tr>
<td>13</td>
<td>Software Quality Metrics</td>
</tr>
<tr>
<td>14</td>
<td>Software Configuration Management</td>
</tr>
<tr>
<td>15</td>
<td>Software Verification and Validation</td>
</tr>
</tbody>
</table>
Course Objectives and Role in Program
The objective of this course is to teach the concepts, artifacts and tools used to assure the development of quality software. Students develop software in most graduate level courses. Therefore, knowledge of how to deliver quality software is essential. In addition, it is expected that an understanding of the issues covered in this course is important in most IT ventures.

Method of Evaluation
Student learning will be evaluated on the basis of
- Completeness and quality of Laboratory and homework exercises
- Completeness and quality of term programming project
- Grade on final examination
- Class participation

The weight assigned to each element of evaluation will be determined by the instructor of the course on the first day of the class.

Required Textbook
"Testing Object-Oriented Systems: Models, Patterns, and Tools", by Robert V. Binder, Addison-Wesley, 1999

Recommended References
"Practical Guide to Testing Object-Oriented Software", by John D. McGregor and David A. Sykes, Addison-Wesley, 2001

b. Learning Outcomes
At the end of the course students should be able to
- Understand the role and importance of software quality assurance in a software project
- Understand the role and importance of configuration management in a software project
- Understand how software metrics are developed and used to insure quality
- Develop a quality assurance plan
- Develop a configuration management plan
- Understand how the major methods for software process improvement work.

c. RESOURCES REQUIRED TO OFFER AND SUPPORT THIS COURSE
Resources currently in place within the department and the University Library will support this new course. No new resources are required.

d. IMPACT ON STAFFING IN THE DEPARTMENT
There is no impact on department staffing.

e. DIFFERENT ASPECT IN 500 LEVEL
Graduate students must do independent research in a topic of current interest. Students are required to write a research paper about their topic and present their findings to the class.