Minnesota State University, Mankato
Curriculum Proposal

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.

College: Science, Engineering and Technology
Department: Computer Science
Program: Computer Science
CIP # 11.0101

Proposal # 297
Effective Date of Change: Academic Year 06-07

Type of Change: COURSE PROPOSALS
Proposed: New Course

Title Current: Network Protocol Internals
Title Proposed: Network Protocol Intern

24-Char. Abbrev: Network Protocol Intern

Course Designator and Number: CS 452/552
Number of Credits: 3

Include a course or program description for the Bulletin (30-40 words maximum for courses, 100 for programs):
As an advanced coverage of data communication, this course explores principles, protocols and performance evaluation techniques of advanced networking technologies. Topics include error detection and recovery, flow control, routing, data throughput, and performance analysis of existing and emerging Internet protocols.
Pre: CS 350 and STAT 354

Rationale or Justification for change:
This is part of the CS program redesign and includes material from COMS 462. Offerings of course electives will be on a two-year variable rotation.

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

<table>
<thead>
<tr>
<th>GE Category #</th>
<th>GE Category Name (Maximum of 3 Categories)</th>
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<tbody>
<tr>
<td>N/A</td>
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* 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>
<th>Course will be offered:</th>
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<tbody>
<tr>
<td>Grade</td>
<td>P/N</td>
</tr>
<tr>
<td>Computer Science</td>
<td>Pre-requisites: CS 350 and STAT 354</td>
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<tr>
<td>Spring Semester</td>
<td>Summer Session</td>
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</tbody>
</table>

- 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.

Revised September 2002
Minnesota State University, Mankato
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***Signature Page***

Department

✓ Recommended (Category/ies_______)

☐ Not Recommended (Category/ies_______)

Department Chair 10/1/06

Comments:

College Curriculum Committee

✓ Recommended (Category/ies_______)

☐ Not Recommended (Category/ies_______)

Committee Chair 11/2/06

Comments:

College Dean

✓ Recommended (Category/ies_______)

☐ Not Recommended (Category/ies_______)

Dean 1/6/06

Comments:

General Education Subcommittee

✓ Recommended (Category/ies_______)

☐ Not Recommended (Category/ies_______)

General Education Subcommittee Chair 1/31/07

Comments:

Undergraduate Curriculum and Academic Policy Committee

✓ Recommended (Category/ies_______)

☐ Not Recommended (Category/ies_______)

UCAP Faculty Chair

Comments:

Faculty Association Graduate Committee

✓ Recommended

☐ Not Recommended

Faculty Association Graduate Chair 2/9/07

Comments:

Graduate Dean

✓ Recommended

☐ Not Recommended

Graduate Dean 2/13/07

Comments:

Academic Affairs Council

✓ Recommended (Category/ies_______)

☐ Not Recommended (Category/ies_______)

Assistant Vice President 2/13/07

Comments:

Senior Vice President and Vice President for Academic Affairs

✓ Approved (Category/ies_______)

☐ Not Approved (Category/ies_______)

Sr. Vice President/Vice Pres. Academic Affairs 2/13/07

Comments:

3 Revised September 2002
CS 452: Network Protocol Internals (3 credits)

**Course Description:**
Advanced coverage of data communication and networking protocols with an emphasis on protocol design and implementation. The course is to introduce the principles, protocols and performance evaluation techniques of various advanced networking technologies. Topics addressed will include error detection and recovery, flow control, routing, data throughput, and performance analysis of existing and emerging Internet protocols.

3 lecture hours per week.

**Prerequisites:** CS 350 and STAT 354

**Proposed Text:**

**Schedule of Topics:**
1) Review of TCP/IP and Socket Programming (~ 1 wk)
2) High-Speed LANs (~ 1 wks)
3) Queuing Analysis (~ 1.5 wks)
4) Congestion Control (~ 1.5 wks)
5) Link-Level Flow and Error Control (~ 2 wks)
6) TCP Traffic Control (~ 1.5 wks)
7) Interior Routing Protocols (~ 1.5 wks)
8) Exterior Routing Protocols (~ 1.5 wks)
9) Protocols for QoS Support (~ 1.5 wks)
10) Network Security (~ 2 wks)

**Student Outcomes**
Students who complete this course will be able to:
1) Describe basic techniques for distributed processing.
2) Explain how the differences between high speed network protocols and traditional protocols aim at meeting the demands of high speed applications.
3) Use queuing theory to design and model a network.
4) Explain network protocols for routing.
5) Write programs using the TCP/IP suite of protocols.
6) Understand UNIX network IPC methods for message passing, semaphores, and shared memory.
7) Apply threads to create multithreaded programs.
8) Apply sockets to communicate between two computers.
9) Apply RPCs to communicate between two computers.
11) Describe Congestion and Traffic Management.
12) Describe the changes needed for real-time applications and quality of service demands.
13) Show the importance of switching in modern packet based networks.
14) Gain experience in using a network simulation tool.

Added Expectations of Graduate Students
1) Graduate students will be held to a higher standard in all coursework, including assignments and exams.
2) Graduate students will also be expected to perform in depth and thorough independent investigation of the subject matter.

Grades will be assigned based on exams and assignments.

Required Resources & Departmental Staffing:
Resources currently in place within the department, the college, and the university library will support this new course. No new resources are required.

There is no impact on staffing requirements.