

# University of North Carolina at Charlotte

CS 1-20-10

## **New Proposal for four related courses, ITCS 3610, ITCS 3211, ITCS 3212, and ITCS 1610**

### **Summary:**

The ITCS 3610 Computing Leaders Seminar is a service-learning seminar course with an overarching goal of increasing students' active engagement in a computing community. The primary outcomes of this engagement are to: 1) develop students as leaders in the 21<sup>st</sup> century technology workforce; 2) enhance students understanding of the social relevance of computing and interdisciplinary applications of computing; 3) enhance students understanding of computing research, graduate school, and careers; 4) enhance student engagement in experiential learning opportunities to enhance their technical skills.

The course content and format are based on a national student leadership program called the STARS Leadership Corps, which was developed by the Students & Technology in Academia, Research and Service (STARS) Alliance ([www.starsalliance.org](http://www.starsalliance.org)), a National Science Foundation funded consortium of colleges and universities with a mission to broaden participation in computing. The STARS Leadership Corps is an innovative approach that combines K-12 recruitment with college student retention and advancement by integrating service-learning, collaborative learning, peer mentoring and community building into regional learning communities that are connected nationally

The results of a three year study, led by UNC Charlotte, of 20 colleges and universities implementing the STARS Leadership Corps show a statistically significant increase in student *efficacy in major, commitment to major, understanding the social relevance of computing, feeling like a part of a computing community, and Grade Point Average*, which are key indicators of retention. For the STARS graduate institutions who have implemented the Corps for at least three years (this is five universities including UNC Charlotte), the enrollment in computing doctoral programs from 2006-2008 increased by 32%, while the enrollment in computing doctoral programs nationwide for this same time period declined by 2%. Anecdotal evidence infers that the majority of the new doctoral students are domestic students, many are from under-represented groups, and participation in the STARS Leadership Corps was a key motivator for these students' decisions to continue on to graduate school.

The Seminar has been offered in the College of Computing and Informatics for six consecutive semesters (as ITCS 3690) since Fall 2007. Student feedback about this course has been positive. The majority of students who have had this course have continued on to graduate school at UNC Charlotte. 88 UNC Charlotte individual UG students have taken the course (some multiple times). Twenty four of these students have graduated, and 64 are still enrolled as undergraduates. Of the 24 graduates: 13 are in graduate school; 5 are in industry (2 of these are with Google); and the whereabouts of 6 are unknown.

The current content of ITCS 3690 has focused on developing the skills mentioned above within the context of seminars and team-based service learning projects. Students could take the course for one or two credits and could repeat for a total of one three-credit technical elective. Students were then invited to continue participation in subsequent years by simply attending the class and participating in team activities. The current structure, which allows students to enroll in the class for different credits and to repeat in different semesters, makes it difficult to build knowledge sequentially and convey the relevance of leadership skills to participation in service-learning projects. Furthermore, we have been asked by the University College of Liberal Arts and Sciences (UCLAS) to offer the STARS Leadership Corps as a theme-based course to select second-semester freshman undeclared majors who have high math aptitude (as measured by SAT scores). We have had prior success involving non-majors in the STARS Leadership Corps and think this would be an effective mechanism to recruit non-declared freshman who have the aptitude to pursue a computing major.

As such, we propose to introduce a set of four courses:

- ITCS 3610 Computing Leaders Seminar (3 credits)
  - Open to CCI majors only
  - Fulfills a 3-credit technical elective
  - Meets 3 hours per week
  - Primary emphasis on class lectures and seminars and team-based service-learning project. Requires extra-curricular participation in technical development activities. CS students' projects must have a substantial technical component.
- ITCS 3211 Computing Leaders Team Projects
  - Prerequisite: C or better in ITCS 3610 or ITCS 1610
  - 1 credit, repeatable
  - Accumulation of 3 credits can count towards a technical elective if ITCS 3610 not previously taken; can count towards a free elective otherwise.
  - Meets 1 hour per week, overlapping with 3610
  - Emphasis on team-based service-learning projects
- ITCS 3212 Computing Leaders Team Leaders
  - By permission only
  - 1 credit, repeatable
  - Accumulation of 3 credits can count towards a general elective (not technical elective)
  - Meets 1 hour per week, overlapping with 3610 and 3211
  - Emphasis on team-based service-learning projects; additional training for team leaders will be included.
  - Students serving as team leaders take this course; By enrolling in a separate course, students have a transcript designator that shows their successful leadership activities and training.
- ITCS 1610 Computing Applications Seminar (3 credits)
  - Open to non-CCI-majors with pre-requisite of Math 1100, 1103, 1120, or 1241
  - Fulfills a free-elective if students later become CCI majors
  - Meets 3 hours per week in conjunction with ITCS 3610
  - Primary emphasis on class lectures and seminars and team-based service-learning project. Service-learning project need not have a deep technical content, but will

develop leadership skills and understanding of social relevance of computing and opportunities in computing.

## **New Proposal to create the following ITCS 3610 Course:**

### **New Undergraduate Course and Curriculum Proposal from the Department of Computer Science**

**Title: Computing Leaders Seminar**

#### **1. Proposal Summary and Catalog Copy**

##### 1. Summary

The Department of Computer Science proposes to add a new course **Computing Leaders Seminar** to its undergraduate curriculum.

##### 2. Proposed Catalog Copy

**ITCS 3610 Computing Leaders Seminar** (3) Prerequisite: CCI major. This is a service-learning seminar course. Seminar topics are intended to enhance disciplinary knowledge and skills (computing technologies, research, careers) and to develop leadership skills by using computing knowledge and skills in service to society (service and civic engagement). Emphasis will be placed on the basic concepts of leadership theory and its application within the computing discipline on an individual, group, and societal level. Students will participate in team-based computing service-learning projects in the community. Student performance evaluation will consider individual homework assignments, participation in team projects, and class participation. (*Spring*)

#### **2. Justification**

Industry partners have expressed that, in addition to technical expertise, ideal computing graduates must possess leadership skills to compete in the global economy. The proposed set of courses complements students' technical expertise with an understanding of leadership in a diverse world and the practical application of leadership skills in service to society. ITCS 3610 (theory and limited practice) will be a pre-requisite for ITCS 3211 (focused hands-on service-learning projects) and ITCS 3212 (Team leaders for 3211 projects).

#### **3. Impact**

The course is designed to serve as an elective course for undergraduate students in Computer Science (technical elective) and related disciplines (e.g., Software & Information Systems). Previously ITCS 3610 classes have ranged from 15 to 30 students and have had a number of repeaters. The fact that students have remained engaged with the cohort and activities of the classes beyond completing 3 credit hours is evidence that the course meets a need for diverse students to feel part of a computing community and to perform outreach through the service-learning projects. These components are critical to attracting students to and retaining students in the computing field. The course also serves a need to develop

students' leadership and communication skills (to build a breadth of general skills while having depth in computing, to make "T-shaped students"). Because the course also serves as a mechanism for enhancing student engagement, academic adjustment to college, and academic achievement, the course has played a key role in attracting NSF scholarships for transfer students (\$600K).

Based on the prior 6 semesters of offering and assessing this course, the expected impact of the course is multi-fold: 1) Students will possess broader computing leadership skills required by industry employers; 2) Computing majors (particularly women and under-represented minorities) taking the course are more likely to be retained, have higher GPAs, and continue on to graduate school; and 3) CCI may attract additional scholarship funds by institutionalizing this mechanism for student success.

#### **4. Resources Required to Support Proposal**

##### 1. Personnel

Faculty and Staff qualified to teach this course include Dr. Teresa Dahlberg, Dr. Tiffany Barnes, Dr. Audrey Rorrer, and Ms. Karen Bean. Many faculty members in the College of Computing and Informatics are qualified to teach this course.

##### 2. Physical Facility

A smart classroom is required.

##### 3. Equipment and Supplies

None identified.

##### 4. Lab/Network Environment

None identified.

##### 5. Audio-Visual

Current facilities are adequate to support this course.

##### 6. Other Resources

None identified.

#### **5. Consultation with the Library and Other Departments or Units**

##### 1. Library Consultation

This will be undertaken.

##### 2. Consultation with Other Departments or Units

Software and Information Systems consultation will be undertaken.

## **6. Initiation and Consideration of the Proposal**

### 1. Originating Unit

Approved by the Department of Computer Science on ?.

### 2. Other Considering Units

Software and Information Systems

### 3. Counsel on General Education (COGE)

This proposal was not submitted to the COGE.

## **7. Course Outline for ITCS 3610**

ITCS 3610 will provide a foundation in leadership theory and practical application of leadership in individual and group activities as well as engagement in service-learning projects.

A series of seminars (offered by the instructor and invited speakers), will be offered to enhance disciplinary knowledge and skills related to computing technologies, research, and careers. The course instructor will introduce students to leadership theory within the context of civic engagement – that is, leadership by using computing knowledge and skills in service to society. Students will be assigned various leadership models to present to the class. Facilitated discussions and activities will engage them in learning the concepts. Teams of students will select an instructor-approved problem to solve during the semester.

Through project experience, students will apply leadership concepts in a community setting therefore reinforcing their leadership skills and better understanding the societal and global context of computing and its ability to improve our collective quality of life.

### **Leadership Theory and Practice**

#### **1. Theory**

- Evolution of industrial models vs. post-industrial models of leadership
- Organizational theory
- Social Change Model (SCM)
  - i. Individual values
  - ii. Group values
  - iii. Societal values

#### **2. Practice**

- Engage in class activities and service-learning project

- Apply principles of SCM to organizational experiences

### **Personal Leadership Skills**

#### **3. Time management**

- Processes
- Tools

#### **4. Writing**

- Reflective
- Professional and research

#### **5. Presentation**

- Oral presentations
- Resumes and personal statements

### **Seminar Topics**

6. Advancing technology to advance society
7. Modern computing careers
8. Computing research and a graduate school roadmap
9. Getting involved in your computing community

### **8. Textbook**

1. Class material will be provided as selected readings and as online resources. There are no adequate text books dedicated for the above topics.
2. The following references are recommended.

*Developing Non-hierarchical Leadership on Campus: Case Studies and Best Practices in Higher Education*, Charles L. Outcalt, Shannon K. Faris, Kathleen N. McMahon, eds., 2001, publisher: Greenwood Press, ISBN: 0-313-31178-1

*Leadership for Social Change*, H. S. Astin, *About Campus*, July-August 1996, publisher: Jossey-Bass, ILL: 60279826

*The Student Leadership Challenge: Five Practices for Exemplary Leaders*, James M. Kouzes, Barry Z. Posner, 2008, publisher: Jossey-Bass, ISBN: 978-0-470-17705-1

*The Team Memory Jogger*, Joiner Associates, 1995

*Student Self-Evaluation: Fostering Reflective Learning*, Jean MacGregor, 1993, publisher: Josey-Bass, ISBN: 1-55542-683-2

<http://services.exeter.ac.uk/cas/employability/students/reflective.htm>

<http://www.smc.edu/servicelearning/facultyresources/journal.htm>

### 3. Policy

- This course will include service-learning components
- Class and service-learning attendances are MANDATORY
- Class participation in facilitated discussion is MANDATORY

### 4. Assessment

Students will be assessed through quizzes, reflective writing assignments, service-learning plans and implementation, class and outreach attendance and participation, and presentations. The grading distribution will be:

- Quizzes (10%)
- Class Presentations (10%)
- Reflective writing assignments (15%)
- Service-learning plans and homework assignments (30%)
- Class attendance and participation (25%)
- Final presentation (10%)

## 9. A Sample Service Learning Project

A sample project in this class could be for students to plan the curriculum for a 10-week Citizen Schools apprenticeship. For example, a team of students prepared a series of ten 1-hour classes to teach middle school students game design. The project required the college students to have a deep understanding of the basic components of game design in order to develop curriculum that is accessible to much younger students. This project required students to work within a team to articulate goals and outcomes for the apprenticeship, explore teaching methodologies, create interactive lessons, assess student learning, and generate written reflections on the experience.

Projects can range from one-time events to multi-week events. Other example prior projects are as follows:

- Created 2-hour Internet Safety program for Girl Scouts to earn an IT Badge
- Created a Virtual JA Biztown to provide an online version of Junior Achievement's Biztown program
- Created interactive demonstrations using Lego Mindstorm Robots to illustrate computing concepts in a fun way to middle and high school students.



## **New Proposal to create the following ITCS 3211 Course:**

### **New Undergraduate Course and Curriculum Proposal from the Department of Computer Science**

#### **Title: Computing Leaders Team Projects**

#### **1. Proposal Summary and Catalog Copy**

##### 1. Summary

The Department of Computer Science proposes to add a new course **Computing Leaders Team Projects** to its undergraduate curriculum.

##### 2. Proposed Catalog Copy

**ITCS 3211 Computing Leaders Team Projects (1)** Prerequisite: ITCS 3610 or ITCS 1610. This is a service-learning course that builds upon the leadership concepts from 3610 through focused hands-on experience with service-learning projects. Students will work in teams to apply computing technologies, knowledge and skills to serve community needs. This course can be repeated for elective credit. (*Fall, Spring*)

#### **2. Justification**

Industry partners have expressed that, in addition to technical expertise, ideal computing graduates must possess leadership skills to compete in the global economy. The proposed set of courses (3610, 3211, 3212) complements students' technical expertise with an understanding of leadership in a diverse world and the practical application of leadership skills in service to society.

#### **3. Impact**

The course is designed to serve as an elective course for undergraduate students in Computer Science and related disciplines (e.g., Software and Information Systems). The fact that students have remained engaged with the cohort and activities of the classes beyond completing 3 credit hours is evidence that the course meets a need for diverse students to feel part of a computing community and to perform outreach through the service-learning projects. These components are critical to attracting students to and retaining students in the computing field.

Based on the prior 6 semesters of offering and assessing this course, the expected impact of the course is multi-fold: 1) Students will possess broader computing leadership skills required by industry employers; 2) Computing majors (particularly women and under-represented minorities) taking the course are more likely to be retained, have higher GPAs, and continue on to graduate school; and 3) CCI may attract additional scholarship funds by institutionalizing this mechanism for student success.

#### **4. Resources Required to Support Proposal**

##### 1. Personnel

Faculty and Staff qualified to teach this course include Dr. Teresa Dahlberg, Dr. Tiffany Barnes, Dr. Audrey Rorrer, and Karen Bean are all interested in teaching this course. Many faculty members in the College of Computing and Informatics are qualified to teach this course.

##### 2. Physical Facility

A smart classroom is required.

##### 3. Equipment and Supplies

None identified.

##### 4. Lab/Network Environment

None identified.

##### 5. Audio-Visual

Current facilities are adequate to support this course.

##### 6. Other Resources

None identified.

#### **5. Consultation with the Library and Other Departments or Units**

##### 1. Library Consultation

This will be undertaken.

##### 2. Consultation with Other Departments or Units

Software and Information Systems consultation will be undertaken.

#### **6. Initiation and Consideration of the Proposal**

##### 1. Originating Unit

Under review by Computer Science department

##### 2. Other Considering Units

Software and Information Systems

3. Counsel on General Education (COGE)

This proposal was not submitted to the COGE.

**7. Course Outline for ITCS 3211**

Following the leadership concepts introduced in ITCS 3610, the goal of ITCS 3211 is to provide focused practice in using computing technologies, knowledge, and skills to serve the needs of the community. In weekly classes and as class assignments, teams of students will identify social problems, adopt a vision statement, meet with community partners, develop a project plan and timeline, and develop a written report. Group discussions will be held throughout the semester in which students will discuss issues and successes of the projects and relate them to the leadership concepts covered in the previous course. Students spend 12 hours on outreach with the partner and write 4 reflective papers based on their experiences with the partner and the concepts discussed in class. Each team will develop a poster describing their project processes and outcomes for the final exam.

**Planning and Implementation**

**1. Team Building**

- Revisit leadership concepts from 3610
- Develop teams and roles
- Identify social problem or need and community partner
- Adopt a vision statement

**2. Solution Identification**

- Meet with community partner
- Gather project requirements
- Develop project goals and timeline in written report

**3. Development and Implementation**

- Develop project deliverables
- Deliver solution

**Reflection**

**4. Evaluation**

- Evaluate the positives and negatives of the individual and group leadership processes and outcomes
- Write reflective paper

## 5. **Presentation of Results**

- Teams develop and present posters to peers
- Students and faculty provide feedback

## 8. **Textbook**

1. Class material will be provided as selected reading material and online resources. There are no adequate text books dedicated for the above topics.
2. Policy
  - This course will include service-learning components
  - Class and service-learning attendances are MANDATORY
  - Class participation in facilitated discussion is MANDATORY
3. Assessment

Students will be assessed through project reports, reflective writing assignments, class and outreach attendance and participation, and presentations. The grading distribution will be:

- Project Report (25%)
- Reflective writing assignments (40%)
- Class attendance and participation (25%)
- Final presentation (10%)

## 9. **Sample Service-Learning Projects**

A sample project in this class could be for students to plan the curriculum for a 10-week Citizen Schools apprenticeship. For example, a team of students prepared a series of ten 1-hour classes to teach middle school students game design. The project required the college students to have a deep understanding of the basic components of game design in order to develop curriculum that is accessible to much younger students. This project required students to work within a team to articulate goals and outcomes for the apprenticeship, explore teaching methodologies, create interactive lessons, assess student learning, and generate written reflections on the experience.

Projects can range from one-time events to multi-week events. Other example prior projects are as follows:

- Created 2-hour Internet Safety program for Girl Scouts to earn an IT Badge
- Created a Virtual JA Biztown to provide an online version of Junior Achievement's Biztown program
- Created interactive demonstrations using Lego Mindstorm Robots to illustrate computing concepts in a fun way to middle and high school students.

## **New Proposal to create the following ITCS 3212 Course:**

### **New Undergraduate Course and Curriculum Proposal from the Department of Computer Science**

#### **Title: Computing Leaders Team Leaders**

#### **1. Proposal Summary and Catalog Copy**

##### 1. Summary

The Department of Computer Science proposes to add a new course **Computing Leaders Team Leaders** to its undergraduate curriculum.

##### 2. Proposed Catalog Copy

**ITCS 3212 Computing Leaders Team Projects (1)** Prerequisite: ITCS 3610 or ITCS 1610. This is a service-learning course that builds upon the leadership concepts from 3610 through focused hands-on experience with service-learning projects. This is a companion course to ITCS 3211. Students in this course serve as team leaders for the team projects undertaken by students in ITCS 3211. Students will lead teams to apply computing technologies, knowledge and skills to serve community needs. This course can be repeated for elective credit. (*Fall, Spring*)

#### **2. Justification**

Industry partners have expressed that, in addition to technical expertise, ideal computing graduates must possess leadership skills to compete in the global economy. The proposed set of courses (3610, 3211, 3212) complements students' technical expertise with an understanding of leadership in a diverse world and the practical application of leadership skills in service to society.

#### **3. Impact**

The course is designed to serve as an elective course for undergraduate students in Computer Science and related disciplines (e.g., Software and Information Systems). Previously ITCS 3610 classes have ranged from 15 to 25 students and have had a number of repeaters. The fact that students have remained engaged with the cohort and activities of the classes beyond completing 3 credit hours is evidence that the course meets a need for diverse students to feel part of a computing community and to perform outreach through the service-learning projects. These components are critical to attracting students to and retaining students in the computing field.

Based on the prior 6 semesters of offering and assessing this course, the expected impact of the course is multi-fold: 1) Students will possess broader computing leadership skills required by industry employers; 2) Computing majors (particularly women and under-

represented minorities) taking the course are more likely to be retained, have higher GPAs, and continue on to graduate school; 3) Non-majors taking the course may enroll in computing majors; and 4) CCI may attract additional scholarship funds by institutionalizing this mechanism for student success.

#### **4. Resources Required to Support Proposal**

##### 7. Personnel

Faculty and Staff qualified to teach this course include Dr. Teresa Dahlberg, Dr. Tiffany Barnes, Dr. Audrey Rorrer, and Karen Bean are all interested in teaching this course. Many faculty members in the College of Computing and Informatics are qualified to teach this course.

##### 8. Physical Facility

A smart classroom is required.

##### 9. Equipment and Supplies

None identified.

##### 10. Lab/Network Environment

None identified.

##### 11. Audio-Visual

Current facilities are adequate to support this course.

##### 12. Other Resources

None identified.

#### **5. Consultation with the Library and Other Departments or Units**

##### 3. Library Consultation

This will be undertaken.

##### 4. Consultation with Other Departments or Units

Software and Information Systems consultation will be undertaken.

#### **6. Initiation and Consideration of the Proposal**

##### 4. Originating Unit

Under review by Computer Science department

5. Other Considering Units

Software and Information Systems

6. Counsel on General Education (COGE)

This proposal was not submitted to the COGE.

**7. Course Outline for ITCS 3212**

Following the leadership concepts introduced in ITCS 3610, the goal of ITCS 3211 is to provide focused practice in using computing technologies, knowledge, and skills to serve the needs of the community. In weekly classes and as class assignments, teams of students will identify social problems, adopt a vision statement, meet with community partners, develop a project plan and timeline, and develop a written report. Group discussions will be held throughout the semester in which students will discuss issues and successes of the projects and relate them to the leadership concepts covered in the previous course. Students spend 12 hours on outreach with the partner and write 4 reflective papers based on their experiences with the partner and the concepts discussed in class. Each team will develop a poster describing their project processes and outcomes for the final exam.

**Planning and Implementation**

**6. Team Building**

- Revisit leadership concepts from 3610
- Develop teams and roles
- Identify social problem or need and community partner
- Adopt a vision statement

**7. Solution Identification**

- Meet with community partner
- Gather project requirements
- Develop project goals and timeline in written report

**8. Development and Implementation**

- Develop project deliverables
- Deliver solution

**Reflection**

## 9. Evaluation

- Evaluate the positives and negatives of the individual and group leadership processes and outcomes
- Write reflective paper

## 10. Presentation of Results

- Teams develop and present posters to peers
- Students and faculty provide feedback

## 8. Textbook

4. Class material will be provided as selected reading material and online resources. There are no adequate text books dedicated for the above topics.

### 5. Policy

- This course will include service-learning components
- Class and service-learning attendances are MANDATORY
- Class participation in facilitated discussion is MANDATORY

### 6. Assessment

Students will be assessed through project reports, reflective writing assignments, class and outreach attendance and participation, and presentations. The grading distribution will be:

- Project Report (25%)
- Reflective writing assignments (40%)
- Class attendance and participation (25%)
- Final presentation (10%)

## 9. Sample Service-Learning Projects

A sample project in this class could be for students to plan the curriculum for a 10-week Citizen Schools apprenticeship. For example, a team of students prepared a series of ten 1-hour classes to teach middle school students game design. The project required the college students to have a deep understanding of the basic components of game design in order to develop curriculum that is accessible to much younger students. This project required students to work within a team to articulate goals and outcomes for the apprenticeship, explore teaching methodologies, create interactive lessons, assess student learning, and generate written reflections on the experience.

Projects can range from one-time events to multi-week events. Other example prior projects are as follows:

- Created 2-hour Internet Safety program for Girl Scouts to earn an IT Badge
- Created a Virtual JA Biztown to provide an online version of Junior Achievement's Biztown program



- Created interactive demonstrations using Lego Mindstorm Robots to illustrate computing concepts in a fun way to middle and high school students.

## **New Proposal to create the following ITCS 1610 Course:**

### **New Undergraduate Course and Curriculum Proposal from the Department of Computer Science**

#### **Title: ITCS 1610 Computing Applications Seminar**

#### **10. Proposal Summary and Catalog Copy**

##### 3. Summary

The Department of Computer Science proposes to add a new course ITCS 1610 **Computing Applications Seminar** to its undergraduate curriculum.

##### 4. Proposed Catalog Copy

**ITCS 1610 Computing Applications Seminar** (3). Prerequisite: Math 1100, 1103, 1120, or 1242. This is a service-learning seminar course designed to emphasize the social relevance of computing. The course aims to inform non-majors of computing technologies, research, and career opportunities. Seminar topics are intended to enhance disciplinary knowledge and to develop leadership skills related to using computing knowledge and skills in service to society. Emphasis will be placed on the basic concepts of leadership theory and its application within the computing discipline on an individual, group, and societal level. Students will participate in team-based computing service-learning projects in the community, in conjunction with computing majors taking ITCS 3610. Student performance evaluation will consider individual homework assignments, participation in team projects, and class participation. (*Fall, Spring*)

#### **11. Justification**

UCLAS has requested offering the STARS Leadership Corps as a theme-based course for second semester undeclared majors. Non-majors who have participated in the STARS Leadership Corps in the prior 4 years, have benefited from learning about computing by working alongside computing majors doing service-learning projects. ITCS 1610 will serve as a version of ITCS 3610 for non-majors. Enrollment will be limited to students who demonstrate high math aptitude. This could serve as a good mechanism to recruit undeclared majors.

#### **12. Impact**

The course is designed to serve as an elective course for undergraduate students who are undeclared majors and have high math aptitude. The course will be offered as a theme-based course for University College students (undeclared majors) and can count as a free elective for these students. Previously ITCS 3610 classes have ranged from 15 to 30 students and have had a number of repeaters. The fact that students have remained

engaged with the cohort and activities of the classes beyond completing 3 credit hours is evidence that the course meets a need for diverse students to feel part of a computing community and to perform outreach through the service-learning projects. These components are critical to attracting students to and retaining students in the computing field. The course also serves a need to develop students leadership and communication skills (to build a breadth of general skills while having depth in computing, to make “T-shaped students”). Because the course also serves as a mechanism for enhancing student engagement, academic adjustment to college, and academic achievement, the course has played a key role in attracting NSF scholarships for transfer students (\$600K).

Based on the prior 6 semesters of offering and assessing this course, the expected impact of the course is that non-majors taking the course may enroll in computing majors and that CCI may attract additional scholarship funds by institutionalizing this mechanism for student recruitment.

### **13. Resources Required to Support Proposal**

#### 7. Personnel

Faculty and Staff qualified to teach this course include Dr. Teresa Dahlberg, Dr. Tiffany Barnes, Dr. Audrey Rorrer, and Ms. Karen Bean. Many faculty members in the College of Computing and Informatics are qualified to teach this course.

#### 8. Physical Facility

A smart classroom is required.

#### 9. Equipment and Supplies

None identified.

#### 10. Lab/Network Environment

None identified.

#### 11. Audio-Visual

Current facilities are adequate to support this course.

#### 12. Other Resources

None identified.

### **14. Consultation with the Library and Other Departments or Units**

#### 3. Library Consultation

This will be undertaken.

4. Consultation with Other Departments or Units  
Software and Information Systems consultation will be undertaken.

## **15. Initiation and Consideration of the Proposal**

4. Originating Unit

Approved by the Department of Computer Science on ?.

5. Other Considering Units

Software and Information Systems

6. Counsel on General Education (COGE)

This proposal was not submitted to the COGE.

## **16. Course Outline for ITCS 1610**

ITCS 1610 will provide a foundation in leadership theory and practical application of leadership in individual and group activities as well as engagement in service-learning projects.

A series of seminars (offered by the instructor and invited speakers), will be offered to enhance disciplinary knowledge and skills related to computing technologies, research, and careers. The course instructor will introduce students to leadership theory within the context of civic engagement – that is, leadership by using computing knowledge and skills in service to society. Students will be assigned various leadership models to present to the class. Facilitated discussions and activities will engage them in learning the concepts. Teams of students will select an instructor-approved problem to solve during the semester.

Through project experience, students will apply leadership concepts in a community setting therefore reinforcing their leadership skills and better understanding the societal and global context of computing and its ability to improve our collective quality of life.

### **Leadership Theory and Practice**

#### **6. Theory**

- Evolution of industrial models vs. post-industrial models of leadership
- Organizational theory
- Social Change Model (SCM)
  - i. Individual values
  - ii. Group values
  - iii. Societal values

## 7. Practice

- Engage in class activities and service-learning project
- Apply principles of SCM to organizational experiences

## Personal Leadership Skills

### 8. Time management

- Processes
- Tools

### 9. Writing

- Reflective
- Professional and research

### 10. Presentation

- Oral presentations
- Resumes and personal statements

## Seminar Topics

10. Advancing technology to advance society

11. Modern computing careers

12. Computing research and a graduate school roadmap

13. Getting involved in your computing community

## 17. Textbook

5. Class material will be provided as selected readings and as online resources. There are no adequate text books dedicated for the above topics.

6. The following references are recommended.

*Developing Non-hierarchical Leadership on Campus: Case Studies and Best Practices in Higher Education*, Charles L. Outcalt, Shannon K. Faris, Kathleen N. McMahon, eds., 2001, publisher: Greenwood Press, ISBN: 0-313-31178-1

*Leadership for Social Change*, H. S. Astin, *About Campus*, July-August 1996, publisher: Jossey-Bass, ILL: 60279826

*The Student Leadership Challenge: Five Practices for Exemplary Leaders*, James M. Kouzes, Barry Z. Posner, 2008, publisher: Jossey-Bass, ISBN: 978-0-470-17705-1

*The Team Memory Jogger*, Joiner Associates, 1995

*Student Self-Evaluation: Fostering Reflective Learning*, Jean MacGregor, 1993, publisher: Josey-Bass, ISBN: 1-55542-683-2

<http://services.exeter.ac.uk/cas/employability/students/reflective.htm>

<http://www.smc.edu/servicelearning/facultyresources/journal.htm>

#### 7. Policy

- This course will include service-learning components
- Class and service-learning attendances are MANDATORY
- Class participation in facilitated discussion is MANDATORY

#### 8. Assessment

Students will be assessed through quizzes, reflective writing assignments, service-learning plans and implementation, class and outreach attendance and participation, and presentations. The grading distribution will be:

- Quizzes (10%)
- Class Presentations (10%)
- Reflective writing assignments (15%)
- Service-learning plans and homework assignments (30%)
- Class attendance and participation (25%)
- Final presentation (10%)

### **18. A Sample Service Learning Project**

A sample project in this class could be for students to explore computing careers, computing research areas, or societal problems that are being solved by computing; develop a multi-media presentation that conveys the excitement of this exploration to younger students; and visit middle and high schools to deliver the presentation to younger students. The activity would serve to enhance students' knowledge of computing, while developing their skills in leadership, communication, and teamwork.