CRITERION 3. STUDENT OUTCOMES

A. Student Outcomes
List the student outcomes for the program and indicate where the student outcomes are documented.

The Student Outcomes are mapped one-to-one to all of the outcomes provided by CAC of ABET; as such, it was decided simply to adopt those provided. Thus, by the time of graduation the program enables students to achieve:

(a) An ability to apply knowledge of computing and mathematics appropriate to information systems.
(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
(c) An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs.
(d) An ability to function effectively on teams to accomplish a common goal.
(e) An understanding of professional, ethical, legal, security, and social issues and responsibilities.
(f) An ability to communicate effectively with a range of audiences.
(g) An ability to analyze the local and global impact of computing on individuals, organizations and society.
(h) Recognition of the need for, and an ability to engage in, continuing professional development.
(i) An ability to use current techniques, skills, and tools necessary for computing practices.
(j) An understanding of and an ability to support the use, delivery, and management of information systems within an Information Systems environment.

These outcomes are documented externally and are available in:

- The Department of Information Science website: [http://www.isc.ku.edu.kw/mission.php?panel=0#Accordion1#tphp](http://www.isc.ku.edu.kw/mission.php?panel=0#Accordion1#tphp)
- Student Exit Survey
- Employer Survey
- Alumni Survey
- Department Handbook
- Student Portfolios
**B. Relationship of Student Outcomes to Program Educational Objectives**

Describe how the student outcomes prepare graduates to attain the program educational objectives.

The relationship between Student Outcomes and Program Educational Objectives are shown in tabular form in **Table B.1**.

**Table B.1: Mapping of Students Outcomes versus Program Educational Objectives**

<table>
<thead>
<tr>
<th>Students Outcomes (SO)</th>
<th>Program Educational Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
</tr>
<tr>
<td>a) An ability to apply knowledge of computing and mathematics appropriate to IS</td>
<td>✓</td>
</tr>
<tr>
<td>b) An ability to analyze a problem, and identify and define the computing requirements</td>
<td>✓</td>
</tr>
<tr>
<td>c) An ability to design, implement and evaluate a computer-based system, process,</td>
<td>✓</td>
</tr>
<tr>
<td>component, or program to meet desired needs</td>
<td></td>
</tr>
<tr>
<td>d) An ability to function effectively on teams to accomplish a common goal</td>
<td>✓</td>
</tr>
<tr>
<td>e) An understanding of professional, ethical, legal, security, and social issues and</td>
<td>✓</td>
</tr>
<tr>
<td>responsibilities</td>
<td></td>
</tr>
<tr>
<td>f) An ability to communicate effectively with a range of audiences</td>
<td>✓</td>
</tr>
<tr>
<td>g) An ability to analyze the local and global impact of computing on individuals,</td>
<td>✓</td>
</tr>
<tr>
<td>organizations and society</td>
<td></td>
</tr>
<tr>
<td>h) Recognition of the need for, and an ability to engage in, continuing professional</td>
<td>✓</td>
</tr>
<tr>
<td>development</td>
<td></td>
</tr>
<tr>
<td>i) An ability to use current techniques, skills, and tools necessary for computing</td>
<td>✓</td>
</tr>
<tr>
<td>practices</td>
<td></td>
</tr>
<tr>
<td>j) An understanding of and an ability to support the use, delivery, and management of</td>
<td>✓</td>
</tr>
<tr>
<td>information systems within an Information Systems environment</td>
<td></td>
</tr>
</tbody>
</table>

The following discussion describes how the Student Outcomes prepare graduates to attain to Program Educational Objectives.

PEO- I. Engage in productive careers with the knowledge of computing to develop, deliver, and manage information systems that support public and private organizations.
Student Outcomes (a)-(c) and (i)-(j) contribute to attain this Program Educational Objective. After graduations, students will be able to use their knowledge of mathematics, computer skills, problem design and analysis, and information systems management in their career within a specific application environment.

PEO- II. Excel in their work environment by communicating effectively, functioning effectively as a team, and practicing professional ethics with the sense of social responsibility.

Student Outcomes (d)-(f) ensure that the graduates will become team members and subsequently team leaders. Graduates will also be able to communicate their knowledge in oral and written format within their teams. They will be mindful of their professional, legal and social responsibilities and act maturely accordingly.

PEO- III. Adapt to the challenges of the changing environment and the new technologies, and to continue professional development, broaden their professional knowledge and/or pursue graduate studies.

Student Outcomes (g)-(i) encourage the graduates to continuously acquire knowledge about new computing tools and the impact of computing on individuals, organizations and society. This will enable them to be engaged in continuous life-long learning and professional development. These Student Outcomes also ensure that the graduates will have the appropriate background to pursue their graduate studies.
C. Process for the Establishment and Revision of the Student Outcomes

Describe the process used for reviewing and revising student outcomes.

Process of Revising Students Outcomes (SOs):

The process used for reviewing and revising Students Outcomes (SOs) consists of

1. The Assessment & Continuous Improvement (ACI) committee at the ISC department monitors for any updates of ABET student outcomes in September of every year.
2. When the ABET student outcomes are revised, the ISC Student Outcomes will be revised accordingly. This includes the approval of department council and the college council.
3. Once the Student Outcomes are revised, then the department subsequently will revise the following documents:
   - Course Description Forms,
   - Instructor Course Evaluation Form,
   - Course Assessment File formats,
   - Mapping between the ISC courses and the revised Student Outcomes
   - Mapping between the Program Educational Objectives and the revised Student Outcomes

Student Outcomes 2003-2009:

When the program was launched in 2003, the Student Outcomes consist of three components: ISC Major learning outcomes, College learning outcomes and GE learning outcomes:

INFORMATION SCIENCE MAJOR LEARNING OUTCOMES

1. Problem Identification and Analysis: students will be able to recognize, define, and classify problems.
2. Problem Solving: students will develop solutions and evaluate their correctness.
3. Information Technologies and their Applications: students will understand the capabilities, use, and application of information technologies.
4. Systems Principles and Practices: students will have an understanding of the different system types, their structures, and standards.
5. Technical Communications: students will be able to develop technical material, effectively present it, and objectively evaluate other technical materials.

COLLEGE LEARNING OUTCOMES

1. Information Literacy and Communication: CFW graduates will recognize information needs, access, and evaluate appropriate information to answer those needs, and communicate effectively to a variety of audiences in both English and Arabic.
2. Information Technology: CFW graduates will have an awareness of the implications of Information Technology (IT) in daily lives and on society as a whole, and the ability to utilize IT to communicate and solve problems.
3. Critical Thinking and Problem Solving: CFW graduates will be able to use information, reasoning, and creative processes to solve problems and achieve goals.
4. Leadership and Teamwork: CFW graduates will be able to assume leadership roles in a variety of real world situations and function effectively in a group of which they are a member.
5. Global Awareness: CFW graduates will be aware of global issues and their implications on their daily lives.

GENERAL EDUCATION LEARNING OUTCOMES
1. **Creative Expression:** CFW graduates will develop their ability for self-expression by engaging in art forms which communicate ideas. This engagement allows them to reflect on the many dimensions of the human experience.

2. **Culture & Society:** CFW graduates will examine and discuss cultural, historical, and social issues from multiple perspectives, investigate the development of their own culture’s values, and contribute to the development of a more humane world.

3. **Language & Communication:** CFW graduates will communicate effectively in English and Arabic in a variety of contexts and media.

4. **Leadership Competency:** CFW graduates will cultivate the capacity to be leaders in their professional and personal communities.

5. **Science, Health, and Technology:** CFW graduates will use tools and methodologies of science and technology to solve problems and explain the world in a wide environmental, cultural, social, and economic context.

### Student Outcomes 2009-2014:

In the academic year 2008-09, the department decided to apply for ABET accreditation. The department invited several ABET consultants in order to revise the student outcomes. Here is a few ABET consultants who visited our department before the second major revision of student outcomes:

- Prof. Abdullah Abanomah 2005-06
- Prof. Ahmed Kamal 2006-07
- Prof. Fayez Gebali 2007-08 (Visiting Professor)
- Prof. Hesham El-Rewini 2008-09
- Prof. John T Gorgone 2009-10

Based on the advice of the ABET consultants, the department decided to rewrite the student outcomes. The unanimous decision was that ISC student outcomes would be nothing but ABET student outcomes. When ABET revises student outcomes, the ISC student outcomes will also be revised automatically.

Based on this decision, the new Student Outcomes were:

a) An ability to apply knowledge of computing and mathematics appropriate to Information Systems
b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
c) An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs
d) An ability to function effectively on teams to accomplish a common goal
e) An understanding of professional, ethical, legal, security, and social issues and responsibilities
f) An ability to communicate effectively with a range of audiences
g) An ability to analyze the local and global impact of computing on individuals, organizations, and society
h) Recognition of the need for, and an ability to engage in, continuing professional development
i) An ability to use current techniques, skills, and tools necessary for computing practices
j) An understanding of processes that support the delivery and management of information systems within a specific application environment
Student Outcomes 2015-2018:

In 2014-15, ABET made revision in Student Outcomes in (j). The new SO(j) revised by ABET was as follows:

j) An understanding of and an ability to support the use, delivery, and management of information systems within an Information Systems environment.

Subsequently, the department also revised its Student Outcomes as follows:

a) An ability to apply knowledge of computing and mathematics appropriate to Information Systems
b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
c) An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs
d) An ability to function effectively on teams to accomplish a common goal
e) An understanding of professional, ethical, legal, security, and social issues and responsibilities
f) An ability to communicate effectively with a range of audiences
g) An ability to analyze the local and global impact of computing on individuals, organizations and society
h) Recognition of the need for, and an ability to engage in, continuing professional development
i) An ability to use current techniques, skills, and tools necessary for computing practices
j) An understanding of and an ability to support the use, delivery, and management of information systems within an Information Systems environment.

Student Outcomes 2019-Future:

In 2016, ABET (CAC) has made major revision in ABET outcomes. The department had decided to incorporate these changes in the year 2019. The department Chairman Prof Jehad Al Dallal consulted with ABET office how to incorporate these changes in our department accreditation process. Since the department is preparing self-study report for accreditation cycle 2017-18, it is advised not to make any changes during this period. All the documents are in the folder “Student Outcomes” available in the display room.
D. Enabled Student Characteristics

All computing programs must show how they enable students to attain, by the time of graduation, characteristics (a) through (i) as listed in Criterion 3 as well as any applicable characteristics defined within the program criteria. For each characteristic listed either in the general criteria or the applicable program criteria, indicate how the program enables that characteristic.

I. Mappings between ISC courses and Student Outcomes

This mapping between ISC course and Student Outcomes is also revised periodically. Prof. Heikki Topi was invited to Kuwait University as ABET consultant. He visited our department in the month March 2016. He advised to make some amendments in the Table D.1. In the earlier version, SO(j) was mapped to ISC480 and XXX450. He recommended that SO(j) should be mapped to only XXX450. Based on his recommendation, the Table D.1 (subsequently Table D.2) was revised.

Mapping before 2016

Table D.1 shows how our ISC program enables students to attain, by the time of graduation, characteristics (a) through (j) of student outcomes.

Table D.1: Student Outcomes versus Information Science Courses

<table>
<thead>
<tr>
<th>Student Outcomes</th>
<th>Courses listed according to priority in achieving an outcome. Lowest (1)-Highest (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)  (2)  (3)  (4)</td>
</tr>
<tr>
<td>a) An ability to apply knowledge of computing and mathematics appropriate to Information Systems</td>
<td>ISC 363  ISC 241  ISC 353</td>
</tr>
<tr>
<td>b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution</td>
<td>ISC 499  ISC 480  *XXX 450</td>
</tr>
<tr>
<td>c) An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs</td>
<td>ISC 499  ISC 321  *XXX 450  ISC 480</td>
</tr>
<tr>
<td>d) An ability to function effectively on teams to accomplish a common goal</td>
<td>ISC 499</td>
</tr>
<tr>
<td>e) An understanding of professional, ethical, legal, security, and social issues and responsibilities</td>
<td>CLS 130  ISC 105</td>
</tr>
<tr>
<td>f) An ability to communicate effectively with a range of audiences</td>
<td>CLS 253  ISC 495  ISC 499</td>
</tr>
<tr>
<td>g) An ability to analyze the local and global impact of computing on individuals, organizations and society</td>
<td>ISC 331  ISC 105</td>
</tr>
</tbody>
</table>
### Table D.2: Information Science Courses versus Student Outcomes (SOs)

<table>
<thead>
<tr>
<th>COURSES</th>
<th>NAME OF THE COURSE</th>
<th>SOs</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLS130</td>
<td>Ethics and Practices</td>
<td>(e)</td>
</tr>
<tr>
<td>CLS253</td>
<td>Technical Writing</td>
<td>(f)</td>
</tr>
<tr>
<td>ISC105</td>
<td>Computers and Society</td>
<td>(e), (g)</td>
</tr>
<tr>
<td>ISC210</td>
<td>Computational Methods</td>
<td>(i)</td>
</tr>
<tr>
<td>ISC241</td>
<td>Data Structures</td>
<td>(a)</td>
</tr>
<tr>
<td>ISC321</td>
<td>Database Systems I</td>
<td>(c)</td>
</tr>
<tr>
<td>ISC331</td>
<td>IS Theory and Practices</td>
<td>(g)</td>
</tr>
<tr>
<td>ISC340</td>
<td>Web Programming</td>
<td>(i)</td>
</tr>
<tr>
<td>ISC350</td>
<td>Networks and Telecommunications</td>
<td>(i)</td>
</tr>
<tr>
<td>ISC353</td>
<td>Information Security Systems</td>
<td>(a)</td>
</tr>
<tr>
<td>ISC363</td>
<td>Computer Organization</td>
<td>(a)</td>
</tr>
<tr>
<td>ISC480</td>
<td>IS Development</td>
<td>(b), (c), (j)</td>
</tr>
<tr>
<td>AAD 450</td>
<td>Applications of Information Systems in Art</td>
<td>(b), (c), (j)</td>
</tr>
<tr>
<td>CSL450</td>
<td>Applications of Information Systems in Communication Disorders</td>
<td>(b), (c), (j)</td>
</tr>
<tr>
<td>ETM450</td>
<td>Applications of Information Systems in Environmental Technology Management</td>
<td>(b), (c), (j)</td>
</tr>
<tr>
<td>FSC450</td>
<td>Applications of Information Systems in Nutrition</td>
<td>(b), (c), (j)</td>
</tr>
<tr>
<td>ISC495</td>
<td>Internship</td>
<td>(f), (h)</td>
</tr>
<tr>
<td>ISC499</td>
<td>Capstone Project</td>
<td>(b), (c), (d), (f)</td>
</tr>
</tbody>
</table>
Prof. Heikki Topi recommended that SO(j) should be mapped to only XXX450. Based on his recommendation, the Table D.1 (subsequently Table D.2) was revised. The revised Tables are given below:

**Revised Mapping from 2016**

**Table D.3 Student Outcomes versus Information Science Courses**

<table>
<thead>
<tr>
<th>Student Outcomes</th>
<th>Courses listed according to priority in achieving an outcome. Lowest (1)-Highest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>a) An ability to apply knowledge of computing and mathematics appropriate to Information Systems</td>
<td>ISC 363</td>
</tr>
<tr>
<td>b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution</td>
<td>ISC 499</td>
</tr>
<tr>
<td>c) An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs</td>
<td>ISC 499</td>
</tr>
<tr>
<td>d) An ability to function effectively on teams to accomplish a common goal</td>
<td>ISC 499</td>
</tr>
<tr>
<td>e) An understanding of professional, ethical, legal, security, and social issues and responsibilities</td>
<td>CLS 130</td>
</tr>
<tr>
<td>f) An ability to communicate effectively with a range of audiences</td>
<td>CLS 253</td>
</tr>
<tr>
<td>g) An ability to analyze the local and global impact of computing on individuals, organizations and society</td>
<td>ISC 331</td>
</tr>
<tr>
<td>h) Recognition of the need for, and an ability to engage in, continuing professional development</td>
<td>ISC 495</td>
</tr>
<tr>
<td>i) An ability to use current techniques, skills, and tools necessary for computing practices</td>
<td>ISC 210</td>
</tr>
<tr>
<td>j) An understanding of and an ability to support the use, delivery, and management of information systems within an Information Systems environment</td>
<td>*XXX 450</td>
</tr>
</tbody>
</table>

*XXX is departmental code of the ISC environment electives
Table D.4 indicates how the program enables that characteristic (a) through (j).

**Table D.4: Information Science Courses versus Student Outcomes**

<table>
<thead>
<tr>
<th>COURSES</th>
<th>NAME OF THE COURSE</th>
<th>SOs</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLS130</td>
<td>Ethics and Practices</td>
<td>(e)</td>
</tr>
<tr>
<td>CLS253</td>
<td>Technical Writing</td>
<td>(f)</td>
</tr>
<tr>
<td>ISC105</td>
<td>Computers and Society</td>
<td>(e), (g)</td>
</tr>
<tr>
<td>ISC210</td>
<td>Computational Methods</td>
<td>(i)</td>
</tr>
<tr>
<td>ISC241</td>
<td>Data Structures</td>
<td>(a)</td>
</tr>
<tr>
<td>ISC321</td>
<td>Database Systems I</td>
<td>(c)</td>
</tr>
<tr>
<td>ISC331</td>
<td>IS Theory and Practices</td>
<td>(g)</td>
</tr>
<tr>
<td>ISC340</td>
<td>Web Programming</td>
<td>(i)</td>
</tr>
<tr>
<td>ISC350</td>
<td>Networks and Telecommunications</td>
<td>(i)</td>
</tr>
<tr>
<td>ISC353</td>
<td>Information Security Systems</td>
<td>(a)</td>
</tr>
<tr>
<td>ISC363</td>
<td>Computer Organization</td>
<td>(a)</td>
</tr>
<tr>
<td>ISC480</td>
<td>IS Development</td>
<td>(b), (c)</td>
</tr>
<tr>
<td>AAD 450</td>
<td>Applications of Information Systems in Art</td>
<td></td>
</tr>
<tr>
<td>CSL450</td>
<td>Applications of Information Systems in Communication Disorders</td>
<td>(b), (c), (j)</td>
</tr>
<tr>
<td>ETM450</td>
<td>Applications of Information Systems in Environmental Technology Management</td>
<td></td>
</tr>
<tr>
<td>FSC450</td>
<td>Applications of Information Systems in Nutrition</td>
<td></td>
</tr>
<tr>
<td>ISC495</td>
<td>Internship</td>
<td>(f), (h)</td>
</tr>
<tr>
<td>ISC499</td>
<td>Capstone Project</td>
<td>(b), (c), (d), (f)</td>
</tr>
</tbody>
</table>
II Justification of mapping between ISC courses and characteristics (a) through (j).

We recall that characteristics (a) through (j) and student outcomes (a) through (j) are the same. In the above tables, the mapping between ISC courses and characteristics (a) through (j) are given. Now we explain how the ISC courses enables that characteristics (a) through (j).

**Characteristic (a):**

“An ability to apply knowledge of computing and mathematics appropriate to Information Systems”.

This characteristic has two components:

1. An ability to apply knowledge of computing appropriate to the discipline
2. An ability to apply knowledge of mathematics appropriate to the discipline

The first part “An ability to apply knowledge of computing appropriate to the discipline” is achieved by ISC241. ISC241 focuses on the construction of efficient data structures and algorithms and implementation of those data structures and algorithms using java programming language. The students course project of ISC241 concentrates on the demonstration of knowledge of computing in some IS application.

The second part of characteristic (a) is “An ability to apply knowledge of mathematics appropriate to the discipline”. This is achieved by two courses ISC353 and ISC363. The course ISC363 includes elaborative mathematical contents:

- Boolean Algebra,
- Number systems,
- Binary number systems, 1’s complement, 2’s complement,
- Algorithms/Techniques of multiplication, addition etc,
- K maps.

The course ISC353 includes significant mathematics:

- RSA algorithm,
- Electronic Signature,
- Cryptography,
- Routing algorithm and networking protocols etc.

Students apply knowledge of mathematics in computer organization and information security systems.

**Characteristic (b):**

“An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution”.

This characteristic is achieved by XXX450, ISC480, ISC499. The course ISC480 includes UML models and IEEE Requirement Specification. Students are also trained to write simple SRS for some specific software applications. XXX450 and ISC499 are more practical. Students build software applications applying software development life cycles (SDLC). The initial part of SDLC is Requirement Phase. In the new format of ISC499, the characteristic (b) is separately assessed and graded.
**Characteristic (c):**

“An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs”.

This characteristic has three components:

1. An ability to **design** a computer-based system, process, component, or program to meet desired needs
2. An ability to **implement** a computer-based system, process, component, or program to meet desired needs
3. An ability to **evaluate** a computer-based system, process, component, or program to meet desired needs

This characteristic is achieved by ISC321, XXX450, ISC480, ISC499. Design Phase is the second stage of SDLC. The courses XXX450, ISC480, and ISC499 focus on entire SDLC. The second stage of SDLC is Design Phase, the third phase of SDLC is Implementation Phase and the fourth phase is Testing Phase. Thus, Design, Implementation Phases and Testing Phases are well covered by these courses.

In addition, ISC321 specializes on the database design using the following techniques:

- Entity–Relationship (ER)
- Enhanced Entity–Relationship (EER)
- UML models,
- Relational algebra
- Relational calculus,
- Functional dependencies and normalization for relational database

**Characteristic (d):**

“An ability to function effectively on teams to accomplish a common goal”.

The characteristic (d) is achieved by ISC499. One of objectives of ISC499 is to function as a team with colleagues and supervisor. The capstone project is a group project. A group consists of 2-3 students. It is supervised by an instructor. A student gets ample opportunities to work as a team during the development of capstone project. There is an exclusive rubric “Evaluation of Team Work” to assess the team work of each student. This is assessed by the peer students and the supervisor.

**Characteristic (e):**

“An understanding of professional, ethical, legal, security, and social issues and responsibilities”.

The characteristic (e) has 5 components:

1. An understanding of **professional** issues and responsibilities
2. An understanding of **ethical** issues and responsibilities
3. An understanding of **legal** issues and responsibilities
4. An understanding of **security** issues and responsibilities
5. An understanding of **social** issues and responsibilities

This characteristic is achieved by CLS130 and ISC105. The following table illustrates how the above items are covered by the courses CLS130 and ISC105:
### Professional issues and responsibilities
- **CFW130**: Employees’ rights, discrimination issues, knowledge and understanding of the working environment

### Ethical issues and responsibilities
- **ISC105**: Case study analysis using practical ethical theories: Kantianism ethical theory, Utilitarianism, Social Contract theory.
- **CLS130**: Case study analysis of ethical issues, code of ethics, ethics related to local culture and sentiments.

### Legal issues and responsibilities
- **ISC105**: Copyright issues, Patent issues, Intellectual Property,
- **CLS130**: Rules & regulations, laws and standards

### Security issues and responsibilities
- **ISC105**: Different threats to computer, how to protect a system? computer security issues including virus, hacking etc
- **CLS130**: different social issues due to the impact of internet, mobile and computers

### Social issues and responsibilities
- **ISC105**: pornography, social networking, social media addition

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**Characteristic (f):**

“An ability to communicate effectively with a range of audiences”.

The characteristic (f) has two components:
- **Written** communication
- **Oral** communication

This characteristic is achieved by the courses CLS253, ISC495 and ISC499. The course CLS253 focuses different aspects of written communication especially technical writing skill. As partial fulfilment of course requirements of ISC495 and ISC499, students submit project reports at the end of the semester. In order to assess written communication skill, there are two different rubrics
- **Technical Report Assessment Form**
- **Written Communication Evaluation**

The oral communication is assessed by the two courses ISC495 and ISC499. The students give oral presentation at the end of the semester. The oral communication skill assessed by a rubric called “Oral Communication Evaluation”. In ISC495, the internship supervisor assesses the written and oral communication skills of the student.

**Characteristic (g):**

“An ability to analyze the local and global impact of computing on individuals, organizations and society”.

The characteristic (g) has two components:
- An ability to analyze the local and global impact of computing on **organizations**
- An ability to analyze the local and global impact of computing on **individuals and society**

The characteristic (g) is achieved by the courses ISC105 and ISC331. The course ISC331 focusses on the local and global impact of computing on organizations. One chapter of
ISC331 is “Role of IS in organizations”. This course also concentrates on the alignment between IT and business in an organization. The name of the course ISC105 itself is “Computers and Society”. This course studies different aspects of local and global impact of computing on individuals and society.

**Characteristic (h):**

“Recognition of the need for, and an ability to engage in, continuing professional development”

The characteristic (h) is achieved by ISC495. The major component of ISC495 is to build the ability to engage in continuing professional development. During the internship, students are forced to learn new environments which include software and hardware on their own in the workplace. As a partial fulfilment of course requirement of ISC495, students submit one report which is exclusively on “Continuing Professional Development”. In this report, students explain how they achieve characteristic (h) during the internship.

**Characteristic (i):**

“An ability to use current techniques, skills, and tools necessary for computing practices”.

The characteristic (i) has three components:
- An ability to use current **techniques** necessary for computing practices.
- An ability to use current **skills** necessary for computing practices.
- An ability to use current **tools** necessary for computing practices

This characteristic is achieved by ISC210, ISC240 and ISC350. The following table illustrates how the above items are covered by the courses ISC210, ISC340 and ISC350:

<table>
<thead>
<tr>
<th>Current techniques necessary for computing practices.</th>
<th>ISC210</th>
<th>ISC340</th>
<th>ISC350</th>
</tr>
</thead>
<tbody>
<tr>
<td>Different numerical techniques such as direct methods (Gaussian Elimination Method) and iterative methods (Gauss Seidel Method). Different computational techniques to find the roots of polynomials such as Bisection Method, Regula-Falsi Method, Newton Method and Secant Method.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current skills necessary for computing practices.</td>
<td>ISC340</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Programming skill, web design skill, documentation skill</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current tools necessary for computing practices.</td>
<td>ISC210</td>
<td>ISC350</td>
<td>ISC340</td>
</tr>
<tr>
<td>MatLab</td>
<td>Networking tools, networking testing tools, and simulation tools</td>
<td>FrontPage, MS Visual Studio</td>
<td></td>
</tr>
</tbody>
</table>
An understanding of and an ability to support the **delivery** of information systems within an Information Systems environment

An understanding of and an ability to support the **management** of information systems within an Information Systems environment

This characteristic is achieved by XXX450. It is specific to IS specialization. In order to achieve this characteristic, students opt for 15-credits Environment Electives. Currently, students fulfill this requirement in the following disciplines:

- Art & Design
- Communication Disorders
- Environmental Technology Management
- Nutrition
- Food Science

XXX 450 is one of the following EE courses:

- AAD 450- Applications of Information Systems in Art
- CSL450- Applications of Information Systems in Communication Disorders
- ETM450- Applications of Information Systems in Environmental Technology Management
- FSC450- Applications of Information Systems in Nutrition

In order to achieve characteristic (j), our program includes an "Environment Electives" component. The characteristic (j) is achieved by a course project in 450 in which the students build an IS application related to the environment and then they show how to support the use, delivery, and management of the built IS application within the environment.

**Student Portfolio**

The Student Portfolio Review course (ISC088) is a zero-credit pass/fail course. It is a core component of the program. It provides students with an opportunity to assess their achievement of Students Outcomes by themselves. Students identify a minimum of two artifacts for each Student Outcome and write a reflection statement justifying how they achieve these outcomes. This helps students identify their strength in various components of IS at the end of the program as well as it serves as an evidence to their achieved competencies that can be presented during Job interviews. Students are an integral part of program constituencies. This is one of the tools in our data collection methods to measure student achievement of Student Outcomes.