Program Review

Technology Integration

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A. Program Overview

The Technology Integration Program includes three distinct technical areas:

- Network Technician
- Telecommunications VoIP Technician
- Computer Maintenance and Repair Technician

The program offers Technical Certificates in three areas of concentration:

- Technology Integration - A+/N+/CCENT/CCNA
- Technology Integration - VoIP Technician

The program offers Associate of Applied Science degree in one area of concentration:

- Technology Integration – Network/Telecommunications Technician

The Technology Integration program, or some of the technical areas in the program, has been offered at Colorado Mesa University – Western Colorado Community College for more than 30 years. The current structure of the program was established in the 2000s in response to changes in the technology businesses in the region. The local networking companies advised that there were few jobs for graduates with narrowly focused training in one of the three areas that are now under this program. The suggestion was that we begin offering a program that provided some classes in all areas to any student that was pursuing a degree in technology related studies. The eventual outcome of that advice was the current structure in which all students in the program will take core courses in each of the technical concentrations that then leads to the emphasis the students are pursuing. Then all students come back together for a capstone course. This provides graduating students with a better understanding of the systems of technology activities that they will encounter upon entering the workforce in our community.

The curriculum in each technical area is updated regularly to reflect changes in area businesses and technology as a whole. The most recent major change occurred in the Networking and Telecommunications emphases where we have combined them into one because of the standardization of the Voice over Internet Protocol. This reflects the national and international trends in the industry. By utilizing the industrial information technology expertise of the faculty we have incorporated Cisco Systems International, CompTIA international key curriculum and technical components into the core of the Networking/Telecommunications Technology degree.
B. Program Goals and Objectives

"Colorado Mesa University shall maintain a community college role and mission, including vocational and technical programs as "Western Colorado Community College". Colorado Mesa University shall receive resident credit for two-year course offerings in its commission-approved service area."

Program Goals
The overall program goals for the Technology Integration program at WCCC are:

- Provide the students with the skills and knowledge to be productive citizens and excel in their chosen fields.
- Work with business and industry stakeholders to continually enhance the quality and timeliness of technical content.

Program Objectives
The program objectives for the Technology Integration program at WCCC are aligned with the role and mission of Colorado Mesa University which allows students and faculty to:

- Demonstrate an understanding and appreciation of the liberal arts including the humanities, social sciences, mathematical and natural sciences,
- Practice a commitment to student learning and achievement, including, but not limited to applying basic through advanced technology theory, demonstrating hands-on skills, problem solving techniques, using multiple strategies,
- Demonstrate subject matter knowledge and pedagogy, including, but not limited to creating effective learning environments, practicing teaching both as a science, providing contextual learning activities,
- Manage and monitor student learning, based upon best practice including, but not limited to using a variety of teaching methodologies, involving support personnel, parents and community members to maximize student success, following ethical responsibilities of teaching,
- Organize teaching practices and learn from experiences including, but not limited to, using current research to improve practice, accept teaching as a lifelong learning process, interact with various education personnel and professional associations,
- Participate in learning communities, including, but not limited to, using the community to enhance programs, interact with parents and business and industry to maximize learning, participate in local, state and national professional associations,
- Use technology and concepts to enhance learning and personal/professional productivity including, but not limited to, implementing curriculum that includes technology-enhanced methods and strategies, applying technology to a variety of assessment and evaluation strategies; and,
- Colorado Mesa University values teaching, learning, and student-faculty interaction. We provide our students with expanded opportunities to participate in
research and active hands-on learning as a supplement to the classroom. Colorado Mesa University is dedicated to assisting students in achieving their goals and dreams.

C. **Analysis of Need for the Program**

- Enrollment rates have been steady until recent years have shown an increase, which also reflects the state-wide enrollments in similar programs, due to the increase in industry demands and refocusing on the new specific AAS emphasis and certificate degrees.

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**Not divided between Fall and Spring**

Our graduation and placement rates are very good in relationship to the type of student that enters our program. We have very few full-time traditional students. Most of the cohorts are working students only taking a few classes per semester, thus it takes them more than two years to graduate and we will have groups of graduates and then only a few per Spring semester.

- As the Grand Valley continues to grow and the technology needs and demands of industry increases, we see a growing demand for networking, and computer maintenance and telecommunications technicians. We have placed many of our graduates in local and national businesses (including Colorado Mesa University, DOE, RICOH, etc.) as network, computer maintenance and telecommunications technicians, and maintain a strong advisory council which helps guide our curricular decisions.

The program supports other programs such as, CISB, and Mathematics coursework (include Cisco State(s) wide support) at the Bishop campus our efficiency is very effective.

Through the guidance of our Business Advisory Committee, we have identified a critical need for network, computer and
telecommunications technicians. This is not only in support of the local businesses and industry, but many other businesses needs are now beginning to emerge. The core of that coursework is Cisco proprietary and non-proprietary generating invaluable multivendor networking and telecommunications problem solving skills.

Our program is successful for the students because we teach contextually in a technologically rich environment with extensive hands-on content-rich course work. Our graduates have work with Faculty that have rich industry experience and the students have work in real-world environments created by that faculty. As stated by Craig Barrett, Chairman Intel Corporation, “My hope as a business leader is that these reforms will get us to the 21st-century school – a 21st-century learning environment that offers a content-rich curriculum. “inquiry-based learning” has value, but process should not replace content” (Appendix vii).

These concepts have been reinforced when members of our department and school were awarded a National Science Foundation Grant (NSF) titled; Integrated Learning Systems: A model approach in which we proposed the development of a content-rich model integrating multiple disciplines in a project-based learning environment. Working with local businesses as partners on the grant, the team will explore this innovative learning model to help create the 21st-century school environment. This acknowledgement by the NSF attests to the fact that we are on the right track.

With the role and mission at Colorado Mesa University/WCCC being a teaching college, our program strives to innovate, research, and excel in that mission. We are teachers first and foremost and the positive results show in the success of our graduates exemplifies our efforts.

D. Narrative Summaries of Resources

i) Unique characteristics of the program influencing the need for resources.
Technology Integration includes multiple disciplines that present a unique set of challenges and synergy.
The challenge is to prioritize the resources to meet industry demands for technically competent workers in developing markets; while maintaining the academically rigorous basic skills required of multiple diverse employers.

ii) Faculty and Staff
a. The afore-mentioned multi-disciplined market place requires multi-disciplined faculty with strong teaching and technical skills. Professional development has to be vigorously pursued to satisfy the rapid advances required of our graduates. We need additional training in current Network Operating Software, Linux Platforms, and other technologies of VoIP.

iii) Physical Facilities
The facilities have been dramatically improved by moving the program into a newly renovated dedicated space. This design was based on a real-world industry environment with production benches for computer maintenance and VoIP, a Network Operating Center separate from the classroom with patch panels between the rooms, and an integrated classroom CISCO learning center.

iv) Instructional equipment, including instructional technology and its use.

a. The program has utilized the fundamental equipment to good advantage for the changing skill demands of industry. This basic equipment is however becoming dated and is in need of deferred preventative maintenance.

b. Changing emphasis of the job market and current technologies and well as requirements for security and improved abilities requires significant capital to meet the specific skill sets which are cyclical. This equipment is more specialized and costly.

c. Additional capital is required to provide asynchronous distance learning for our non-traditional working student.

v) Library, including DVD, video, etc.
Library support is adequate and provides good reference materials to support the core competencies. The changing technical skills need additional asynchronous curriculum and course development. The WCCC campus has need of a dedicated student computer to supplement and augment class/library support.

E. Effectiveness

- Accreditations by Professional, National, and International Associations are critical to the Technology Integration and Process Systems Technology degree programs, because the businesses and industries that support us require certifications when hiring our graduates. The program is nationally and internationally certified by the following external organizations:

  Certified curriculum (ETA Electronics Technicians Association)
  Local Cisco Academy, Accredited by CISCO
• Changes since the most recent program review include the blending of the Network Technician and Telecommunications Engineering emphases into one. This change grew out of industry changes in which the telephones with network systems are combined utilizing Voice over Internet Protocol. Additionally, in working closely with the Math department we have restructured the MATH 107 math class to more closely align with the Colorado Community College System (CCCS) and with the requirements of the mathematics department by developing MATH 108 Technical Mathematics. The staff has also restructured the Applied Physics course to align with the changes in the mathematics course.

• Assessment of student academic achievements within the program includes the assessment process of Mesa State College. The department also keeps CCCS assessment records on completers, surveys, certifications, and skills Olympics.

• Faculty success data

Promotions
2005 One faculty promoted to Associate Technical Professor
2006 One faculty promoted to Assistant Technical Professor
2007 One faculty applying for Assistant Technical Professor
2011 One faculty promoted to Assistant Technical Professor

• Teaching

Professional and student evaluations
CCCS Certification and mentoring approval

• Advising

Departmental
SOAR

• Scholarship

Industry Certifications
Professional Certifications
Bridge Courses
Continuing education coursework

• Service

Advisory committees Career Center, Job Corp, RMPBS, Business departments in MCSD 51
MSC service: Faculty Senate, Advising Committee, Information Technology support, Promotion and Tenure committees, Hiring committees.

- Other
  NSF Grant
  Industry association work – special recognition
  Cisco Academy Support Center -- Colorado, New Mexico, Utah and Wyoming
  Instructor Training Center

- Student success data

  Awards
  2010, Postsecondary Netriders (Cisco) placed 12th in USA and Canada
  2011, Secondary Netriders (Cisco) placed in top 3 in the state
  2012, Postsecondary student selected to maintain the NOC at Cisco Live International
  2012, Postsecondary Netriders (Cisco) placed in the top 5 of the state.
  2012, Postsecondary Netriders (Cisco) placed to continue in the top 2 in the state to represent Colorado in the USA and Canada Theatre Finale

  Certifications
  2005 two CCNA CISCO Certifications
  2005 seven Associate Certified Electronics Technicians
  2005 two A+ Certifications
  2006 two Associate Certified Electronic Technicians
  2009 one CCNA Cisco Certifications
  2010 six Voice over IP Certifications
  2011 one CCNA Cisco Certifications
  2012 one CCNA Cisco Certification
  2012 two A+ Certifications
  2012 two Network+ Certifications
  2012 one Associate Certified Electronics Technicians

BAS degree students

  Even though there are no current statistics for BAS students, we know of four graduates with a BAS degree and four students currently on the BAS path who have earned an AAS in Technology Integration.
F. **Strengths Identified by the Review**

- The strengths identified by our internal review include strong support from our business advisory council and participation of businesses with internships, support of grants, and guest lectures. We are also accredited by external national and international organizations which enhance the placement and growth of our graduates.

Additionally, the program is enhanced by the quality and commitment of the faculty in scholarship, advising, service and professional development. The student’s evaluations attest to the quality of education they are receiving.

G. **Areas Needing Strengthening Identified by Review**

- The major area needing strengthening is the enrollments and graduation rates. The degree offerings require a very specialized student willing to commit to very rigorous coursework as demanded by the industry. Many of our international certifications only have an 80% pass rate. Our students are very easy to spot, they are just hard to find.

We know that there is a pool of qualified students in our service area and we need to develop a recruiting plan to reach out to those interested. There is also competition from other colleges and technical schools in the area that advertise heavily in our service area. Even though, their programs are more specialized and more expensive, they have a strong marketing component that attracts the type of student we need.

Finally, as we propose to launch a new degree which will strengthen the program, we will need to have equipment and trainers to be able to design our instruction around modern technologies to support the needs of local and regional businesses.

H. **Vision**

- As previously mentioned, we are proposing to combine the Networking and Telecommunications emphases into one now that the Voice over Internet Protocol standards has been established. This will increase the headcount in all of the classes for a combined degree and it will help the faculty to student FTE numbers effectively.
- The technology we work with needs to be the same equipment and systems that our students will be using in the field; if not, we are
doing the students a disservice and ineffectively supporting our business stakeholders. Some of the equipment and support can be solicited from the business partners, but the college needs to also support this critical new path.
Appendix A

Program Statistics
### 5 Year Completion Rate Trends

**Program at WESTERN COLORADO COMMUNITY COLLEGE**

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<th>School Year</th>
<th>Status</th>
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<th>Number of Completers</th>
<th>Completion Rate</th>
<th>Number Enrolled</th>
<th>Number of Completers</th>
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**This CIP Statewide**

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### 5 Year Placement Trends - Follow Up Students

**Program at WESTERN COLORADO COMMUNITY COLLEGE**

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**This CIP Statewide**

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Appendix B

Finance & Budget
**Finance and Budget Sheet for past five years**

**FY14 Budget Worksheet**

**BASIS**

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<th>PROGRAM</th>
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<td>Total Process Tech</td>
<td>5,090</td>
<td>4,530</td>
<td>(560)</td>
<td>3,690</td>
<td>(1,400)</td>
<td>3,500</td>
</tr>
<tr>
<td>Office Admin</td>
<td>Program Expenses</td>
<td>2,000</td>
<td>1,216</td>
<td>(784)</td>
<td>1,300</td>
<td>(700)</td>
</tr>
<tr>
<td></td>
<td>Course Fees</td>
<td>1,750</td>
<td>458</td>
<td>(1,292)</td>
<td>1,750</td>
<td>-</td>
</tr>
<tr>
<td>Total Office Admin</td>
<td>3,750</td>
<td>1,674</td>
<td>(2,076)</td>
<td>3,050</td>
<td>(200)</td>
<td>1,500</td>
</tr>
<tr>
<td>Tech Int</td>
<td>Program Expenses</td>
<td>3,500</td>
<td>3,573</td>
<td>73</td>
<td>3,300</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Course Fees</td>
<td>2,400</td>
<td>2,102</td>
<td>(298)</td>
<td>2,400</td>
<td>-</td>
</tr>
<tr>
<td>Total Tech Int</td>
<td>5,900</td>
<td>5,675</td>
<td>(225)</td>
<td>5,900</td>
<td>-</td>
<td>3,500</td>
</tr>
<tr>
<td>Water Quality</td>
<td>Program Expenses</td>
<td>2,000</td>
<td>-</td>
<td>(2,000)</td>
<td>500</td>
<td>(1,500)</td>
</tr>
<tr>
<td></td>
<td>Course Fees</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Water Quality</td>
<td>2,000</td>
<td>-</td>
<td>(2,000)</td>
<td>500</td>
<td>(1,500)</td>
<td>1,500</td>
</tr>
<tr>
<td>TOTAL BASIS</td>
<td>22,615</td>
<td>20,398</td>
<td>(2,217)</td>
<td>25,415</td>
<td>(1,200)</td>
<td>18,000</td>
</tr>
</tbody>
</table>

* Attach justification for budget increases (specific purchases, increased costs, increased FTE, etc)

**Includes Animation, Graphics, Media Tech**
Appendix C

Library Assessment
The following form is a snapshot of the library's collection in support of a program review.

Date of assessment: December 2012

Collection under review: Technology Integration with the following areas of emphasis: Network/Telecommunications Technician, Telecommunications VoIP Technician, Network Technician (Western Colorado Community College)

Program level: Certificate Associates Bachelors Masters

Delivery mode: ________________________________

Library Liaison: Aimee Brown

1. Current Collection Review

The Library collection was assessed using the Library of Congress subject headings listed in section b divided three areas, electric circuits, integrated circuits and telecommunications/networking.

a. Reference Sources:

There are 15 titles on these subjects in the Reference Collection published 1965-2008. They include Handbook of Research on Educational Communications and Technology (Lawrence Erlbaum Associates, 2008) and Desktop Encyclopedia of Telecommunications (McGraw-Hill, 2000). Most of them were published before 1995.

b. Monographic Sources:

Electric circuits
The library has 43 books, including 3 e-books, published 1944-2011 in the general collection with this subject heading. Only 3 of these books were published in 2000 or more recently.

Integrated circuits
The library has 258 books, including 211 e-books, published 1969-2013 in the general collection with this subject heading. 82% of these (e-books) were published 2011-2013.
Telecommunications/networking
- Cisco Systems, Inc.
- Computer networks
- Internet telephony
- Internetworking Telecommunication
- Local area networks (computer networks)
- Routers (computer networks)
- TCP/IP (computer network protocol)
- Telecommunication
- Telecommunication systems
- Wide area networks (computer networks)

There are over 1500 books with at least one of these subject heading, including over 1300 e-books published 2011-2012.

- Age Analysis of Monographic Collection

Please see section above.

c. Periodicals:

The library provides access through our licensed article databases to several periodicals in full text online through the current issue that cover these subjects. They include:

- *Active And Passive Electronic Components*
- *Advances in Electrical and Computer Engineering*
- *Computer Speech and Language*
- *Electronic Device Failure Analysis*
- *Electronic Engineering Times*
- *IUP Journal of Telecommunications*
- *Journal of Telecommunications Management*
- *Rural Telecommunications*
- *USA Telecommunications Report*

In addition, there are several open access journals available through the journal finder on the library’s web site incusing:

- *Advances in Electrical & Electronic Engineering*
- *International Journal of Computer Networks*
- *International Journal of Computer Networks & Communications*
- *International Journal of Computer Science and Communication Networks*
- *Journal of Computer Networks and Communications*
d. Electronic Resources:

The library subscribes to the licensed article database Academic Source Complete which provides access to articles on technology integration. Below is a list of the number of full-text articles published in 2000 or later specifically in trade journals that a search for the subject terms below produced.

- Telecommunication systems: 3,154
- Computer networks: 17,357
- Electric circuits: 894

2. Recommendations for additions to the collection:

Most of the library’s e-books related to this program are geared toward upper-level students and engineering and computer science professionals. Most of the hard copy resources may be out-of-date. In consultation with the faculty, the collection needs to be weeded and additional materials should be added to ensure that they are relevant to the entry-level students. Any new materials added should be in electronic format so that they are convenient for students to access.

Library Director: Sarah Cron Date: 1/2/2013
Appendix D

Faculty Vitae
Name: Carolyn R Ferreira-Lillo

Start Year: 1/2009

Program: Technology Integration

Department: WCCC - Business, Applied Science & Information Services

Faculty Rank
- Technical Professor
- Assistant Technical Professor
- Associate Technical Professor
- Technical Instructor

Highest Degree
- MS StonyBrook University Technology System Management 1999 - 2001

Education: (List all degrees beginning with most recent—include post docs and external certificates)
- M.S. Technology System Management, StonyBrook University, 2001
- B.S.E.E Electrical Engineering, City College of New York, 1993
- A.A.S Electrical Engineering Technology, Queensborough Community College, 1984

Teaching 2003-Present:
- Courses Taught
  - TECI-132 Introduction to IT Hardware and System Software
  - TECI-260 Information Technology Hardware and System Software
  - TECI-110 Applied Physics
  - PROS-117 AC Circuits
  - PROS/TECI-118
  - Math-108 Technical Mathematics
  - Math-107 Mathematics for Technology
  - PROS 120 Process Technology I: Equipment
  - PROS 230 Quality in Process Technology
  - 44310 Process Technology
  - 44311 Engineering Physics
  - 44316 Technology Integration 1
  - 44317 Math for IT
  - 44329 Technology Integration 2
  - PROS 100 Introduction to Process Technology

Certificate
- CTE Post secondary: Technology Integration Preliminary
- CTE Post secondary Energy, STEM
- 2011 Cisco Networking Academy Instructional Conference
- Spring 2011 Instructor Certification by Cisco for Discovery 3: Introducing Routing and Switching in the Enterprise
- Spring 2010 Instructor Certification by Cisco for Discovery 2: Working at a Small-to-Medium Business or ISP
- Spring 2010: Instructor Certified by Cisco for Discovery 1: Network for Home and Small Business
- 2009 Instructor Certified by Cisco for TECI 132/260 PC Hardware and Software
- Evidence of Continuous Improvement
- Spring 2012: EDU 260
- Spring 2012: Campous Safety Workshop
- Fall 2011: EDUT 250 CTE in Colorado
- Fall 2011: ISMT 580 IS Phys: Acad Institute/CTE
- Summer 2011: Colorado Career & Technical Education Conference (14 contact Hours)
Summer 2011: ISMT 580 IS ED: Understanding by Design
Spring 2011: Instructor Technical Webinars
Spring 2011: Plans of Study (POS) Paleooza
Spring 2011: ISMT 580 IS Math: Acad Institute/CTE (7.5 contact hr)
Spring 2011: ICAP Career Guidance and (1 contact hr)
Fall 2010 Cisco Networking Academy Instructional Conference
2009/2010 workshops at Mesa state in Web CT
2009 Universal Design for Learning: Creating Accessible Course Materials
Fall 2011: EDUT 250 CTE in Colorado
Spring 2009: WebCT Basic Workshop
Spring 2009: WebCT Advanced Workshop

Innovative Materials/Activities

Supervision of Student Research/Project(s)

Scholarship and Creative Work, 2003-Present:

Journal Articles

Conference Presentations

Technical Reports

Exhibits

Grants (proposed or funded)

Professional Memberships
2009 - present Cisco Alumni
2011- present ACTE

Honors and Awards

Service 2003-Present:

Institutional
Colorado Community College System: Member of the Curriculum Committee 2010 - present
Vice Chair for 2011-Present
Undergraduate Curriculum Committee 2011 - present
WCC Counsel spring 2011
CTE Committee 2010 - present
2010 - present Secondary (high school) Committee 2011
2010 - present High Schools Interviews
2010 - present Tours for high school
2009 advising at Mesa State
Community
2010 - present Rotary
2010 - present Event volunteer at Sacred heart Church
2011 CACTE

Advising 2003-Present:

Institutional level
2010 - present Post Secondary Advising
Committee:
2010- present Curriculum Committee
2. Career in technical Education
public service:
Fund raisers for Rotary
Fund Raiser for Sacred Heart Church
Department level
2010 -Present Postsecondary Advising
2010- Present High school Advising

Prior Professional Experience Relevant to Current Position: (Include year(s) of employment, employer, position title and responsibilities)

<table>
<thead>
<tr>
<th>Year(s) of Employment</th>
<th>Employer / Company</th>
<th>Position Title</th>
<th>Position Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997 - 2008</td>
<td>Bronx Community College (Bronx NY)</td>
<td>Lecturer</td>
<td>Syllabi, Creating Writing intensive classes for JENED</td>
</tr>
<tr>
<td>1984 - 1998</td>
<td>Queensborough Community College</td>
<td>Adjunct Technician</td>
<td>the operation and maintenance of lab equipment associated with electronic classes</td>
</tr>
</tbody>
</table>

Please record the number "items/events" you have listed above in the following categories.

- Books
- Journal Articles
- Conference Presentations
- Sabbaticals
- Other (related to discipline)

If you specify items/events under "other," please provide an explanation/definition.
Name: Jack P Yon

Start Year: 2003

Program:
Technology Integration

Department:
WCCC - Business, Applied Science & Information Services

Faculty Rank
- Technical Professor
- Assistant Technical Professor
- Associate Technical Professor
- Technical Instructor

Highest Degree
AAS Mesa State College Technology Integration - Networking/Telecommunications 2008

Education: (List all degrees beginning with most recent - include post docs and external certificates)
Certificate: Cisco Certified Network Associate - Security, Santa Barbara City College, CA, 2009;
Certificate: Cisco Information Technology (IT) Essentials I: PC Hardware and Software, Mesa Community College, AZ, 2008;
Certificate: Cisco Information Technology (IT) Essentials II: Network Operating Systems, Mesa Community College, AZ, 2008;
Certificate: SkillsUSA - Colorado State Certified Leadership Trainer (Train-the-Trainer), SkillsUSA University, Kansas City, MO, 2008;
Certificate: Associate Electronics Technician, Electronics Technicians Association International, Greencastle, IN, 2008;
Certificate/License: Professional Teacher License, State of Colorado, June 2007 - June 2012
Certificate: Cisco Certified Network Associate - Wide Area Network (WAN) Technologies, Colorado Mountain College, CO, 2007;
Certificate: Cisco Certified Network Associate - Switching Basics and Intermediate Routing, Colorado Mountain College, CO, 2006;
Certificate: Chapter Management Institute, SkillsUSA University, Denver, CO, 2006;
Certificate/License: Provisional Teacher License, State of Colorado, August 2004 - August 2007;
Certificate: Cisco Certified Network Associate - Routers and Routing Basics, Colorado Mountain College, CO, 2003;
Certificate: Cisco Certified Network Associate - Networking Basics, Colorado Mountain College, CO, 2003;
Certificate/License: Alternative Teacher Licensure Program, Colorado State University, CO, 2003-2004

Teaching 2003-Present:
Courses Taught
44310, Process Technology I
44311, Engineering Physics
44312, Process Technology II
44316, Technology Integration I
44317, Math for IT
44318, Technology Integration II
ELCL 120, Fundamentals of Electricity
PROS 100, Introduction to Process Technology
PROS 110, Safety, Health, & Environment
TECI 132, Introduction to IT Hardware and System Software
TECI 180, Cisco Networking I
TECI 185, Cisco Networking II

20
TECI 196, Topics: Security
TECI 220, Regulations and Standards
TECI 230, Cisco Networking III
TECI 235, Cisco Networking IV
TECI 260, Information Technology Hardware and System Software
TECI 265, Advanced IT Hardware and System Software
TECI 265L, Advanced IT Hardware and System Software
TECI 290, Certification: A+
TECI 290, Certification: CCENT/ICND1
TECI 290, Certification: CET(a)
TECI 290, Certification: ICND2
TSTC 160, Electronic Control Systems
UTEC 120, Industrial Safety Practices
UTEC 220, Industry Employment Practices
WQMS 100, Introduction to Water Quality

Evidence of Continuous Improvement
Fluke Networks, Webinar, "Wired & Wireless Analysis with One Tool", February 20, 2012
Fluke Networks, Webcast: Troubleshooting on Both Sides of the Access Point, February 14, 2012
Colorado Association for Career and Technical Administrators, Mid-Winter Conference, February 7-10, 2012
Colorado Association of Career and Technical Educators, Executive Board Meeting, January 20, 2012
Career and Technical Regional Standards Workshop, October 14, 2011
Academics-in-Career and Technical Education, Workshop, October 7-8, 2011
ISMT-580, IS Math: Academic Instruction/CTE, Graduate-level In-service, October 7, 2011
ISPH-580, IS Physics: Academic Instruction/CTE, Graduate-level In-Service, October 8, 2011
Colorado Association of Career and Technical Educators, Executive Board Meeting, September 30, 2011
Colorado Community College System (CCCS), Regional Career and Technical Education Workshops, September 21-23, 2012
Colorado Association for Career and Technical Educators, Summer Conference, July 17-21, 2011
Perkins Funding and Budgets Training, May 23, 2011
ISEN-580, IS English: Academic Instruction/CTE, Graduate-level In-Service, April 29, 2011
Colorado Energy NEED Workshop, Encana Corporation, April 19, 2011
Fruita Middle School, Career Fair Presentation, March 29, 2011
Colorado Association for Career and Technical Administrators, Mid-Winter Conference, February 8-11, 2011
Colorado Association of Career and Technical Educators, Executive Board Meeting, January 21, 2011
Individual Career and Academic Plans, meeting, November 16, 2010
Academics-in-Career and Technical Education, workshop, November 5-6, 2010
Colorado Association of Career and Technical Educators, Executive Board Meeting, October 15, 2010
STEM, Careers and Technical Education, workshop, October 8-9, 2010
ISMT-580, IS Math Academic Instruction/CTE, Graduate-level In-Service, October 9, 2010
MCSD 51, ICAP Task Force, September 21, 2010
Colorado Association of Career and Technical Educators, Executive Board Meeting, September 17, 2010
Cisco Networking Academy Conference 2010, August 2-4, 2010
Colorado Association for Career and Technical Educators, Summer Conference, July 19-22, 2010
8th Annual Career Cluster Institute, June 13-16, 2010
Colorado Association for Career and Technical Administrators, Mid-Winter Conference, February 3-5, 2010
North American STEM Education Symposium, October 12-16, 2009
College-in-Colorado-Advance Training, July 24, 2009
Innovative Materials/Activities
Chapter and Final Case studies for, Technology Integration I & II; "real world" scenario based study integrates content of objective areas and requires students to apply concepts to create a solution for the scenario. Final case study is one of which the students will create presentations and virtual networking concepts, which enables them to create a portfolio of accomplished skill sets.

Chapter and Final Case studies for, Cisco Networking classes, TECI 180 - 235; "real world" scenario based study integrates content of objective areas and requires students to apply concepts to create a solution for the scenario. Final case study is one of which the students will create presentations and virtual networking concepts, which enables them to create a portfolio of accomplished skill sets.

Embedded Academic content within CTE course, cross-walked to State, National, ACT standards and approved for Graduation credit requirements.

Supervision of Student Research/Project(s)
December 2011: Ten students from TECI 230, completed a presentation of a case study scenario, that represented a fictional company with specific requirements for a company network and were required to use proper and preferred methods of protocols and practices.

May 2011: Ten students from TECI 185, completed a presentation of a case study scenario, that represented a fictional company with specific requirements for a company network and were required to use proper and preferred methods of protocols and practices.

April 2009: Seven students from TECI 260, performed preventative maintenance on 127 computers under the supervision of myself and the company of Western Colorado Podiatry services.

Scholarship and Creative Work, 2003-Present:
Conference Presentations
"Affect of Moores Law" and it's relationship to an IT Support persons pay and or the cost of new technology today, Academic-in-CTE, October 7-8, 2011

"Energy and relationships" and the cause and effect as stored in a spring, Academic-in-CTE, October 7-8, 2011

"Information representation" - Information representation in Information Technology, using base numbers, April 29-30, 2011

Grants (proposed or funded)
"Digital Tools for Electronics and Electricity in the classroom", Grand Junction Chamber of Commerce classroom Improvement grant, $800.00 for handheld digital oscilloscopes for the Technology Integration Curriculum, December 2008
Professional Memberships
Association of Career and Technical Education (ACTE) -- 2004 - present
Colorado Association of Career and Technical Education (CACTE) -- 2004 - present
Colorado Association of Career and Technical Administrators (CACTA) -- 2009 - present
SkillsUSA -- 2003 - present
Electronics Technician Association, International (ETAi) -- 2003 - present
National Coalition for Electronics Education (NCEE) -- 2003 - present
Computer Science Teachers Association (CSTA) -- 2005 - present

Honors and Awards
2011
-- Promoted to Assistant Technical Professor, Rank
-- Recommended for "Distinguished Faculty", Mesa State College

2008
-- Five Year Service Award

Service 2003-Present:
Institutional
2012
-- Career and Technical Education Committee, Chair
-- Crisis Team Member
-- College and Career Readiness Tour

2011
-- Career and Technical Education Committee, Chair
-- Crisis Team Member
-- SkillsUSA Advisor
-- Tenure and Promotion Recommendation Committee
-- Imbedded Academic-in-CTE Crosswalks, Chair
-- Sophomore Tour

2010
-- Career and Technical Education Committee, Chair
-- Crisis Team Member
-- SkillsUSA Advisor
-- Imbedded Academic-in-CTE Crosswalks, Chair
-- Sophomore Tour

2009
-- SkillsUSA Advisor
-- Imbedded Academic-in-CTE Crosswalks, Chair
-- Sophomore Tour

2008
-- SkillsUSA Advisor
-- Imbedded Academic-in-CTE Crosswalks, Chair
-- Sophomore Tour

2007
-- SkillsUSA Advisor
-- Sophomore Tour

2006
-- SkillsUSA Advisor
-- Sophomore Tour
2005
-- SkillsUSA Advisor
-- Sophomore Tour

2004
-- SkillsUSA Advisor
-- Sophomore Tour

2003
-- SkillsUSA Advisor

Community
2012
-- School District 51, Individual Career and Academic Plans Committee, Advisor
-- Secondary and Post Secondary Plans of Study, Chair
-- Colorado Association for Career and Technical Education, Executive Board Member
-- Colorado Association for Career and Technical Education, STEM, Arts, Design and IT Division President
-- Career Center: Multi-Media, Graphics, and Computer Technology Advisory Committee Member
-- Career Fair, Fruita Monument Middle School
-- Career and Technical Education MCSD 51 Leadership Team, Chair
-- Imbedded Academic-in-CTE Crosswalks, Chair
-- CTE, College Credit in place, Chair

2011
-- School District 51, Individual Career and Academic Plans Committee, Advisor
-- Secondary and Post Secondary Plans of Study, Chair
-- Colorado Association for Career and Technical Education, Executive Board Member
-- Colorado Association for Career and Technical Education, STEM, Arts, Design and IT Division President
-- Career Center: Multi-Media, Graphics, and Computer Technology Advisory Committee Member
-- Career Fair, Fruita Monument Middle School
-- Career and Technical Education MCSD 51 Leadership Team, Chair
-- School District 51, Individual Career and Academic Plans Committee, Advisor
-- Secondary and Post Secondary Plans of Study, Chair
-- Imbedded Academic-in-CTE Crosswalks, Chair

2010
-- Colorado Association for Career and Technical Education, Executive Board Member
-- Colorado Association for Career and Technical Education, STEM, Arts, Design and IT Division President Elect
-- SkillsUSA State Certified Trainer
-- Proto Camp Instructor/Advisor
-- Career Fair, Fruita Monument Middle School
-- Career Fair, Rocky Mountain Elementary School
-- Imbedded Academic-in-CTE Crosswalks, Chair

2009
-- SkillsUSA State Certified Trainer
-- Imbedded Academic-in-CTE Crosswalks, Chair

2008
-- SkillsUSA State Certified Trainer

Advising 2003-Present:
Institutional level
2008
-- SOAR Sessions: 2
--SOAR Sessions: 3

2006
--SOAR Sessions: 2

2005
--SOAR Sessions: 2

Department level
2005 - present
Student Advisor -- 20-45 students
2004 - present

Technology Integration Program High school Interviews -- 30-50 students

Prior Professional Experience Relevant to Current Position: (Include year(s) of employment, employer, position title and responsibilities)

<table>
<thead>
<tr>
<th>Year(s) of Employment</th>
<th>Employer</th>
<th>Position Title</th>
<th>Position Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001 - 2002</td>
<td>IntelliTec Colleges, CO</td>
<td>Dean of Faculty</td>
<td>Train and manage full time faculty</td>
</tr>
<tr>
<td>2000 - 2001</td>
<td>SBM Site Services, CO</td>
<td>Area Manager</td>
<td>Train and manage staff</td>
</tr>
<tr>
<td>1979 - 2000</td>
<td>United States Navy</td>
<td>Chief Petty Officer</td>
<td>Train and manage service members</td>
</tr>
</tbody>
</table>

Please record the number "items/events" you have listed above in the following categories.

If you specify items/events under "other," please provide an explanation/definition.

<table>
<thead>
<tr>
<th>Books:</th>
<th>Journal Articles:</th>
<th>Book Reviews:</th>
<th>Creative Publications:</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Conference Presentations:</td>
<td>Performances:</td>
<td>Patents:</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>1</td>
<td>Grants-funded and non-funded</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Creative Publications:</th>
<th>Book Chapters:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grants-funded and non-funded</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other (related to discipline):</th>
<th>Student Services and Advising Center presentations of Technology Integration, Process Tec</th>
</tr>
</thead>
</table>
Name: John L Sluder

Start Year: 1998

Program: Technology Integration

Department: WCCC - Business, Applied Science & Information Services

Faculty Rank
- Technical Professor
- Assistant Technical Professor
- Associate Technical Professor
- Technical Instructor

Highest Degree
- Colorado Mesa University Business Computer Information Systems 2014

Education: (List all degrees beginning with most recent include post docs and external certificates)
- Cisco Networking Academy CCNA Discovery Certificate 2010
- VoIP Global Knowledge Certificate 2009
- Cisco Networking Academy CCNA 1&2 Certificate 2003
- Colorado State University Professional Teacher Licensure License 2003
- Buck Institute for Education Project-Based Curriculum Dev. Certificate 2002
- Red Hat Global Learning Linux System Administration Certificate 2002
- Intel Innovation in Education Intel Master Teacher Certificate 2001
- Colorado State University Vocational Teacher Credential 1998

Teaching 2003-Present:
Courses Taught
- TECI 132 Introduction to IT Hardware and System
- TECI 170 Introduction to Communications
- TECI 180 Cisco Networking I
- TECI 185 Cisco Networking II
- TFCI 240 VoIP Fundamentals
- TECI 251 Leadership
- TECI 260 Information Technology Hardware and System
- TECI 265 Advanced IT Hardware and System Software
- TECI 265L Advanced IT Hardware and System Software Laboratory
- TECI 290 Certification:
  - TECI 292 Capstone in Technical Engineering Planning and Economics

Evidence of Continuous Improvement
- Cisco Networking Academy CCNA Discovery Certificate 2010
- VoIP Global Knowledge Certificate 2009

Innovative Materials/Activities
- National Science Foundation - "Integrated Learning Systems, A Model Approach" Co-Principal Investigator. Awarded to Mesa State College/Western Colorado Community College - $445,000

Supervision of Student Research/Project(s)
- Encana Drill Cuttings Reclamation and Reuse
  - Developed and maintained the Linux, Apache, Moodle, PHP (LAMP) distance learning site for the NSF project.
Scholarship and Creative Work, 2003-Present:
Conference Presentations
CISCO Academy CISCO I & II Instructor Certified 1998-2011
NSF/ATE CoPI Integrated Learning Systems 2006-2010
SCATE National Robotics Training Center 2009
Curriculum Development Consultant
AACC Annual Convention; Presenter, ILS 2009

Technical Reports
SCATE National Robotics Training Center 2009
Curriculum Development Report

Grants (proposed or funded):
National Science Foundation - "Integrated Learning Systems, A Model Approach" Co-Principal Investigator. Awarded to Mesa State College/Western Colorado Community College - $445,000

Professional Memberships
Cisco Networking Academy
Association for Career and Technical Education (ACTE)

Honors and Awards
Chamber of Commerce Teacher of the Year, 2001

Service 2003-Present:
Institutional
HLC Self-evaluation subcommittee lead

Community
RMPBS Local Advisory Board

Advising 2003-Present:
Institutional level
WCCC student advising sessions

Department level
Students in department programs

Prior Professional Experience Relevant to Current Position: (Include year(s) of employment, employer, position title and responsibilities)

<table>
<thead>
<tr>
<th>Year(s) of Employment</th>
<th>Employer</th>
<th>Position Title</th>
<th>Position Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Information Technologies International, Inc., ISP Grand Junction, CO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner, Chief Operating Officer (1993-1997)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Director of Internet Services from startup to sale of first successful ISP in Grand Junction.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Supervise all the stages involved with planning and production of multimedia programs and Internet Services, including technical support and customer service.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Actively teaching and training Internet communications through the use of digital technology.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Principal Consultant for Information Management Systems. Principal Expert/Consultant for photographic and video production.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RUST Geotech, Grand Junction, CO
Manager, Reproduction and Audiovisual Services (1988-1993)
· Responsible for all photographic, printing, audiovisual, and multimedia services for the U.S. Department of Energy Grand Junction Project Office.
· Managed the facility's copy center production, managed 12 employees.
· Responsible for budget and cost control.
UC West Photo Lab, Colorado Springs, CO

*General Manager (1985-1987)*
- Manager responsible for bringing the business to break-even in eight months.
- Supervised the purchase and installation of equipment.
- Responsible for employee hiring and training, responsible for inventory control, sales, marketing, and budgeting while managing 20 employees.

Williams and Meyer Co., Art Form Communications, K&S Photo, Chicago, IL

*General Manager/ Freelance Designer (1982-1985)*
- Managed a full-service photo laboratory with 80 employees.
- Trained in Kodak E-6, C-41, and EP-2 processes.
- Experienced designer on Dicom d D-38, Micro II IBM, Micro I Apple, and FCG Beacon computer graphic systems.

Please record the number "items/events" you have listed above in the following categories. If you specify items/events under "other," please provide an explanation/definition.

<table>
<thead>
<tr>
<th></th>
<th>Books</th>
<th>Book Reviews</th>
<th>Creative Publications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Journal Articles</td>
<td>Performances</td>
<td>Patents</td>
</tr>
<tr>
<td>3</td>
<td>Conference Presentations</td>
<td>Exhibitions</td>
<td>Grants-funded and non-funded</td>
</tr>
<tr>
<td></td>
<td>Sabbaticals</td>
<td>Fullbrights</td>
<td>Book Chapters</td>
</tr>
<tr>
<td>1</td>
<td>Other (related to discipline)</td>
<td>Coleman Fellow</td>
<td></td>
</tr>
</tbody>
</table>

28
Appendix E

Program Sheets
About This Emphasis ...

Students enrolled in Technology Integration learn a multitude of skills to help prepare them to enter a variety of careers related to computer systems, computer system administration and networking, electronics, and telecommunications engineering. Students begin the program studying basic core classes including communications, DC/AC circuitry, information technology hardware and software, and Cisco Systems Network training.

In the second year, students select an area of emphasis from three choices — telecommunications engineering, network technician, or certified electronics technician. The course work in this associate of applied science program is aligned with national and international certifications including Cisco, A+/N+, CET, and Convergent Technology Professional (CTP), and Voice over Internet Protocol (VoIP). Program content has been structured to give a basic education to all graduates entering this field. Emphasis has been placed on providing a common core of training for all students due to the convergence of the communication industries.

Network Technician coursework teaches students valuable Internet technology skills, including networking, Web design, IT Essentials, Cabling, Java and UNIX. The curriculum covers a broad range of topics from basics on how to build a network to more complex IT concepts such as applying advanced troubleshooting tools.

For more information on what you can do with this major, go to http://www.coloradomesa.edu/wccc/programs.html.

POLICIES:
1. It is your responsibility to determine whether you have met the requirements for your degree. Please see the catalog for a complete list of graduation requirements.
2. You must turn in your “Intent to Graduate” form to the Registrar’s Office by September 15 if you plan to graduate the following May, and by February 15 if you plan to graduate the following December.
3. This program sheet must be submitted with your graduation planning sheet to your advisor during the semester prior to the semester of graduation, no later than October 1 for spring graduates, no later than March 1 for fall graduates.
4. Your advisor will sign and forward the Program Sheet and Graduation Planning Sheet to the Department Head for signature.
5. Finally, the Department Head or the department administrative assistant will take the signed forms to the Registrar’s Office. (Students cannot handle the forms once the advisor signs.)
6. If your petition for graduation is denied, it will be your responsibility to reapply for graduation in a subsequent semester. Your “Intent to Graduate” does not automatically move to a later graduation date.
7. NOTE: The semester before graduation, you may be required to take a Major Field Achievement Test (exit exam).

NAME: ____________________________ STUDENT ID # _______________________

LOCAL ADDRESS AND PHONE NUMBER: ________________________________ ( _ _ ) ____________

I, (Signature) ___________________________________________, hereby certify that I have completed (or will complete) all the courses listed on the Program Sheet. I further certify that the grade listed for those courses is the final course grade received except for the courses in which I am currently enrolled and the courses which I complete next semester. I have indicated the semester in which I will complete these courses.

Signature of Advisor ______________________________ Date ____________

Signature of Department Head ______________________________ Date ____________

Signature of Registrar ______________________________ Date ____________

Associate of Applied Science: Technology Integration – Network/Telecommunication Technician

2012-2013 Program Sheet, Page 1 of 3

Posted 12/4/12
Students should work closely with a faculty advisor when selecting and scheduling courses prior to registration.

Degree Requirements:

- Minimum of 60 semester hours total (A minimum of 16 taken at CMU in no fewer than two semesters).
- 2.00 cumulative GPA or higher in all CMU coursework and a "C" or better must be achieved in coursework toward major content area.
- Pre-collegiate courses (usually numbered below 100) cannot be used for graduation.
- A student must follow the CMU graduation requirements either from 1) the program sheet for the major in effect at the time the student officially declares a major; or 2) a program sheet for the major approved for a year subsequent to the year during which the student officially declares the major and is approved for the student by the department head. Because a program may have requirements specific to the degree, the student should check with the faculty advisor for additional criteria.
- It is the student's responsibility to be aware of, and follow, all requirements for the degree being pursued. Any exceptions or substitutions must be approved by the student's faculty advisor and Department Head.
- When filling out the program sheet a course can be used only once.
- See the "Undergraduate Graduation Requirements" in the catalog for additional graduation information.

GENERAL EDUCATION REQUIREMENTS (Minimum 15 semester hours) See the current catalog for a list of courses that fulfill the requirements below. If a course is on the general education list of options and a requirement for your major, you must use it to fulfill the major requirement and make a different selection within the general education requirement.

<table>
<thead>
<tr>
<th>Course No Title</th>
<th>Sem.hrs</th>
<th>Grade Term/Tns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication (6 semester hours)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 111 English Composition</td>
<td>3</td>
<td></td>
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<tr>
<td>ENGL 112 English Composition</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGL 111 English Composition and</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>SPCH 101 Interpersonal Communication or</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>SPCH 102 Speechmaking</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Mathematics: (Minimum 3 semester hours)</td>
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<td></td>
</tr>
<tr>
<td>MATH 108 Technical Mathematics (or higher)</td>
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<td></td>
</tr>
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Social Sciences, Natural Science, Fine Arts or Humanities, or Selected Applied Studies Courses* (Minimum 6 semester hours)

OTHER LOWER DIVISION REQUIREMENTS

<table>
<thead>
<tr>
<th>Wellness (2 semester hours)</th>
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<td>KINE 100 Health and Wellness</td>
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ASSOCIATE OF APPLIED SCIENCE: TECHNOLOGY INTEGRATION – NETWORK/TELECOMMUNICATION TECHNICIAN REQUIREMENTS (48 semester hours)

Core Classes

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<th>Grade Term/Tns</th>
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<tr>
<td>TECI 118 AC Passive Circuits</td>
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</tr>
<tr>
<td>TECI 12 Intro to IT Hardware and System Software</td>
<td>3</td>
<td></td>
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<td>TECI 170 Intro to Communications</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>TECI 180 Cisco Networking I</td>
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<td></td>
</tr>
<tr>
<td>TECI 185 Cisco Networking II</td>
<td>4</td>
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<tr>
<td>TECI 220 Cisco Networking III</td>
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<tr>
<td>TECI 235 Cisco Networking IV</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>TECI 260 Information Technology Hardware &amp; System Software</td>
<td>3</td>
<td></td>
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<tr>
<td>TECI 265 Advanced IT Hardware &amp; System Software Lab</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>TECI 290 Certification</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>TECI 292 Capstone in Technical Engineering and Economics</td>
<td>4</td>
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</tr>
<tr>
<td>TECI 110 Applied Physics</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>TECI 251 Personal and Professional Leadership Development</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>TECI 240 VoIP Fundamentals</td>
<td>3</td>
<td></td>
</tr>
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</table>

*Please see your advisor for requirements specific to this program.
SUGGESTED COURSE SEQUENCING FOR THE ASSOCIATE OF APPLIED SCIENCE WITH A MAJOR IN TECHNOLOGY INTEGRATION, EMPHASIS IN NETWORK/TELECOMMUNICATION TECHNICIAN

This is a recommended sequence of course work. Certain courses may have prerequisites or are only offered during the Fall or Spring semesters. It is the student's responsibility to meet with the assigned advisor and check the 2 year course matrix on the Colorado Mesa website for course availability.

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Hours</th>
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<tr>
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<td>TECI 117  DC Passive Circuits</td>
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<tr>
<td>TECI 132  Intro to IT Hardware &amp; Sys Software</td>
<td>3</td>
</tr>
<tr>
<td>TECI 170  Introduction to Communications</td>
<td>3</td>
</tr>
<tr>
<td>TECI 180  Cisco Networking I</td>
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<tr>
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<tr>
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<tr>
<td>TECI 230  Cisco Networking III</td>
<td>4</td>
</tr>
<tr>
<td>TECI 240  VoIP Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>TECI 260  Info Tech Hardware/System Software</td>
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<tr>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Semester</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>ENGL 111  English Composition</td>
<td>3</td>
</tr>
<tr>
<td>TECI 110  Applied Physics</td>
<td>3</td>
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<tr>
<td>KINE 100  Health and Wellness</td>
<td>1</td>
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<tr>
<td>TECI 118  AC Passive Circuits</td>
<td>3</td>
</tr>
<tr>
<td>TECI 185  Cisco Networking II</td>
<td>4</td>
</tr>
<tr>
<td>TECI 251  Personal/Professional Leadership Dev.</td>
<td>2</td>
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<tr>
<td>KINA Activity</td>
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<td></td>
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<table>
<thead>
<tr>
<th>Fourth Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Soc/Beh. Sci, Humanities, or Speech</td>
<td>3</td>
</tr>
<tr>
<td>TECI 235  Cisco Networking IV</td>
<td>4</td>
</tr>
<tr>
<td>TECI 265  Adv. IT Hardware &amp; Sys Software</td>
<td>3</td>
</tr>
<tr>
<td>TECI 265L Adv. IT Hardware &amp; Sys Software Lab</td>
<td>1</td>
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<tr>
<td>TECI 290  Certification:</td>
<td>2</td>
</tr>
<tr>
<td>TECI 292  Capstone in Tech Engineering/Economics</td>
<td>4</td>
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<tr>
<td></td>
<td>17</td>
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</tbody>
</table>
## About This Certificate...

Students enrolled in Technology Integration learn a multitude of skills to help prepare them to enter a variety of careers related to computer systems, computer system administration and networking, electronics, and telecommunications engineering. Students begin the program studying basic core classes including communications, DC/AC circuitry, information technology hardware and software, and Cisco Systems Network training.

Students select an area of specialization from two choices – telecommunications VoIP technician or network technician. The coursework in this certificate is aligned with national and international certifications including Cisco, A+/N+, CET, and Convergent Technology Professional (CTP). Program content has been structured to give a basic education to all graduates entering this field. Emphasis has been placed on providing a common core of training for all students due to the convergence of the communication industries.

Telecommunications Technician coursework includes networking fundamentals, telephony networking installing and troubleshooting analog and digital phone lines, and fundamental concepts, standards and practices that combine telephony and data networks into convergence networks. This program is designed to help prepare students to work in technical positions in communication fields.

For more information on what you can do with this major, go to [http://www.coloradomesa.edu/wccc/programs.html](http://www.coloradomesa.edu/wccc/programs.html)

### POLICIES:

1. It is your responsibility to determine whether you have met the requirements for your degree. Please see the Catalog for a complete list of graduation requirements.
2. You must turn in your “Intent to Graduate” form to the Registrar’s Office by September 15 if you plan to graduate the following May, and by February 15 if you plan to graduate the following December.
3. This program sheet must be submitted with your graduation planning sheet to your advisor during the semester prior to the semester of graduation, no later than October 1 for spring graduates, no later than March 1 for fall graduates.
4. Your advisor will sign and forward the Program Sheet and Graduation Planning Sheet to the Department Head for signature.
5. Finally, the Department Head or the department administrative assistant will take the signed forms to the Registrar’s Office. (Students cannot handle the forms once the advisor signs.)
6. If your petition for graduation is denied, it will be your responsibility to reapply for graduation in a subsequent semester. Your “Intent to Graduate” does not automatically move to a later graduation date.
7. NOTE: The semester before graduation, you may be required to take a Major Field Achievement Test (exit exam).

### NAME: ______________________ STUDENT JD # ______________________

### LOCAL ADDRESS AND PHONE NUMBER:

__________________________________________________________

I, (Signature) ______________________________________________, hereby certify that I have completed (or will complete) all the courses listed on the Program Sheet. I further certify that the grade listed for those courses is the final course grade received except for the courses in which I am currently enrolled and the courses which I complete next semester. I have indicated the semester in which I will complete these courses.

Signature of Advisor

Date

Signature of Department Head

Date

Signature of Registrar

Date

Technical Certificate: Technology Integration – Telecommunications VoIP Technician

2012-2013 Page 1 of 2

Posted 4/6/12
Students should work closely with a faculty advisor when selecting and scheduling courses prior to registration.

Degree Requirements:

- 2.00 cumulative GPA or higher in all CMU coursework
- "C" or better in each course which comprises the area of emphasis or specialization.
- Pre-collegiate courses (usually numbered below 100) cannot be used for graduation.
- Program sheets are for advising purposes only. Because a program may have requirements specific to the degree, check with your advisor for additional guidelines, including prerequisites, grade point averages, grades, exit examinations, and other expectations. It is the student's responsibility to be aware of, and follow, all guidelines for the degree being pursued. Any exceptions or substitutions must be approved by the faculty advisor and/or Department Head.
- See the "Undergraduate Graduation Requirements" in the catalog for additional graduation information.

Technical Certificate: Technology Integration - Telecommunications Technician (32 Semester Hours)

See the current catalog for a list of courses that fulfill the requirements below. If a course is on the general education list of options and a requirement for your major, you must use it to fulfill the major requirement and make a different selection within the general education requirement.

<table>
<thead>
<tr>
<th>Course No Title</th>
<th>Sem hrs</th>
<th>Grade</th>
<th>Term/Tms</th>
</tr>
</thead>
<tbody>
<tr>
<td>TECI 132 Intro to IT Hardware &amp; System Software</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TECI 170 Intro to Communications</td>
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<td></td>
<td></td>
</tr>
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</table>

Course No Title | Sem hrs | Grade | Term/Tms |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TECI 180 Cisco Networking I</td>
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<tr>
<td>TECI 185 Cisco Networking II</td>
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<td></td>
<td></td>
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<tr>
<td>TECI 230 Cisco Networking III</td>
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</tr>
<tr>
<td>TECI 235 Cisco Networking IV</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>TECI 240 VoIP Fundamentals</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>TECI 251 Personal &amp; Professional Leadership Development</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>TECI 290 Certification</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>UTEC 107 Math for Technology</td>
<td>4</td>
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</table>

SUGGESTED COURSE SEQUENCING FOR THE TECHNICAL CERTIFICATE WITH A PROGRAM OF STUDY IN TECHNOLOGY INTEGRATION - SPECIALIZATION IN TELECOMMUNICATIONS TECHNICIAN

This is a recommended sequence of course work. Certain courses may have prerequisites or are only offered during the Fall or Spring semesters. It is the student’s responsibility to meet with the assigned advisor and check the 2 year course matrix on the Colorado Mesa website for course availability.

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Hours</th>
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<tbody>
<tr>
<td>UTEC 107 Math for Technology</td>
<td>4</td>
</tr>
<tr>
<td>TECI 132 Intro to IT Hardware &amp; Sys Software</td>
<td>3</td>
</tr>
<tr>
<td>TECI 170 Introduction to Communications</td>
<td>3</td>
</tr>
<tr>
<td>TECI 180 Cisco Networking I</td>
<td>3</td>
</tr>
<tr>
<td>TECI 185 Cisco Networking II</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>TECI 251 Personal &amp; Professional Leadership Dev.</td>
<td>2</td>
</tr>
<tr>
<td>TECI 230 Cisco Networking III</td>
<td>4</td>
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<tr>
<td>TECI 235 Cisco Networking IV</td>
<td>4</td>
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<tr>
<td>TECI 240 VoIP Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>TECI 290 Certification</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>15</td>
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</tbody>
</table>
About This Certificate...

Students enrolled in Technology Integration learn a multitude of skills to help prepare them to enter a variety of careers related to computer systems, computer system administration and networking, electronics, and telecommunications engineering. Students begin the program studying basic core classes including communications, DC/AC circuitry, information technology hardware and software, and Cisco Systems Network training.

Students select an area of specialization from two choices – telecommunications VoIP technician, or network technician. The coursework in this certificate is aligned with national and international certifications including Cisco, A+/N+, CET, and Convergent Technology Professional (CTP). Program content has been structured to give a basic education to all graduates entering this field. Emphasis has been placed on providing a common core of training for all students due to the convergence of the communication industries.

Network technician coursework teaches students valuable Internet technology skills, including networking, Web design, IT Essentials, Cabling, Java and UNIX. The curriculum covers a broad range of topics from basics on how to build a network to how to build a website and more complex IT concepts such as applying advanced troubleshooting tools.

For more information on what you can do with this major, go to http://www.coloradomesa.edu/wcpc/programs.html

POLICIES:
1. It is your responsibility to determine whether you have met the requirements for your degree. Please see the Catalog for a complete list of graduation requirements.
2. You must turn in your “Intent to Graduate” form to the Registrar’s Office by September 15 if you plan to graduate the following May, and by February 15 if you plan to graduate the following December.
3. This Program Sheet must be submitted with your graduation planning sheet to your advisor during the semester prior to the semester of graduation, no later than October 1 for spring graduates, no later than March 1 for fall graduates.
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7. NOTE: The semester before graduation, you may be required to take a Major Field Achievement Test (exit exam).

NAME: ________________________ STUDENT ID # _______________________

LOCAL ADDRESS AND PHONE NUMBER: ________________________________

( ) ____________________________

I, (Signature) ____________________________, hereby certify that I have completed (or will complete) all the courses listed on the Program Sheet. I further certify that the grade listed for those courses is the final course grade received except for the courses in which I am currently enrolled and the courses which I complete next semester. I have indicated the semester in which I will complete these courses.

Signature of Advisor
Date 20__

Signature of Department Head
Date 20__

Signature of Registrar
Date 20__

Technical Certificate: Technology Integration – Network Technician
2012-2013 Program Sheet, Page 1 of 2
Posted 4/6/12
Students should work closely with a faculty advisor when selecting and scheduling courses prior to registration.

Degree Requirements:
- 2.00 cumulative GPA or higher in all CMU coursework
- "C" or better in each course which comprises the area of emphasis or specialization.
- Pre-collegiate courses (usually numbered below 100) cannot be used for graduation.
- Program sheets are for advising purposes only. Because a program may have requirements specific to the degree, check with your advisor for additional guidelines, including prerequisites, grade point averages, grades, exit examinations, and other expectations. It is the student's responsibility to be aware of, and follow, all guidelines for the degree being pursued. Any exceptions or substitutions must be approved by the faculty advisor and/or Department Head.
- See the "Undergraduate Graduation Requirements" in the catalog for additional graduation information.

### Technical Certificate: Technology Integration – Network Technician (33 Semester Hours)

See the current catalog for a list of courses that fulfill the requirements below. If a course is on the general education list of options and a requirement for your major, you must use it to fulfill the major requirement and make a different selection within the general education requirement.

<table>
<thead>
<tr>
<th>Course No</th>
<th>Title</th>
<th>Sem.hrs</th>
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<tbody>
<tr>
<td>TECI 132</td>
<td>Intro to IT Hardware &amp; System Software</td>
<td>3</td>
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<td>TECI 170</td>
<td>Introduction to Communications</td>
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<tr>
<td>TECI 180</td>
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### Course No Title | Sem.hrs | Grade | Term/Trns |
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<td>Cisco Networking II</td>
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<tr>
<td>TECI 230</td>
<td>Cisco Networking III</td>
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<td>TECI 235</td>
<td>Cisco Networking IV</td>
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<tr>
<td>TECI 251</td>
<td>Personal &amp; Professional Leadership Development</td>
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<td>TECI 260</td>
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<td>UTEC 107</td>
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### SUGGESTED COURSE SEQUENCING FOR THE TECHNICAL CERTIFICATE WITH A PROGRAM OF STUDY IN TECHNOLOGY INTEGRATION - SPECIALIZATION IN NETWORK TECHNICIAN

This is a recommended sequence of course work. Certain courses may have prerequisites or are only offered during the Fall or Spring semesters. It is the student's responsibility to meet with the assigned advisor and check the 2 year course matrix on the Colorado Mesa website for course availability.

<table>
<thead>
<tr>
<th>First Semester</th>
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Western Colorado Community College

Technology Integration- Program Review

Prepared For: Colorado Mesa University, Grand Junction, Colorado
Prepared By: Dave Galley, Director of Engineering and Technology,
Collin College, North Dallas, Texas

9/1/2013
Background of the Reviewer

Dave Galley is the Director of Engineering at Collin College, a two year institution located in North Dallas, Texas. During the past 5 years, he has turned around the Engineering Department which had approximately 500 student enrollments and was in danger of being shut down five years ago. Today, the department has 1700 student enrollments. It has been recognized throughout the Dallas/Fort Worth Metroplex (DFW) as a premier provider of two-year terminal engineering degrees (AAS) and as a generator of excellent "2 + 2" transfer students in the area of Engineering and Engineering Technology. During the turn around, the Cyber Security and Robotics Programs have earned local/regional acclaim for generating some of the area’s best students for the DFW workforce. The department offers an excellent CCNA/CCNA Security/CCNP Cisco Academy, an acclaimed Microsoft Academy and an outstanding Computer Networking program. Currently, nearly 600 students participate in the Computer Networking area of the department. In addition, the Cyber Security program has grown from 3 students (5 years ago) to 230 student enrollments, at present, by staying on top of technological Megatrends in the DFW region. Through the use of strong Industrial Advisory Boards each of the programs in the Engineering Department prides itself on being on top of industry trends and, thereby, the department is able to fulfill industry needs for entry level employees. In addition, current industry employees seeking specific certifications or needing to further their academic training for their present jobs utilize the engineering department for their academic needs.

Professor Galley can be reached at dgalley@collin.edu or by phone at 972-377-1676.
Context of the Program

The Observed Intent of Colorado Mesa University

The intent of Colorado Mesa University (CMU) is clearly stated in this excerpt from the CMU website.

"Colorado Mesa University was founded, not as an end in itself, but to enable its students and the residents of Western Colorado to create their own future and not simply enter a future that's been created for them. Within its resource constraints, the university has an obligation to offer the highest quality academic programs and services to those whom it serves to enable them to prepare for their future. Because the environment in which it functions is in a constant state of change, the university, like its students, must recognize that growth and change are an integral part of our collective future. University stakeholders must embrace the notion that change and innovation within the institution should be the norm rather than a necessity in response to crises. In this context, then, our goals are built around the theme of "Achieving a Higher Degree." This theme reflects a key element of the university's strategic plan: the philosophy that as the institution adapts to its changing world, it does so with the overarching goal of supporting the residents of Western Colorado to achieve a higher degree of educational attainment by preparing students to function successfully in the future."

The intent of this program review is to assist in guiding the WCCC Technology Integration Program towards the achievement of the fundamental "goal of supporting the residents of Western Colorado to achieve a higher degree of educational attainment by preparing students to function successfully in the future". In order to achieve this goal, an analysis of the WCCC Technology Integration Program goals against the current and future market conditions is essential.

The Observed Intent of Western Colorado Community College

The intent of Western Colorado Community College (WCCC) is clearly stated in this excerpt from the WCCC website.

"Western Colorado Community College is committed to student success. Whether you are interested in an associate degree, a certificate degree, customized industry training, or a change in your career options, we are here to serve you. Our faculty members are experts in their chosen field and have substantial formal education and training. Our excellent facility and classrooms contribute to a positive learning environment. Recommendations from business advisory committees help us keep all aspects of instruction current and relevant to today's employment needs. We offer valuable, hands-on instruction that equips you with real-world skills and lets you step into the career you want."

The intent of this program review is to assist in guiding the WCCC Technology Integration Program towards the achievement of the above stated WCCC goal of maintaining strong programs that fulfill existing and future industrial needs. As is well known, technology is always morphing and changing. Given the two-year nature of the student pipeline, Workforce Education programs must stay ahead of the technology Megatrends in order to produce relevant graduates.

The Current State of the Marketplace for Technology Integration

Technology Integration programs, in general, were popular in the period between 1998 and 2010. At this time in the technology lifecycle, many devices and components were discrete entities that required workers to deploy them, connect them and troubleshoot them. Throughout the period and beyond, increases in raw computing power, storage, virtualization, and cloud-based computing concepts have changed the market from what one would consider as non-integrated technology. Today, many
technology solutions come pre-packaged and integrated. Therefore, one must take a hard look at Technology Integration programs to determine which technologies are being integrated, what the student needs in terms of understanding the integration, and how the integration is being managed by the workforce employers and program stakeholders.

The Current State of the Marketplace for Information Technology/Cyber Security

Even through the economic challenges of the past three years, jobs in Information Technology have remained strong (see Figure I). The general Megatrend towards improvement of the efficiency of the production of goods and services has maintained this solid trend. Many companies that one does not think of as IT companies have substantial IT staffing requirements (e.g. hospitals, retail operations). As can be seen in Figure II, the professionals in the field are being well compensated in spite of the economic problems of the past three years. In general, these individuals themselves feel positive about the trends in the IT industry.

![Figure I- Hiring Demand for IT Professionals - Hiring Trend 2012 - 2013](image)

![Figure II- IT Professionals - Salary/Satisfaction Survey 2011 - 2013](image)

As the integration of technology has moved forward, whole technologies like Voice-Over-Internet-Protocol (VOIP), for example, have become commodities. Therefore, having an entire course dedicated to the technology behind VOIP, for example, is unnecessary and undesired. Students that desire to integrate information technology solutions rarely need printed circuit board level knowledge of systems and components. Students do need to understand how the components fundamentally behave and are configured. The need for students to understand the security of systems has increased dramatically. Primarily, this is due to the “connected nature” of our technology world and the ability of individuals to violate systems/databases through these connected pathways. Recognition of the Megatrend changes in technology during the past 15 years and the way that the concept of “technology integration” has changed are at the forefront of the recommendations in this program review.

WCCC- Technology Integration- Program Review
Dave Galley, Director of Engineering and Technology, Collin College
These Megatrends have produced less demand (in most areas of the country) for two year workforce education in the disciplines of electronics and device/component level integration. Further, given the use of the new-found computing power, the size relational databases that have come into use and the advent of mobile device (or "bring-your-own-device") technology, Cyber Security has become a critical component of any Technology Integration solution. For reference, Figure III shows that details the Megatrend in hiring individuals with certifications and understanding of the Cyber Security landscape.

![Figure III- Hiring Demand for Cyber Security Professionals - 4 Year Hiring Trend](image)

If indeed the goal of WCCC is to produce students that can graduate and fulfill regional employers' needs, Megatrends like these are critical to benchmark Technology Integration programs against in today's marketplace. Further, all workforce programs have a fiduciary responsibility to re-tool professionals in the market that they serve. When executed properly, this responsibility results in industrial professionals coming back to the institution to upgrade their certifications and gain the knowledge that is required to perform or reform their current jobs. Recognizing the critical nature of the link that a workforce program has to a given company's competitive edge, the creation of programmatically based stakeholders in the community becomes reality. This reality results in the health and vitality not only of the workforce program, but of the relationship between the Technology Integration program and the Industrial Advisory Board for the program.

**Overview of the Observed Greater Grand Junction Market**

A cursory analysis of the job market within a 150 mile radius produced relatively few (i.e. 8 to 12) Technology Integration jobs/employers. On the other hand, an analysis of the need for two year CCNA Certified professionals and Cyber Security professionals found very different results. Throughout the period of March 2013 through August 2013, more than 150 jobs were posted by more than 59 regionally identified employers. This analysis was not exhaustive. However, given the methodology the analysis is very reliable. The analysis used DICE.COM, INDEED.COM, Monster.com, Google.com, and discussions with DOD contractors and NSA officials (personal private communications with the reviewer). During the next three to five year period, the number of jobs reported above should increase as existing businesses grow and as two Cyber Security defense contractors in Denver (along with the NSA) contemplate re/co-location on the Western Slope. The main reservation expressed by those businesses contacted had to do with the ability of WCCC (and other institutions) to support the entry level employment needs of said existing and potential business entities. In summary, as one looks to the potential of a program
redesigned to support IT and Cyber Security, the future is seemingly bright in terms of market demand. (As will be indicated later, Jack Yon's "restaurant impossible" year in which the lab was moved and the CCNA program was substantially stabilized is a major reason to believe that those involved can pull off the curriculum changes needed when given the necessary/required WCCC/CMU support.) Further, as one looks to the notion of completers, surely the number of completers (2011-2012: 9 students) can be increased to two or three times the current program output. Of extreme importance to note in the analysis moving forward is the notion of the pipeline represented by this program. In order to be able to successfully support the current and projected greater Grand Junction market, one must consider that there is a one year curriculum cycle and a two to three year student production cycle. Therefore, the conclusion of the analysis is that the necessary programmatic changes need to be executed promptly and continuously for the next three years in order to fulfill the fiduciary responsibility of WCCC to the constituent business base in the local/regional area.

Methodology Used to Complete the Program Review

Prior to the reviewer's visit, numerous emails were reviewed which included:

1. the Internal Program Review: Technology Integration
2. the textbooks used in the program
3. all course syllabi including learning objectives and assessment strategies
4. the faculty's opinions about the program and credentials of the faculty
5. the relationship between WCCC and CMU
6. a list of individuals that would meet with the reviewer during a two day visit (which was insisted on by the reviewer for completeness at no additional cost to CMU).

Further, the reviewer requested and was granted the following:

1. access to the students for interviews without the faculty present
2. access to perform class visits which included a classroom observation of the two main faculty members in terms of quality of delivery and quality of instruction
3. access to the Industry Advisory Board in a lunch meeting with faculty and students present and access after the visit on a confidential one-on-one basis
4. access to the President of CMU for a frank discussion of resources that could be brought to bear directly over the next few years to support the Technology Integration program assuming that the changes recommended by the reviewer were initiated (Of great concern to this reviewer is the fact that non-funded mandates don't work.)
5. given the level of IT support required, access to the Director of Information Services (that assisted in lab relocation) to determine whether virtualized and private cloud solutions were in fact implementable (given institutional regulations regarding white hat hacking and the implementation of segregated virtual machine space).

Specific individuals that provided the reviewer answers to questions and provided the reviewer feedback were (in visited order):

1. Steve Werman, Assistant VP Academic Affairs, CMU
2. Jack Yon, Technology Integration Faculty
3. Class Observation/Student Interviews- Lower Division Course: TECI 170- Introduction to Telecommunications – (BB188)
4. Class Observation/Student Interviews- Lower Division Course: TECI 185- CCNA 2 – (BB 188)
5. Jack Yon, Technology Integration Faculty
6. Class Observation/Student Interviews- Upper Division Course TECI 235- CCNA 4 – (BB188)
7. John Sluder, Department Head of Technology Integration and Technology Integration Faculty
8. Brigitte Sundermann, Vice President of WCCC (VPCCA)
9. Andrea Grich, Technology Integration Faculty
10. Lunch: TECI Students, Business Advisory Members, & Faculty
11. Sarah Cron, Director of Library Services, CMU
12. Suzanne Lay, Coordinator of Assessment, WCCC/CMU
13. President Foster
14. Jeremy Brown, Director of Information Services, WCCC/CMU
15. Steve Werman, Assistant VP Academic Affairs, CMU.

These individuals provided valuable insight into the mission of CMU and WCCC, student expectations, faculty expectations, and critical areas of the review including:

1. Retention and Completion Philosophy/Requirements
2. Faculty Credentialing Expectations
3. Support Offered by CMU for WCCC
4. Use of the Library by WCCC Students
5. Perceptions of WCCC Student Connectivity to CMU
6. Perspectives on Workforce Education and Perceptions of the Value of Area Employers as Program Stakeholders at WCCC.

Observations and Recommendations for the Future Success of the Program

The Observed State of the Technology Integration Program

The Technology Integration Program is technically behind best practices for programs of its type. The shining exception to this statement is the CCNA lab that has been configured by Jack Yon. Based on the market analysis mentioned in previous sections, in this reviewer’s opinion, the character of the program needs to be refocused on the current noted strength of the program, Information Technology (IT). In addition, in order to follow the current industry Megatrends the program needs to further be refined to focus on the areas of Cyber Security and Server Technology.

The existing Technology Integration AAS Degree is shown below:

<table>
<thead>
<tr>
<th>SUGGESTED COURSE SEQUENCING FOR THE ASSOCIATE OF APPLIED SCIENCE WITH A MAJOR IN TECHNOLOGY INTEGRATION, EMPHASIS IN NETWORK/TELECOMMUNICATION TECHNICIAN</th>
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<tr>
<td><strong>First Semester</strong></td>
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<td>TECI 112</td>
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<td>TECI 132</td>
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<td>TECI 170</td>
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<td>TECI 180</td>
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<td>ENGL 111</td>
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<td>TECI 110</td>
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<td>KINE 300</td>
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<tr>
<td>KINE</td>
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<td><strong>Third Semester</strong></td>
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<td>TECI 240</td>
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<td>TECI 350</td>
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This is a recommended sequence of course work. Certain courses may have prerequisites or are only offered during the Fall or Spring semesters. It is the student's responsibility to meet with the assigned advisor and check the 2 year course matrix on the Colorado Mesa website for course availability.

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In order to be efficient in the discussion, the review will focus on the AAS Degree and will assume extrapolations to the Certificates in the program.

The Observed State of Instruction and Facilities for Instruction

The Technology Integration program has two main full time instructors, John Sluder and Jack Yon. Professor Sluder functions as the Department Head and has numerous other responsibilities. Professor Yon has the main Cisco CCNA and Computer Networking curricular responsibilities. As part of the program review, the reviewer observed two of Professor Yon's classes and one of Professor Sluder's classes. Each of the observations occurred after the objectives of the class to be observed were discussed (see Attachment #2). During the observation, a classroom evaluation was conducted (see Attachment #3). Although the details of the written evaluation were considered confidential between the individual professor and the reviewer, the reviewer found each professor to be capable, confident, and an excellent overall professor. Each managed the classroom well and achieved the learning objectives by the close of the class period. It was obvious that each professor cared deeply for their students, had an excellent grasp of the material covered, and was highly respected by the students. The students showed this respect by their attention and engagement, excellent questions and, generally, a very high professional decorum in the classes observed.

As shown in the photo below, the classroom (the new lab) was well maintained and the Cisco Equipment was state-of-the-art.

In terms of the rest of the equipment, the reviewer found it to be behind the expectation of best practice. Some of it (shown in the next photo) was appropriate to the current state of the program, but will need to be reconsidered moving forward. As indicated earlier, the program has a history. The program has just upgraded to these facilities from the facilities shown in the next two photos. The task of upgrading came at the same time that Cisco was changing its curriculum and new routers and switches had been donated to the department. With help from the IT staff (Jeremy Brown) and others, Professor Yon achieved the impossible (he calls it "restaurant impossible") and put the lab together. He is to be commended!
In summary, the new lab will be adequate for the curricular changes that are required. New equipment will need to be procured or donated. It is recommended that, in order to support the new equipment, a plan be in place that allows for the basic lab maintenance and set-ups to be done by one or two paid/qualified student assistants. The below photo shows the area of the NOC where topologies could be maintained by a qualified student, thus giving the student invaluable experience and lowering the burden on the faculty.
The Observed State of the Faculty and Faculty Credentials

The state of the faculty which was observed and the credentialing of the faculty proved to be of concern.

Prior to this discussion, it is important to note that (due to scheduling) I did not meet Professor Carolyn Ferreira-Lillo. I did meet with a part-time faculty member, Andrea Grych. She was charming and appeared competent from our 30 minute meeting.

As I indicated previously, the two faculty members that I met with numerous times and described the program to me were outstanding instructors. Their classroom skills, pedagogical approach, technical expertise and care for their students was viewed by this reviewer to be outstanding.

However, their credentials are of concern to this reviewer (and to them). Jack Yon has an AAS degree and a prestigious Cisco CCNA Industry Certification. He is a Cisco Certified Instructor. While this is the minimum acceptable set of credentials nationally accepted to teach at a community college (i.e. an AAS and an Area Specific Certification), it is generally accepted that a Bachelor's degree is the minimum qualification to teach AAS students in practice. In Professor Sluder's case, he does not hold a college degree. At present, he is working on a Bachelor's degree at CMU. This is, of course, a great concern.

As part of the review process, each professor was quizzed about this concern. Each instructor indicated that he would like to go back and finish a four year degree (Yon) or that he was going to school in his limited free personal time to complete his four year degree (Sluder). During these discussions, it became clear that other problems exist in the department that are in competition with either instructor being successful in pursuit of a four year degree. I asked them to discuss what their last year was like and how they had spent their time both on-campus and off-campus. It became obvious that these extremely dedicated professors have essentially been working themselves to burnout due to the requirements placed on their time by their programs and the lack of resources allocated to them by WCCC and CMU. Professor Yon indicated that he would enjoy pursuing a four year degree, but that he too had been working eighty hour weeks and did not have the time to take care of his credentials and his students at the same time. As was clear from my encounters with both men, each chose their students welfare and teaching/advising over their own health and/or credentialing concerns.

Based on this observation, it will be recommended (in the conclusion section) that another full-time faculty member be hired as soon as possible to help with each of their course loads and a course release be given to each of them in order to allow them to pursue/complete the required 4 year degree in a timely fashion. This recommendation will be noted for the good of WCCC and CMU, as well as these two fine dedicated men.

Further, it is recommended that Professor Sluder be relieved of some of his highly diverse departmental responsibilities. As a department chair, he is responsible for far too many diverse programs. He is spread too thin and, as such, he cannot support the needs of each program sufficiently. It is unconscionable that a teaching professor be responsible for so many diverse areas. Surely, WCCC and CMU do not want set this kind of unhealthy precedent. A matrix of his responsibilities is listed in the table on the next page.
A further complication to Professor Sluder’s situation is his budget (shown below). He indicates that this is what he has to manage the capital equipment in these technology programs. In the majority of the institutions that this reviewer is familiar with (including his own), these funds do not rise to the level of capital expenditures or repair and maintenance, these funds are at the level of classroom supplies.

In order to take the department to the next level as is recommended by this review, budgets will have to be reviewed and curriculum development time will be needed for the faculty. This reviewer does not see how curriculum development time will be possible for Professors Yon and Sluder without the hiring of at least one new full time faculty member to balance the load. Finally, in order to achieve the new technology requirements, each faculty member will need to pursue the professional development. This constitutes attendance at a minimum of one high-level conference per year in order stay abreast of new technology trends. This time is not available under the current situation.

In summary, the state of the faculty needs to be addressed in order to consider the future proposed curriculum and equipment changes.
The Observed State of the Student Population

During the course of the program review, the reviewer had the opportunity to interview 13 students one-on-one and three class sections together, as a class. In all cases, the student interviews were done without the faculty present. The observed state of the students in the program was very good. The students are very supportive of their professors, in particular Professor Yon and Professor Sluder.

The students wanted to make me aware of how overworked they felt the faculty had become during the past few years. They expressed their concern for the well-being of the faculty. Specifically, the students worried that Professor Sluder would have health problems (they did not know about the mini-strokes) and that one day Professor Yon would just quit and use his CCNA to work in industry (or instruct in industry).

In terms of the curriculum, the students voiced the following concerns:

1. The program is technically behind.
2. The Technology Integration Degree is too "befuddled" or "general" as it is presently configured to produce for them marketable skills for the job market.
3. CCNA Security is viewed as a needed course after CCNA 4 and before graduation.
4. Security + is a credential that was needed as a part of the program.
5. Local businesses need to be made aware of the Technology Integration Program at WCCC.
6. The Advisory Board is too small. Professor Yon does not have time to recruit new Advisory Board members and advertise the program.
7. Microsoft Server Technology should go past Active Directory concepts.
8. Internships are needed to support after college student employment.
9. The program does not include any discussion of Virtualized Machines, Storage Technology, or Cloud Computing concepts.

In the eye of the reviewer, these comments were in-line with the new direction that the program should take and were pretty much right on target. The students clearly had a good idea of what they would need to bring from WCCC as they enter the marketplace.

As a note of concern, unanimously, the students felt completely disconnected from CMU. They felt that it was "the shining city on the hill" and that they were at best the "orphaned step-child." This was so pervasive a feeling that the administrations of WCCC and CMU must to address this issue in the near future. As it was outside of the scope of this review, only the recommendation to consider that a potential problem exists is made by this reviewer.
The Observed State of the Health, Quality and Stakeholdership of the Industrial Advisory Board

Given the importance of this workforce program, the Industrial Advisory Board of the Technology Integration program must be very competent in the subject area and offer strong leadership. Shown below are the current members of the Advisory Board.

Bob Eggen  
Bob Byars  
Mark Swain  
Preston Thornburg  
Merrill Kiddie  
Odus Harwood  
Richard White Sr.  
Todd Goro  
Ryan Lee  

St. Mary's Hospital  
St. Mary's Hospital  
Networks Unlimited  
Networks Unlimited  
comCables  
MSCVSD#51  
City of Grand Junction  
Hill Top  
IT Solutions

WCCC Technology Integration- Current Advisory Board

In Attachment #4, the reviewer has attached minutes of the Industrial Advisory Board meeting for 11/15/2012. This was the last advisory meeting prior to the reviewer's visit. As can be seen from the notes, some of the same concerns that the reviewer has noted in this review are noted by the Industrial Advisory Board.

The reviewer was able to meet with members of the Industrial Advisory Board at lunch on the second day of the visit and was allowed to contact them (privately) after the visit. A few points became clear from these interactions.

1. The board is well intentioned and has a degree of passion about the program.
2. There are not enough local/regional businesses represented.  
   (Professor Yon stated that he needs release time to build a stronger and larger board. This reviewer is in complete agreement.)
3. As students are allowed to participate in board meetings, the reviewer recommends caution.  
   Student participation is good at some level. However, the reviewer found that at lunch the students did not treat the Industrial Advisory Board members with the decorum that allowed the Board member's ideas to dominate the meeting. This can be a problem as there is a fixed amount of time for each meeting. The Industrial Advisory Board member has taken time out of their business day to serve the institution and should be engaged with the utmost respect.  
   (The reviewer notes that this was a lunch meeting and, possibly, not a good representation of standard levels of decorum.)

Although the reviewer found no fault with members of the Industrial Advisory Board during the lunch, the reviewer is concerned about the level of passion and ability to advise/execute on the present board. If the recommendations of this review are to be executed, the Industrial Advisory Board must be a group of engaged, energetic, passionate stakeholders with "skin in the game." By that it is meant that they must help craft and execute a viable transition/implementation plan for the program which results in their businesses hiring WCCC graduating students. It was not clear to this reviewer that the present membership had the appropriate energy level to carry forward the task at hand. Hopefully, the new recruits that Professor Yon spoke of will be able to fulfill this need/requirement moving forward.

WCCC- Technology Integration- Program Review  
Dave Galley, Director of Engineering and Technology, Collin College
Recommendations for Substantive Curriculum Changes

As stated earlier, the Technology Integration Program at WCCC has numerous challenges ahead. Substantive Curriculum changes are required to bring the program to where it needs to be in the context of the technology trends today. During the reviewer's visit, the reviewer confirmed for Professors Yon and Sluder their thoughts for what needed to be changed, the inputs from the Industrial Advisory Board as to what local business' needs were, and what has worked at the reviewer's home institution. While it is beyond the scope of this review to help reconfigure the program (that is best left to the local faculty), discussions of future program direction were engaged. The reviewer offered to help in that process by providing insight into what had worked at his home institution, if needed.

There are a number of important inputs from the reviewer that were discussed during the review:

1. The program should move towards Information Technology (IT) and Cyber Security.
2. There is no need for Electronics or Circuits courses in the program as it moves towards IT.
3. The VOIP course should be removed (as VOIP is now a purchased commodity).
4. In order for the students to have the ability to take higher level IT Server and Cyber Security courses, students should get their CCNA certification courses completed in the first year. This can and should be accomplished by using an eight week express format that would allow for CCNA 1 and CCNA 2 to be taken in eight week increments during the Fall Semester. During the Spring Semester, students would complete CCNA 3 and CCNA 4 in the same eight week format. At this point, students would have a year left in the program in which they could work on higher level course work. At present, CCNA 4 is one of the last courses taken in the degree plan which limits the level of the curriculum that can be taught in the upper level courses.
5. In that there is not much direct Math content in the new proposed area of focus, the specific Math component of the program should be reviewed.
6. Curriculum concept maps should be drawn up for each course to ensure that instructional time is used in teaching new concepts and that minimal and necessary concept overlap occurs between courses.
7. The updated program should focus on getting students the certifications that they need from the DOD 8570 triangle. Obviously, this implies that there must be A+ (or Cisco based ITE), Network+, and Security + training early in the coursework. The students should be highly encouraged to take and pass the certification exams in the summer of the first year of the program.
8. By following the above approach, the second year of the program is left open to work through all of the new megatrend course work. This would include, but not be limited to:
   a. Microsoft Server 2008 or 2012 Technology
   b. Linux
   c. Advanced Cyber Security
      i. Incident Response
      ii. Firewall Technology
      iii. Forensics
   d. CCNP
   e. CCNA Security
   f. Cloud Essentials or Cloud +
   g. Virtualization (VM Ware)
   h. Cloud Based (SANS) Storage
Recommendations for Class Scheduling Changes/Format Changes That Will Build Upon Existing Strengths and Aid in Recruiting New Student Populations

During discussion with the students and faculty, course scheduling came to light as a potential area of improvement. In order to attract new student populations, a number of suggestions are made:

1. Incorporate evening classes so that working students can participate in greater numbers than at present.
2. Offer classes in two eight week semesters within the 16 week regular semester, thereby, making it possible to get a CCNA Certification in less than one year instead of the two year pathway at present.
3. Offer classes that are taught completely on-line, thereby allowing students to take more classes simultaneously with the same in class time commitment.
4. Teach Hybrid classes (50% face-to-face/ 50% on-line). In this case, the lab component could be completed during the class time.
5. As the updated program is put in place, consideration should be given to "Flipped Classes" and the advantages for students that they allow.
6. The program should aggressively reach into the high schools with Technical Dual Credit courses that show the student community the advantages of coming to WCCC.

While not all of these approaches can be done at once, it is the recommendation of the reviewer that students be polled as to which scheduling idea might be best for their employment schedule.

Conclusions of the Reviewer

The Technology Integration program has been reviewed by the reviewer in as specific a way as possible within the time constraints. In the face of the Megatrends noted at the outset, the program can be updated and upgraded to fulfill the needs of business. The faculty was found to be energetic and competent (albeit needing to fix some credentialing issues). Further, as was discussed in detail, the physical state of the faculty is a concern. Clearly, based on the observed state of the faculty members, it is strongly recommended that two additional full-time faculty members be hired to absorb part of the load carried by Professors Yon and Sluder. These two new faculty members would need to be responsible for an appropriate portion of the new curriculum development required. Finally, by adding these two faculty members, it becomes possible to strongly recommend that Professors Yon and Sluder be given course release time to pursue their respective four year degrees. The students were found to be engaged and knowledgeable in terms of what industry needs. The program’s Industrial Advisory Board was found to have a small, but stable base on which to build the kind of board that is required moving forward. While some equipment upgrades are necessary during the course of this transition, these upgrades should be manageable if the program is given sufficient resources by CMU/WCCC.

In summation, as the reviewer, I find that the basic building blocks are in place for a lively program with a three or four fold (or more) increase in the student population. It is the opinion of the reviewer that this is not only possible, but likely if the recommendations of this review are adopted.
<table>
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<tr>
<th>Program Review Element</th>
<th>Check the appropriate selection</th>
<th>Provide explanation if not agree with element and/or why unable to evaluate</th>
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<tbody>
<tr>
<td>The program’s self-study is a realistic and accurate appraisal of the program.</td>
<td>Yes</td>
<td>The self-study shows accurately where the program is at present. It shows the limitations in terms of faculty, equipment and plans toward future direction. Further, it shows the tremendous efforts of those involved to move the program forward against formidable challenges.</td>
</tr>
<tr>
<td>The program’s mission and its contributions are consistent with the institution’s role and mission and its strategic goals.</td>
<td>Yes</td>
<td>The program is technically behind. However, the way that the program is executed and taught is consistent with the institution’s role and mission and its strategic goals.</td>
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<tr>
<td>The program’s goals are being met.</td>
<td>Yes</td>
<td>As shared with this reviewer, the goals of the program are being met. The new class laboratory environment has allowed for the immediate goals to be met. Changes will be needed in the future to ensure that future industry based goals can be attained.</td>
</tr>
<tr>
<td>The curriculum is appropriate to the breadth, depth, and level of the discipline.</td>
<td>No</td>
<td>The curriculum must be updated. Only the Cisco CCNA curriculum is at the industry standard level (Prof. Yon).</td>
</tr>
<tr>
<td>The curriculum is current, follows best practices, and/or adheres to the professional standards of the discipline.</td>
<td>No</td>
<td>The curriculum must be updated. Only the Cisco CCNA curriculum is at the industry standard level (Prof. Yon).</td>
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<tr>
<td>Statement</td>
<td>Yes/No</td>
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<tr>
<td>Student demand/enrollment is at an expected level in the context of the institution and program’s role and mission.</td>
<td>No</td>
<td></td>
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<tr>
<td>The program’s teaching-learning environment fosters success of the program’s students.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Program faculty members are appropriately credentialed.</td>
<td>No</td>
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The number of completers is low and could be easily doubled (or more) if program improvements are made. It is difficult to “make” classes with the limited number of students in the program. On-line classes and scheduling changes must be considered that favor the student’s work schedules. Students confirmed to this reviewer that they would take more classes per student if schedules were different and if on-line courses existed. In addition, the students indicated that there is a new student population source. Night classes were said to attract new students that could help in terms of student numbers in the program. We discussed “Hybrid” (50% F2F/50% Web) and “Flipped Classes” that would have the lectures on-line and the class time as lab time. The “Flipped-Classes” only take 50% of the lab capacity.

The new laboratory room is very nice. Student’s commented on this during interviews. However, given the single lab space. It is hard or nearly impossible to run simultaneous classes. A lecture/lab approach is suggested.

Generally, faculty teaching at an Associate’s Degree level should have a Bachelor’s Degree. When quizzed about this requirement faculty were willing to get the additional credentials, but were stretched so thin that they did not know how they would find the time. (Later, I learned that Professor Shuler was pursuing a Bachelor’s Degree during his limited personal time.)
Program faculty members actively contribute to scholarship, service and advising. | Yes | | | Given the overwhelming time requirements required of the faculty, it was hard to see how they could be so involved with their students. During student interviews, it became clear that the faculty finds the (personal) time to help each student. This is true dedication and is commendable.

Campus facilities meet the program’s needs. | Yes | | | At present, the needs are met. With the recommended program upgrades, resources will need to be committed.

Equipment meets the program’s needs. | No | | | The equipment must be updated. Only the Cisco CCNA equipment is at the industry standard level (Jack Yon).

Instructional technology meets the program’s needs. | Yes | | | It was adequate.

Current library resources meet the program’s needs. | Yes | | | The students do not use the library. They use many on-line resources. With the recommended curriculum updates, resources will need to be purchased. During meetings with the library staff, they committed that these resources will be forthcoming upon request.

Student learning outcomes are appropriate to the discipline, clearly stated, measurable, and assessed. | Yes | | | The curriculum needs to be updated in order for the learning outcomes to be consistent with the state of the discipline. Examples of Assessments were reviewed. The reviewed Assessments were clearly stated and measurable.

Program faculty members are involved in on-going assessment efforts. | Yes | | | Absolutely.

Program faculty members analyze student learning outcome data and program effectiveness to foster continuous improvement. | Yes | | | As stated, the faculty is short on staffing and over-burdened. To the extent that they have the time, they discussed continuous improvement ideas. Some of those ideas have been implemented, but this is a time-limited effort.
The program's articulation of its strengths and challenges is accurate/appropriate and integral to its future planning.

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The faculty was very open about strengths and challenges. In addition, they were open about their concerns in updating their curriculum as required by the industry with the sparse resources that they have, at present.
Attachment #2- Classroom Expectations Form
Collin College  STEM Division

NOTE: Please provide me this completed form prior to the day and time of your class visit.

PREPARATION FOR CLASS VISITATION

INSTRUCTOR'S NAME ____________________________

COURSE ___________________ SEC. ______ CAMPUS ______

DAY __________ TIME _______ ROOM ______

TOPIC: Please describe briefly the topic for that day.

1. What are the goals for the class that I will observe?

2. What are your plans for achieving these goals?

3. What teaching/learning activities will take place?

Revised 9/26/11 ____________________________ Dave Galley
4. What have the students been asked to do in preparation for this class?

5. Will this class be typical of your teaching style? If not, why?

6. What would you like me to focus on during the observation?
Attachment #3- Classroom Observation Form
COLLIN COLLEGE

EVALUATION FORM FOR CLASSROOM VISIT

FACULTY NAME:  
CLASS/SECTION:  
DATE OF VISIT:  
TIME:  
Campus:  
Room:  

EVALUATOR: Evaluate the instructor based on the four criteria listed below by describing your observations of their classroom presentation/activities conducted during your visit.

Criterion 1. Preparation: The instructor provided examples to reinforce concepts, provided clear answers to students' questions, expanded upon the textbook;

Criterion 2. Content: The instructor used appropriate materials, previewed upcoming course material, presented in a logical sequence;

Criterion 3. Methodology: The instructor respected the students, presented enthusiastically, used variety of presentation methods, and moved from podium;

Criterion 4. Student involvement: The instructor solicited questions, comments and examples, provided opportunities for group or individual discussion on the material, and students participated in experiential activities.

1. The instructor was prepared for class.

2. The content of the class session was appropriate for achieving instructional goals.

3. The instructor effectively presented the material.
4. The students were appropriately involved in the learning process.

Evaluator's Comments/Recommendations: (Please use reverse side if additional space is needed.)

Instructor's Comments/Response:

Signatures

Instructor

Date

Evaluator

Date

Division Dean

Date
Technology Integration (TECI) Advisory Committee
Meeting Minutes

11/15/2012
Present: Bob Byars, St. Mary’s
Merrill Kiddle, ComCables
Ryan Lee, IT Solutions
Cody ???, Crum

Faculty:
John Gluder, TECI
Jack Yon, TECI
Carolyn Lillo, PROS

Students:
John Loibl
Jennifer Ross
Travis James

Next meeting: TBA,

I. Announcements
Student Showcase(s), Student Case study presentations in December (2nd week), Presentations in Spring 2013, another meeting in the spring time.

II. Discussion
- Certifications:
- Student Internships:
- Field Trip Possibilities:
- Real world experience options:
- Tour of the NOC and Classroom facilities:
- Future needs for change to curriculum
- Needs for technical competencies
- VoIP and Whether Cisco Call manager was viable
- Donations of equipment materials, etc...
- Smart Residential systems
- Wireless security
- New technologies in B & I
- Wireless bio-equipment becoming more prevalent.

III. Roundtable
Skills needed by prospective employees:
Strong knowledge of wireless technology
Knowledge of Cloud computing
Understanding of basic electronics
Knowledge of Security
Ability to run cabling
Troubleshooting skills a must
Merging of IT and Process Tech in current business environment

Prospective employers looking for; (local area)
A+ Certification
Net+ Certification
Convergence
Not as much emphasis on CCNA in this business and industry local area