PROFESSIONAL-TECHNICAL PROGRAM APPROVAL REQUEST

College: Bellevue College

<table>
<thead>
<tr>
<th>Program Title: Intermediate Business Intelligence Developer Certificate of Accomplishment</th>
<th>CIP: 11.0802</th>
<th>EPC: 503</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Credits: 30</td>
<td>Anticipated maximum enrollment: 12</td>
<td>Anticipated yearly completions: 6</td>
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Primary ☒ (if so, initial ☐ or final ☐ documentation) Option ☐ Contract ☐

If option, to which primary program
If option, include curriculum guide for primary program.

Award at completion (type of degree or certificate) Certificate of Accomplishment

Brief program description: Bellevue College’s Intermediate Business Intelligence (BI) Developer certificate has been designed to meet the growing demand for appropriately qualified workers in the field of information systems and technology and specifically in Business Intelligence. As entry-level educational requirements rise, many current professionals will need additional training and education. Bellevue College’s proposed BI certificate will be designed to meet the explicit needs that employers have identified for data specialists through providing a pathway to earning an additional credential in the field of Business Intelligence.

The Intermediate Business Intelligence Developer certificate is an advanced certificate option designed to introduce students to the rapidly changing field of business intelligence. Courses in this certificate will focus on tools, practices and issues surrounding the use of data in support of key decisions in organizations. Topics include: dimensional modeling, report creation, data warehousing, creating and manipulating OLAP objects. This certificate will be well-suited for IT professionals who will be involved in analysis, data profiling, development and integration of data from unrelated data sources throughout a project life cycle and the documentation of the ETL process.
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Plan Description</th>
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<tbody>
<tr>
<td>1. Potential <strong>career progression</strong>, including job titles</td>
<td>The Intermediate Business Intelligence Developer certificate will expand employment opportunities for IT professionals in one of two ways; It will assist those who need to develop proficiency in data analytics in order to better perform in their current job or prepare individuals for transition into an analytics positions that include:</td>
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<td>• Data Specialist</td>
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<td>• Analytics Specialist</td>
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<td>• Informatics Specialist</td>
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<td>• Data Analyst</td>
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<td>• Business Analyst</td>
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<td>• Data Warehousing Analyst</td>
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<td>• Data Warehousing Architect</td>
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<td>• Data Engineer</td>
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<td>• Data Analytics Manager</td>
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<td>2. Initial assessment of <strong>work-based learning/clinical sites</strong> (must be answered if applicable to program)</td>
<td>N/A</td>
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<tr>
<td>3. <strong>Collaboration with other colleges</strong> – Indicate which other colleges have similar programs and what potential conflicts may exist. Provide evidence of attempts to collaborate with other colleges.</td>
<td>Currently there are no other community or technical colleges in Washington state that offer a credit certificate in Business Intelligence. The University of Washington does offer related programs such as their professional certificate in Business Intelligence: Technology for Decision Making and Business Intelligence: Building the Data Warehouse. While there is some overlap between the two certificates at UW and proposed Bellevue College BI certificates there are also some differences.</td>
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<td>• More contact hours in the BC certificate (54 hours of seat time per class)</td>
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<td>• Students receive college credit (6 classes=30 credits)</td>
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<td>• Eligible for financial aid and worker retraining</td>
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<td>• Credits can be used in transfer to a baccalaureate program or as requirements fulfilled in application to a graduate program</td>
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<td>• Students get to choose 2 classes from electives to customize their certificate</td>
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<td>Bellevue's program will also be offered in a hybrid format to provide more flexibility for working adults whereas the UW certificate programs are fully classroom-based.</td>
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<td>Criteria</td>
<td>Plan Description</td>
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<td>4. Planning/advisory committee – Provide ADV form located at <a href="http://www.sbctc.ctc.edu/college/e-wkforceproftechprograms.aspx">http://www.sbctc.ctc.edu/college/e-wkforceproftechprograms.aspx</a> and minutes of the related meeting(s) showing evidence that the committee has determined there is a commitment in the geographic area to employ individuals who have been served by the program. *</td>
<td>A meeting was convened to establish commitment in the geographic area. An Information Systems Technical Advisory Committee was held on November 19, 2013 to establish need and review proposed curriculum and expressed support related to employability of potential certificate completers. Minutes from the meeting have been attached.</td>
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<td>5. Other supporting documentation</td>
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**PROGRAM DESCRIPTION**

1. Attach program description, goals, and learning objectives.

The Intermediate Business Intelligence Developer Certificate of Accomplishment will prepare students for entry and mid-level Business Intelligence (BI) positions in a variety of industries. Students use state-of-the-art tools to design and create BI solutions. They design and develop database reports, data warehouses and multi-dimensional databases.

**Learning Outcomes**
Certificate recipients should possess the skills and abilities described below:

- Develop a dimensional model for a business process
- Implement a complex dimensional model by creating a data mart or a data warehouse that satisfies accepted practices
- Create a multidimensional database using a data mart and/or a data warehouse as a data source
- Create and manipulate advanced On Line Analytical Processing (OLAP) objects that satisfy stated requirements
- Create complex reports using data from a multidimensional database that satisfy stated requirements
- Design, create and apply Multi Dimensional (MDX) queries against an OLAP cube
- Design and create Data Mining models based on a business scenario

* If an active Joint Apprenticeship and Training Committee for the occupation exists in the region, at least one labor and one management member from that committee should be invited to serve on the advisory committee. The college shall contact the chairperson or secretary of the JATC and request representation for the specific occupation. In cases where representation is not provided by the JATC, a letter must be on file from the college to the JATC requesting representation for that occupation. JATCs may act as the advisory committee where it has been determined that both the college and the occupation could best be served. "Organized labor" representatives should be used whenever possible to ensure a balance of all points of view, and currency with issues relevant to the development of courses.
<table>
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<tr>
<td>2. Attach program/curriculum guide (list by course number, course title, credit and/or clock hours per course, and total credits). NOTE: May not be available for a new primary program at initial submission. Is required for final approval.</td>
<td>Content for the Intermediate Business Intelligence Developer certificate have been attached.</td>
</tr>
<tr>
<td>3. Attach course descriptions, goals, and learning outcomes as they will appear in the catalog (do not include course syllabi). NOTE: May not be available for a new primary program at initial submission. Is required for final approval.</td>
<td>Course descriptions and learning outcomes are attached.</td>
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<tr>
<td>4. Program goals are developed in conjunction with the planning/advisory committee. This joint development is reflected in the minutes of the committee.</td>
<td>Minutes from the Information Systems Technical Advisory Committee have been attached.</td>
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</table>

**Assurances**

By the signatures below, we attest to the fact that the following actions have occurred:

1. The program has been integrated with the strategic planning and budgeting plan of the college.
2. The curriculum of this program has gone through the institution’s established approval process.
3. The college will maintain an advisory committee of industry representatives to help the institution keep the program current with employer needs.
4. A continuous improvement plan is in place for this program.

**Approvals:**

Chief Instructional Officer  

Date  

June 24, 2014
**Curriculum Guide**

**Intermediate Business Intelligence Certificates of Accomplishment**

**Admission Prerequisite Requirements**

**Intermediate BI Analyst Certificate**: Database Analyst Certificate of Accomplishment and Math 130 (Statistics) or equivalent skills and experience with SQL and relational databases.

**Intermediate BI Developer track**: Database Report Developer Certificate of Achievement or equivalent skills and experience with software development, SQL and relational databases.

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<tr>
<th>BI Analyst Certificate</th>
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<td>CMST</td>
<td>330</td>
<td>Intercultural Communication for the Professional</td>
<td>5</td>
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<td>ISIT</td>
<td>330</td>
<td>Business Intelligence Applications</td>
<td>5</td>
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<td>ISIT</td>
<td>334</td>
<td>Data Visualization</td>
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<td>Choose 3 classes</td>
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<td></td>
<td>ISIT</td>
<td>337</td>
<td>Predictive Analytics</td>
<td>5</td>
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<td>ISIT</td>
<td>338</td>
<td>Data Analyst Techniques</td>
<td>5</td>
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<td>434</td>
<td>Web Analytics</td>
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<td>Performance Management</td>
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<td>ISIT</td>
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<td>Data Warehousing</td>
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<td></td>
<td>ISIT</td>
<td>336</td>
<td>Dimensional Modeling</td>
<td>5</td>
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<td></td>
<td>ISIT</td>
<td>432</td>
<td>Data Repositories for Analytics</td>
<td>5</td>
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<td>TOTAL</td>
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CMST 330 Intercultural Communication for the Professional

Description:

Examines how a professional practitioner may positively engage in oral communication with a culturally dissimilar client or person in a variety of contexts. Students practice intercultural communication strategies and skills. Prerequisite: Acceptance to the program or permission of instructor.

Outcomes:

After completing this class, students should be able to:

- 1. To mindfully communicate with the culturally dissimilar other in a professional, work, and social environment.
- To be able to orally present findings to the class from an academically rigorous naturalistic cases study.
- To be able to apply intercultural communication concepts in a movie analysis presentation to the class.
- To practice in an improvisation intercultural communication scenario, and to be able to analyze and discuss the issues presented in the improvisation scenario.
- To write email learning journals and critically summarize major intercultural communication concepts, support the summary points with specific examples and reflect and report of their own learning on the chapter assignments from the textbook.
- To demonstrate collaboration skills by effectively working on small group projects and orally present the group’s project report to the class.
- To demonstrate mindful interpersonal intercultural oral communication in classroom exercises

ISIT 330 Business Intelligence Applications

Description:

Students learn about Business Intelligence (BI) applications and appropriate application architectures for a variety of scenarios. The benefits of BI and the possibilities for organizational change are discussed. Students use current BI tools to develop realistic solutions. Current trends are discussed as is the growing role of “big data.” Prerequisite: Admission to the certificate or permission of the instructor.

Outcomes:

Analyze the role of Business Intelligence (BI) in organizations
Analyze the components of a Business Intelligence solution
Evaluate the applicability of various BI solutions for an organization
Evaluate the benefits an organization may derive from various types of BI solutions
Analyze the role of a data warehouse
Create reports from data in a data warehouse using current reporting software tools
Analyze the various types of analytic data repositories and the advantages of each
Create multi-dimensional databases to allow for ease data analysis
Create reports from data in a multi-dimensional database using current reporting software tools
Analyze the capabilities of analytic software tools
Create interactive data visualizations and analyze data from a variety of sources using current analytic software tools
Analyze the role of performance management in an organization
Evaluate the benefits of performance management

ISIT 332 Data Warehousing

Description:

Students learn concepts and techniques associated with development of a data warehouse. They learn how to prepare data for consolidation and exchange. Students learn to apply Extract, Transform and Load (ETL) principles and they use current ETL tools. Students practice coding techniques for extracting, cleaning and conforming data. Prerequisite: ISIT 330.

Outcomes:

After completing this class, students should be able to:

- Analyze the role of Data Warehousing in an organization
- Plan the activities comprising a data warehousing project
- Analyze the role of Master Data Management
- Plan for the extraction of data from heterogeneous data sources
- Plan for the consolidation of heterogeneous data into a data warehouse
- Using current software tools, create software components for the extraction of various types of data from a variety of data sources
- Using current software tools, create software components to appropriately clean, conform and load organizational data
- Using current programming languages, write code to appropriately clean, conform and load organizational data
- Analyze the tasks involved in managing an ETL (Extract, Transform and Load) environment
ISIT 334 Data Visualization Tools & Techniques

Description:

This course introduces the theory and concepts related to effective display of data with a focus on quantitative data. Students learn the principles of preparing effective visualizations and the tools to create such visualizations. Students use analytic tools to create visualizations. Prerequisite: ISIT 330.

Outcomes:

After completing this class, students should be able to:

- Analyze a variety of data visualization techniques and their applicability to various scenarios
- Analyze the characteristics of an effective data visualization
- Select an appropriate visualization technique for a data analysis scenario
- Create an appropriate interactive visualization for a data analysis scenario using software tools
- Analyze the capabilities of data visualization software including analytic software, reporting software and spreadsheet software
- Create a variety of data visualizations using analytic tools
- Create a variety of data visualizations using reporting tools

ISIT 336 Dimensional Modeling

Description:

Dimensional modeling has been broadly accepted as one of the principle techniques for data warehouse design. Students use a sequenced series of case studies and hands-on exercises to learn effective design principles for data warehouse development. Prerequisite: ISIT 330.

Outcomes:

After completing this class, students should be able to:

- Analyze the organizational goals of a data warehouse
- Analyze the importance of dimensional modeling for a data warehouse
- Analyze the basic structure of a dimensional model
- Analyze the differences between dimensional modeling and other design techniques
- Analyze the key facets of good fact table design
- Analyze the different types of fact tables and when it is appropriate to use each
- Create designs for fact tables using solid dimensional modeling techniques
- Analyze the key facets of good dimension table design
- Analyze the different ways in which change is handled in dimension tables
- Create designs for dimension tables based upon solid dimensional modeling principles
- Create appropriate dimensional models/designs for a variety of organizational data warehouses/data marts
- Apply appropriate dimensional modeling techniques to new scenarios
ISIT 337 Predictive Analytics

Description:

In this course students learn to go beyond simply querying data to do predictive data mining analysis. Students learn to apply data mining algorithms to realistic organizational data to find previously undiscovered patterns and draw conclusions. Students use current software tools and hands-on exercises to learn theoretical concepts. Prerequisite: ISIT 330.

Outcomes:

After completing this class, students should be able to:

- Analyze the role of predictive analytics in an organization
- Analyze the differences between predictive analytics (data mining) and Data Query
- Analyze the nature of both supervised and unsupervised learning
- Create a variety of data mining models using predictive analytic software
- Select appropriate data mining techniques/algorithms for organizational needs
- Evaluate data mining models to assess their effectiveness
- Make predictions of future outcomes based upon data mining models
- Articulate the ethical issues surrounding data mining

ISIT 338 Data Analysis Techniques

Description:

Students learn a variety strategies and techniques for analyzing data and making decisions based upon that data. Students use case studies to integrate their analysis and problem solving skills. Students use current software systems to do analysis and they are required to present the results of their analyses. Prerequisite: ISIT 330, and either MATH 130 or BA 240.

Outcomes:

After completing this class, students should be able to:

- Select data sources to use for collecting information
- Assess data quality and distinguish signal from noise
- Create basic data models to illuminate patterns, and assimilate new information into the models
- Evaluate techniques to handle ambiguous information
- Design experiments to test hypotheses and draw conclusions
- Using segmentation, organize data within discrete market groups
- Visualize data distributions to reveal new relationships and persuade others
• Predict future outcomes with sampling and probability models
• Clean data to make it useful
• Communicate the results of an analysis to an audience

ISIT 432 Data Repositories for Analytics

Description:

Students learn to create and query analytic databases including multi-dimensional databases (cubes) and “big data” repositories. Students create business-oriented solutions for analytics. Prerequisite: ISIT 330.

Outcomes:

After completing this class, students should be able to:

• Analyze the different types of data repositories and their capabilities
• Select the appropriate data repository for a given organizational scenario
• Design and create multi-dimensional databases for data analysis
• Evaluate and apply software tools for querying multi-dimensional databases
• Design and create repositories for immense sets of data
• Create queries to retrieve information from “big data” repositories
• Analyze unstructured data for information retrieval

ISIT 434 Web Analytics

Description:

Students learn techniques for analyzing data generated by web traffic and social media sites. Students learn the importance of such data to an organization and they learn what analytic measures are available and applicable. Students also learn how to implement web data collection and analytic tools for web-sites. Prerequisite: ISIT 330.

Outcomes:

After completing this class, students should be able to:

Analyze the types of information web traffic can provide and why it is important to an organization
Use analytic tools to analyze traffic data collected from a web-site
Create appropriate reports/visualizations of web traffic data
Appropriately interpret reports produced by analytic tools
Analyze traffic data for patterns identifying visitor behavior
Present analysis results to stake-holders
Suggest web-site improvements based upon analysis of web-site traffic
Implement analytic tools for web-site data collection

ISIT 436 Performance Management

Description:

Students learn how to implement performance management in support of organizational change. Students learn how organizations define objectives, establish goals and measure progress using metrics and key performance indicators. Students learn how to implement software systems to provide appropriate information to users at all levels within an organization. Prerequisite: ISIT 330.

Outcomes:

After completing this class, students should be able to:

- Analyze how performance management can benefit an organization
- Create useful metrics for an organization
- Create appropriate KPIs (key performance indicators) for an organization
- Design effective scorecards, dashboards and other visualizations using current software tools
- Evaluate measurement and feedback to identify beneficial organizational changes
- Plan for the implementation of performance management within an organization
- Perform as an effective team member in the implementation of performance management
PROFESSIONAL-TECHNICAL ADVISORY/PLANNING COMMITTEE
(Voting Members)

Community/Technical College: Bellevue College  
Date Submitted: 6/24/14
Committee/Program Title: Information Systems Advisory Board

Please indicate which type of committee this is:
- [x] Program advisory committee
- [ ] General advisory committee
- [ ] Ad hoc/planning committee
- [ ] Other (specify)

Meeting dates for previous year:
- November 19, 2013
- June 16, 2014

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<th>Check Appropriate Column(s)</th>
<th>Voting Committee Member Information</th>
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<tr>
<th>Non-Voting Committee Member Information</th>
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<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Sylvia Unwin</td>
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<tr>
<td>Linda Rumans</td>
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<td>Shanon Ehmke Reedy</td>
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College Advisory Committee Procedures - [http://sbctc.edu/general/policymanual_/a-policymanual-ch4Append.aspx#appendg](http://sbctc.edu/general/policymanual_/a-policymanual-ch4Append.aspx#appendg)

SBCTC ADV 3/12)
Information Systems
Advisory Committee Meeting

Agenda

Date: Thursday, June 13, 2013
Location: Cafeteria, C130B
Time: 3:00 – 4:30 PM

1. Welcome and Introductions
   - Update Roster

2. Student Enrollments

3. IT Events
   - Job Fair and Networking, May 8
   - Test Fest – free MTA certifications, May 18
   - Pathways to IT Applied Baccalaureate Degrees for WA State Students Summit, June 7 [http://www.coeforict.org/events/futures/]

4. 4 year Baccalaureate
   - Pathways: high school, 2 year technical degree
   - Advanced certificates, job applicability

5. Discussion about jobs, internships, projects
   - Please plan on providing information to the following questions:
     Would it be possible to share job descriptions?
     What category of job involves software development (report developers, UI developers, ETL developers, etc.)
     If using .NET environment, what are the plans to move to WPF

6. Job Trends
   - What is new that is coming around the horizon? What skills might you need in two years?
   - IT in healthcare – what’s needed?

7. Other

8. Next meeting – TBA – Fall 2010
IS TAC Meeting
November 19, 2013

Western Wash University/Bellingham Job Fair, TAC members say looking for business expertise and can train on the IT

- Agenda add/does anyone want to be our committee chair—Angie Cook agreed to continue as chair
- Modify 2 year degree to stay relevant but have BAS be driving force.
- Sylvia referencing chart/document for AAS-T
- BI Track-more a high level skill base, want BI track at BS level, 300 level classes fuller and more in-depth than 100/200 level classes. Students need BAS to get a job, not just an AAS.
- Analyst and developer certs, student in these certs already have 4-year degree
- Create upper division certs either analyst or developer or one general?
- Students need stats (ISIT 337) and any pre-reqs for classes in the cert
- Jim says good to have one cert so employers know what it is (no confusion) and for economy of scale
- Chan asking about the pre-reqs, you need SQL and database to get in the cert
- Name for cert: not specialist that title comes comes in at bottom, administrator group says no,
- Motion to approved, and all were in favor

Sylvia: Update to 2 year degree,

Remove BI track from IS 2-year

Software Development, move PROG 109 to core

Strengthen DBA track with DBA 233.

Add IT 101 and ISIT 105 to two year degree. Add PROG 210 and 225 to the BAS program.

Chan, taking PROG 210 and 225 out of the two year degree will dumb it down, keep the PROG 210, and have 5 credits of electives instead of 10, include web services as a method of data access

Jim, where are people coming out of the BI 2 year program being hired? Sylvia, they aren’t that is the problem.
Need to know how to work with frameworks

PROG 210-data connectivity (possible new name)

Database admin:

Chan, Costco’s modernization, no more homegrown, using CRM SAP but need data integration—HL7

Use lots of Vendor based systems that need to come together and talk to each other—want a data integration track (server based)

Jim, there are 400 job roles across organizations, BI rarely comes up, DBA are usually senior people with industry certification, need a business analyst to work with outside vendors and from BI and BA (Business Analyst), we can teach the technology but need to solve business problems, healthcare uses BA, BA are lower level but each organization defines BA differently

Software testing as a 2-year degree, more likely to hire a software tester with a 2 year, but curriculum could be the same as application development concentration, make a unit testing class, black box, white box, software testing certifications are very popular. Look at PROG 160 to infuse with AGILE, testing theory, test first write the code. Include industry standards in the classes.

Data integration is more a 4 year degree.

Costco hired 40 Business Analysits, get a copy of job description of BA from Chan

Remove 2 year BI track: Chan motioned to remove the BI track from 2-year degree and seconded by Jim, none opposed

Sylvia will send out proposal for changes Software Development and DBA tracks and ask for feedback.

MIS is more holistic, to include testing, system analysis and design

Competing against people with 20+ years of experience in DBA

More experience for entry level BA, get job descriptions from Jim and others, look in to a BA track

Need to know how data is connected and use business rules, a good BA will go across verticles, could go in to DA BAS to have the breadth, Angie just hired a dedicated data analyst.

We will have a meeting in winter 2014.