

# SREB

## **Measuring Technical and Academic Achievement**

Employer/Certification Examinations'  
Role in High School Assessment

Southern  
Regional  
Education  
Board

592 10th St. N.W.  
Atlanta, GA 30318  
(404) 875-9211  
[www.sreb.org](http://www.sreb.org)

# Foreward

The primary mission of state education policy-makers is to establish the goals and guidelines that ensure high school graduates are prepared for further study, gainful employment and responsible citizenship. Policy-makers set high standards for educators to ensure schools are provided with highly-qualified teachers and leaders, and they adopt challenging education objectives to ensure high school graduates demonstrate readiness for postsecondary studies and careers.

Despite higher standards and new policies, many high school graduates are not prepared for further study or a career. Some students simply drop out of the system because their learning environment seems to be neither relevant nor challenging. While student failure and progressive disengagement are not always the result of an educational system's shortcomings (students and parents must bear some of the responsibility), educational leaders continue to refine policies and practices to improve educational outcomes for all students. At the high school level, this requires helping all students find their talents and interests and developing a full range of programs of study to bolster and nurture students' ability to succeed in any field.

The Southern Regional Education Board (SREB) believes all students should be enrolled in challenging courses that will engage them and prepare them for further study and work. For many students, career/technical (CT) studies provide the engaging, challenging and relevant assignments that will motivate them to master complex academic and technical materials by enhancing the development of a special interest in the context of a career field. Career/technical studies can engage students in academic studies while linking academic content to career fields of interest, rather than focusing on students' deficits through an instruction process that lacks meaning and purpose.

As high school leaders work to create a curriculum that addresses students' unique talents, interests and goals, one size of state accountability and assessment will not fit all students. Schools and states must find methods for evaluating whether or not students in career/technical programs are developing their talents in a potential career field of interest. Employer certification exams provide one type of evaluation for certain career/technical fields. In fact, some states have already begun to use employer certification examinations to assess students' mastery of complex material that combines academic and technical content. In some cases, these exams are being used to replace some traditional high school graduation examinations.

State CT leaders are responsible for contributing to the education and preparation of high school students who are academically and technically competent. The measures used to assess student learning through CT studies must reflect rigorous and relevant content coverage and the psychometric quality necessary for making appropriate judgments about achievement.

Policy-makers and educators who are less familiar with the nature of industry-based examinations need assurance that the foundations of science, mathematics, reading comprehension, logic and critical reasoning are embedded in technical examinations. The application of these skills and knowledge to work settings provides significant proof that what is learned in career/technical studies has direct and productive relevance to solving real-world problems.

# Contents

<b>Executive Summary</b> .....	<b>3</b>
<b>Purpose of the Project</b> .....	<b>4</b>
Significance of Examinations for Career/Technical Education .....	4
The Concept of Rigor .....	5
Industry-Based Examinations and Required Skills .....	5
<b>The Diverse Nature of Industry and Professional Examinations</b> .....	<b>6</b>
Wide Range of Programs .....	6
The Nature of Certification .....	6
Test Development .....	7
Computer-Adaptive Testing .....	8
<b>Project Criteria Applied to Examinations</b> .....	<b>8</b>
Essential Criteria .....	8
Necessary Criteria .....	10
Desirable Criteria .....	11
<b>The Examination Review Process</b> .....	<b>12</b>
Developing a Master List of Examinations .....	12
Data Collection .....	12
The Test Information Sheet .....	12
Course and Classroom Contact Hour Linkage .....	13
Analysis and Recommendation .....	13
<b>Recommendations</b> .....	<b>14</b>
Recommended Examinations .....	14
Provisionally Recommended Examinations .....	15
Suggested Guidelines for Accepting Student Performance on Alternative Examinations .....	17
Examinations Not Recommended or Not Reviewed .....	17
<b>Observations About CTE and Industry-Based Examinations</b> .....	<b>18</b>
The Risks of Using Industry-Based Examinations as Alternative Examinations and Program Accountability Measures .....	18
The Broad Reach of CTE and Industry Examinations .....	18
The Proprietary Nature of Industry-Based Examinations .....	19
Program Examination Coverage and the Realities of Scale .....	19
<b>General Recommendations and Next Steps</b> .....	<b>20</b>
<b>Appendix A: Test Information Sheet</b> .....	<b>24</b>
<b>Appendix B: Organizations and Professional Associations</b> .....	<b>27</b>
<b>Appendix C: Recommendation Summary</b> .....	<b>28</b>



# Executive Summary

SREB believes every student should be in challenging and relevant courses that will motivate them to graduate and prepare them for further learning in postsecondary studies and work settings. **States that require students to pass academic examinations for graduation should require all students to pass academic examinations in reading, writing and mathematics; however, students pursuing a concentration in specialized career/technical (CT) studies could be offered an option to pass state-approved, nationally recognized employer certification examinations in lieu of passing additional academic examinations.** It should be noted that no industry-based examination — regardless of its degree of difficulty or recognition within its respective field — replicates or meets the academic blueprint for a given academic examination in fields such as biology, chemistry, United States History or Algebra II.

SREB considered more than 500 employer certification examinations and reviewed and evaluated more than 200 of these examinations to identify a set of acceptable alternative examinations. In consultation with state leaders, criteria were established specifying that examinations should be standardized, independently scored and available nationally or internationally; possess rigor; be knowledge-based; have employer relevance; and evaluate both technical and academic knowledge and skills that represent high school level work.

We decided that industry examinations should represent the scope and coverage of content that would equal or exceed academic end-of-course examinations. To address this concern, another criterion was established requiring that, before a student is eligible to take an industry-based examination and to declare it as an alternative examination in a career/technical field, he or she must complete a minimum preparation and classroom contact time equal to or greater than 150 hours, which is the maximum time required for earning a Carnegie Unit of high school credit.

Because this is the first external review of CT examinations as possible qualifying examinations for graduation, a conservative stance was taken in requiring high, but reasonable, standards. As a result, examinations are not recommended for all career clusters, majors or pathways. The focus of the effort centered on evaluating the nature and quality of examinations, rather than providing alternative examinations for students in each CT area.

We established two categories of examinations for recommendation: recommendation without reservation and provisional recommendation. Examinations that are recommended without reservation are proposed because they meet the essential criteria and additional necessary and desirable criteria established by SREB in consultation with state education leaders. Examinations in the provisional recommendation category may have satisfied the essential criteria, but may not have met other necessary or desirable criteria based on information available. For example, some provisionally recommended examinations meet most of the criteria, but are not currently endorsed or recognized by an industry group or association. Other provisionally recommended examinations qualify for this level only if *bundled* with one or more related examinations. That is, the examination must be taken along with at least one other bundled certifying examination in order to qualify as an alternative examination. Other examinations in this category are nationally recognized and valued highly by professionals in the field, but we were unable to gather sufficient information to support full recommendation due to the proprietary nature of the examinations.

We conducted a preliminary review of 541 examinations. After narrowing the list to those examinations that were available nationally and were viable alternatives for high school students, we fully reviewed and completed examination profiles for 204 examinations prior to evaluating them against the established criteria. **In total, 177 examinations are recommended for approval, 86 of which are recommended without reservation and 91 of which are recommended on a provisional basis.** The full report contains a brief description of and observations about the nature of these examinations. Electronic files of the examination profiles and the factors that led to each recommendation can be obtained from SREB.

Although we would have preferred to study copies of these examinations, security and proprietary issues prohibited such study. Nevertheless, we were able to review all the information available to the public and collect additional information through surveys and direct interviews with examination managers, developers and owners, thus gathering sufficient information to make recommendations regarding many of the examinations.

To ensure the continued rigor and quality of accepted industry-based examinations, states will need to conduct ongoing reviews and evaluation of the examinations and take further steps to accept or reject examinations in the provisional recommendation category. Recommended actions for states are provided at the conclusion of the report.

## Purpose of the Project

SREB undertook a study to review the quality, content and rigor of external examinations relevant to career/technical (CT) fields. The purpose was to review career/technical examinations as potential replacements for select academic examinations required for graduation, excluding required examinations in reading, writing and mathematics. To ensure a common base for judging test quality, we developed a set of criteria for reviewing employer certification examinations as alternative graduation examinations. The outcome of this review is a list of recommended examinations for states to consider as alternative examinations that students may take and pass to fulfill part of their high school graduation requirements or as indicators that students completing a concentration in CT studies are prepared for the work force.

### *Significance of Examinations for Career/Technical Education*

By including career/technical examinations as qualifying alternatives for certain high school exit examinations, states recognize that some students learn differently and that quality CT studies — with intellectual rigor and embedded academic content — aligned with a coherent sequence of academic courses can advance academic and technical achievement. This recognition signals an important message to parents, students, educators and policy-makers: Quality career/technical education (CTE) involves rich cognitive assignments that blend “hand work” and “brain work” into challenging learning experiences and foster greater motivation in CT and academic courses.

Along with this recognition comes greater attention to the nature and quality of measures of CTE outcomes. The most recent federal legislation for career/technical studies, known as Perkins IV, brought greater attention to measuring educational outcomes. In the past, the measurement of CT programs focused more on enumerative data (e.g., the number of programs available, the number of students in programs, the number of students graduating, the number entering related employment or postsecondary education). A few states have developed their own examination series to measure program quality, and some states have relied on nationally available examinations for completing program reviews. Most teachers have been grateful for the mere existence of relevant test titles, given the wide diversity and breadth of programs, and have not looked much beyond test blueprints other than to see whether the topics covered in the classroom are covered in the examination. Content congruence and content validity, although fundamental to test selection, fall short of determining the quality of an examination. As CTE takes its rightful place alongside traditional academic measures, greater attention will be given to the psychometric quality of CT examinations. This change invites a review of employer certification exams to assess the effects of CT studies and graduates’ readiness for employment.

## *The Concept of Rigor*

This review of industry-based examinations was founded on the assumption that rigor addresses both the *depth of knowledge* measured by an examination and the *complexity* of the examination.<sup>1</sup> Measuring a *depth of knowledge* contrasts with the traditional view of rigorous studies as a breadth of knowledge, which follows the notion that students should learn about as many topics as possible. This view was established as state standards continually increased the range of content that teachers were required to cover for each grade level. Rigor as depth of knowledge encourages students to study fewer content areas, but to delve deeper and master the subject matter within content areas.

The concept of rigor as *complexity* relates to students' abilities to understand how various academic disciplines are related and to incorporate multiple disciplines when completing intellectual work-related assignments. This concept of rigor is evident in CT curricula that require students to complete real-world activities, problems or projects in a given career field of study by drawing upon what they have learned in the wide variety of academic courses.

To be recommended as acceptable alternative examinations, CT examinations had to include both a *depth of knowledge* in the respective field and *complexity*, combining different academic and technical content to meet examination standards.

## *Industry-Based Examinations and Required Skills*

Industry-based examinations will not replicate content in any core academic examinations, but will require students to demonstrate the ability to read, interpret, and understand complex technical materials written at or above a high school level. To function successfully in many career fields requiring certification, students must possess relevant knowledge and understanding of mathematics, language arts, government regulations and related sciences such as biology, chemistry, physics, health, and food and nutrition science. Knowledge of these disciplines is necessary for students to demonstrate sufficient depth of technical knowledge to answer the types of questions that practitioners within their respective fields would be expected to answer. A broad background of academic and technical knowledge enables students to diagnose a problem, evaluate possible solutions, and select the most effective solutions and appropriate strategies.

The test specifications for industry-based examinations are governed by an assessment of job requirements, the inclusion of best practices, and state and federal regulations and requirements. Many examination developers conduct continuous job analyses and monitor developments and innovations in the field to ensure examinations are current with changing requirements. Employers who rely on these examinations as employment screens for applicants or as employer evaluations expect high standards of content and set cut scores representing appropriate standards. Trade and industry associations that use these examinations for induction or certification maintain equally high expectations for the quality and rigor of the examinations.

The procedures for developing and maintaining industry-based examinations are quite similar to those used to develop traditional academic examinations. Committees of practitioners provide the blueprints, review questions and monitor the quality of the examinations. A statistical group supports test development and maintenance and oversees the scaling, equating, scoring, reporting and computer-driven delivery system. Some examination owners, such as the National Occupational Competency Testing Institute (NOCTI) and Brainbench, convene diverse development committees composed of practitioners in the respective fields, high school and college instructors and academic consultants (particularly in the case of NOCTI). Their psychometric infrastructure, support and computer-delivery systems are state of the art.

<sup>1</sup> Grubb, W. Norton and Jeannie Oaks. *Restoring Value to the High School Diploma: The Rhetoric and Practice of Higher Standards*. Education and the Public Interest Center, Arizona State University and Education Policy Research Unit, University of Colorado at Boulder, 2007.

Most owners of certification examinations establish and report their cut scores on a pass/fail basis. Rarely do industry owners provide diagnostic information about the nature of shortcomings that may have led to failing an examination. Some, however, do provide information explaining the percentage of questions that an applicant must answer correctly. We found this general lack of feedback to test-takers or their teachers to be a severe limitation in addressing student deficits and informing the improvement of career/technical curricula and instruction.

## The Diverse Nature of Industry and Professional Examinations

### *Wide Range of Programs*

Industry and professional certification programs are as diverse as the career/technical programs that prepare students for entry into productive careers. In all, we studied 68 associations, institutes, and boards and registries that offer multiple examinations in nearly as many fields and specialties. The most dominant segment of CT examinations was found in Information Technology. Other significant areas were construction, business and transportation. The number of certification examinations in these areas reflects their growing importance in domestic and international economies and a mature status in the increasingly complex automotive and manufacturing domains.

Other examinations and associations were discovered as the data collection phase of this effort came to a close. Nearly all of these organizations have Web sites that contain information about becoming certified, and many offer learning programs directly or through a separate organization. A number of the learning programs are available on a contract basis to high schools, technical schools and postsecondary institutions.

### *The Nature of Certification*

Industry-based certification examinations serve one of three purposes: 1) to validate the skills and knowledge of a candidate against an industry or professional standard, as in the case of the American Welding Society and American Design Drafting Association; 2) to certify knowledge and skills associated with a specific product or service, as in the case of examinations associated with specific Adobe software (e.g., Dreamweaver, Photoshop) or those associated with Web development, security, and administration by Microsoft and Cisco Systems; and 3) to determine a progressive level of mastery within a given field, such as the International Fluid Power Society's Hydraulic Power Mechanic, Specialist, and Technician levels. Other certifications of this third type may designate "Associate," "Professional" or "Engineer" levels. Some of these certifications are earned not by completing a specific examination, but as a result of completing a series of examinations.

#### EXAMPLES OF TYPES OF CERTIFICATION EXAMS

- 1) The Computer Aided Drafting and Design Certification is offered by the American Design Drafting Association and certifies that the recipient possesses the knowledge based on theory and principles and the skill components that are fundamental to the drafting profession, regardless of the software application used.
- 2) The Adobe certification exams certify that Adobe believes the recipient is qualified in that specific Adobe software exam (e.g., Photoshop, Dreamweaver, Flash). A recipient of the certification in Adobe Photoshop has passed two examinations that cover painting and retouching, creating and using layers, supporting video, working with vector tools, using Smart Objects, managing assets with Bridge and managing color.
- 3) The International Fluid Power Society (IFPS) offers the Hydraulic Power certification series, for which students can pass three different levels of work skills. The first exam certifies the recipient as a mechanic and requires the ability to diagnose and evaluate problems, select repair strategies, and determine causes and solutions for select issues. The next level of the exam, specialist, requires the same skill set as the mechanic level, but requires the recipient to handle a wider variety of issues. The final level, technician, requires the recipient to handle the previous skill sets and as many additional issues as determined necessary by IFPS.

This third example of accumulating several examinations to qualify for certification was the basis for *bundling* certain recommended certification examinations. In brief, certain examinations were too narrow in scope to meet the breadth and depth threshold needed to qualify as an examination for recommendation. We recommended such examinations if they were required in combination (or bundled) with one or more other certifying examinations.

In some cases, the steps toward certification are an integral part of a learning program package available to states and schools on an institutional subscription basis. Portions of certification tests are administered as end-of-unit classroom examinations as part of the learning program. Successful completion of all end-of-unit examinations automatically results in certification. We were reluctant to recommend these arrangements, regardless of how valuable they may be, because the in-class examinations administered and scored by instructors did not meet the criteria of independent scoring.

## *Test Development*

Industry-based examinations have precise blueprints or examination objectives that describe the nature of the examination. These blueprints are established and monitored to ensure all standards are current and the examinations have sufficient depth to convince candidates, employers and state boards of certification that successful candidates have the necessary skills for job entry or promotion.

The development of these industry examinations follows the same general procedures used for the development of traditional academic examinations. A committee of practitioners in the field, who also may be members of the sponsoring association, is formed to review specifications, oversee the development of test questions, review the statistical monitoring of the quality of the questions and manage the life cycle of a particular form of the test. These associations more often contract with another organization — often the same companies used by education-related examinations — to assemble, administer or deliver the examination by computer-assisted means and to analyze and report examination results. The renewal schedule for the examinations varies greatly — some examinations are changed after every administration or every candidate, as in the case of computer-delivered examinations, and others are renewed every three to five years. Examination representatives often said the examinations are renewed when the product revisions or introductions (in the case of software) occurred or when innovations within the field required changes in test specifications.

Although the blueprints for these examinations are necessarily highly technical and specific to the CT field, they often include direct and indirect academic skill requirements within their specifications. Some blueprints advise candidates that knowledge of academic subjects such as algebra, health science, chemistry, or physics will be necessary to succeed. Most blueprints are more precise, indicating required skills. In the case of carpentry and metal working, for example, an examination might specifically indicate necessary skills in measurement conversion, ratios, torque calculations, electrical circuitry, dosage and formulation interactions, chemical reactions and geometric solutions. In such instances, we were able to document academic analogs or attributes found in the examination.

The Certified Production Technician (CPT) is a certificate offered by the Manufacturing Skill Standards Council (MSSC). The certificate verifies that the recipient possesses the non-occupational skills to work well in small team efforts and differs from the historical employee possessing only a single occupational skill. This certification was funded by the National Skills Standards Board, a committee formed by the U.S. Departments of Education, Labor and Commerce, and supported by manufacturing unions and private industry. The creation of the blueprint for this certification took several years and included 7,000 front-line workers discussing their job requirements, 350 subject matter experts to codify the job requirements into a blueprint, and 400 companies that provided their expertise.

## Computer-Adaptive Testing

A growing number of industry-based certification examinations use computer-adaptive test (CAT) technology. This delivery strategy tailors the questions posed to the candidate according to the person's skill level. As a test-taker answers each question, the correctness of the response governs the nature and difficulty of the next question the candidate receives. Once the software has determined the candidate's skill in one area, it moves to another until all areas of the test are covered and the confidence level concerning the candidate's accomplishment has been reached. This strategy greatly reduces the duration of the examination and reports results more quickly and with greater precision. The result is that an examination that may last four hours in paper-and-pencil format can be completed in less than one-hour with computer-adaptive testing, and results are available immediately. Under this method, the length of an examination or the number of questions posed is an irrelevant measure of the quality of the examination.

## Project Criteria Applied to Examinations

Before work began, we met with several state education leaders to discuss the project objectives and learn from state experience in implementing alternative CT examinations. Some leaders expressed concerns about what was perceived to be uneven rigor of industry-based examinations and about the amount of course work required and available for proposed examinations. The need for direct course linkage to industry examinations, substantial contact hours and meaningful course work, and an emphasis on industry or employer endorsement helped to shape the criteria the project team established.

We established three levels of criteria for reviewing examinations to propose as qualifying alternative tests: essential criteria, necessary criteria and desirable criteria.

### Essential Criteria

*Essential criteria* are qualities that all exams should possess.

- **The examination is standardized.** The examination must be administered under strict testing conditions such that students will have an equal opportunity to answer questions, the testing time provided is equal for all students, the examination is proctored by trained test administrators, and the validity and reliability of the examination and its psychometric support meet standard and rigorous specifications. Furthermore, if multiple forms of the same examination are available, the results are placed on a common reporting scale using generally accepted procedures of statistical equating so that a student taking either form would perform equally well.
- **The examination is independently graded:** The process of grading and reporting results is the direct responsibility of a third party. A great majority of the examinations reviewed require the use of a computer (or computer software) linked to a central remote location beyond the bounds of school or state property. The student or applicant logs on to the computer and links with the testing software. At the conclusion of the examination, the results are immediately presented on the computer screen.

#### ESSENTIAL CRITERIA

- Examination is standardized
- Examination is independently graded
- Examination is knowledge-based
- Examination is available nationally
- Examination provides recognized credential
- Results are available immediately
- Cut scores exist
- Examination represents employer relevance
- Correlations are available

Other modalities alert the student to log on to the test owner's Web site to receive the test results. Paper-and-pencil examinations require the traditional returning of answer sheets and booklets to the test provider for scoring and reporting.

It is important to note that owners of most industry-based examinations employ a separate testing agency to register students, administer examinations, score responses and report the results. They use the same organizations that many owners of traditional academic examinations use.

- **The examination is knowledge-based:** This general term is used to cover two definitions for this criterion. First, appropriate knowledge and skills are required for successful completion of the examination, meaning that questions can be answered not by applying common sense alone, but by demonstrating knowledge gained through a planned curriculum and extensive worksite learning. Secondly, examinations are knowledge-based in that they are not performance-based. Allowances were made for industry examinations that required both a written portion and a practical or performance segment if the written portion of the examination met the essential criteria. Examinations that are entirely performance-based, however, are not included in the recommendations. These examinations might be excellent alternative examinations that faithfully reflected the requirements in the field, but fell short of providing a paper-and-pencil or computer-based measurement of a candidate's content knowledge in the given career field.
- **The examination is administered nationally or internationally.** For an examination to be eligible as an alternative examination, it must be available for use beyond the boundaries of a single state. Examinations offered by a state can be included if they are available for use by other states. This criterion exists to ensure that students completing a concentration in CT studies take reputable examinations known within the industry, independent of local or state credentialing.
- **The examination results in a recognized credential.** This stipulation required careful review of examination certification programs to separate industry-valued certifications and endorsements from those with value limited to recruitment for an association membership. A number of examinations met all the essential criteria in terms of rigor, depth and breadth of knowledge and high psychometric quality, but do not issue certificates or are not endorsed by an employer- or employee-based organization. However, in all other respects, these examinations verify achievement and are of quality equal to or higher than others that do award certificates, and have thus been provisionally recommended.
- **The examination results are available immediately.** In nearly all the cases of the recommended and provisionally recommended examinations, the results are readily available or prepared within 30 days.
- **The examination cut scores were set using a standards-setting or other logical process** and are reported. This criterion originally stipulated only that cut scores be reported; however, we found several examinations that did report cut scores, but those scores were set arbitrarily, rather than through a standards-setting process. This issue is compounded by the general practice of industry-based examinations to report only a "pass" or "fail" result with little or no explanation. Thus, the criterion was altered to include the stipulation that cut scores not only be reported, but also be set using a logical process.
- **The examination represents employer relevance.** Employer relevance requires that test content relate directly to the knowledge and skills required in the field, such that successful completion of the examination might qualify a candidate for meaningful employment.
- **Examination correlations to academic studies are apparent.** We recommended only examinations with sufficient linkage with traditional academic subjects. Accordingly, where possible, we identified the types of mathematics, science, language arts or other academic skills that students would need to complete the examination successfully. A nursing or dental assistant examination, for example, would require knowledge of human anatomy, some chemistry and some mathematics. A manufacturing technician, welder or construction inspector examination might require algebra, trigonometry and physics; knowledge of metals, machine calibrations and conversions; and the ability to read charts, graphs and blueprints. These academic analogs are noted in the examination profiles wherever possible.

## Necessary Criteria

*Necessary criteria* were established to address the concept of *rigor*, defined as “a level of difficulty that is appropriate for the grade level and that meets state and/or national standards.” The rigor of an alternative examination must equal or exceed that of current graduation examinations.

The intent of this study is not to provide an easier alternative to academic examinations, but rather to recognize students’ accomplishments and applied academic and technical knowledge and skills in a recognized CT field. Therefore, we analyzed examinations to determine whether some industry examinations would be too narrow in scope and coverage or too simple to match the challenge of end-of-course academic examinations. For example, a certification examination for keyboard skills that requires instruction time of 30 to 90 hours would not be recommended as an acceptable alternative examination.

### NECESSARY CRITERIA

- Preparation and classroom contact hours equal or exceed one Carnegie Unit.
- Blueprint information and sample questions represent a 12th-grade level of work.

- **Recommended preparation and classroom contact hours are equal to or greater than a single Carnegie Unit.** This minimum threshold ensures depth and breadth of the knowledge and skills necessary for successful completion of the corresponding examination. To judge compliance with this expectation, we asked state career/technical staff in one state to identify the courses and classroom contact hour they consider to be appropriate preparation for each reviewed industry examination. In evaluating more than 200 examinations, we quickly discovered that, far from being end-of-course examinations, the industry-based examinations were most often end-of-program (or near-end-of-program) examinations. As a consequence, the classroom contact hours and courses far exceeded the single Carnegie Unit minimum that corresponded to a given academic course. For example, the courses listed in one state for adequate preparation to take the American Design Drafting Association Computer-Aided Design (CAD) examination amount to 1,020 contact hours. No single course will prepare the student for this examination. Rather, at some point during the student’s preparation, the guiding instructor may suggest that the student is ready to take the examination, based on the known requirements of the examination.

### COURSES REQUIRED FOR CAD DESIGN ELECTRONICS SPECIALIST

Fundamentals of CADD	120
Drawing and Document Management	45
Advanced Presentation Graphics Animation	120
Principles of CAD Design	165
CAD Electronics Introduction	120
CAD Electronics Level 1	60
CAD Electronics Level 2	60
CAD Electronics Level 3	60
CAD Electronics Level 4	120
CAD Electronics Level 5	120
Workforce Staging	30

The courses and classroom contact hours, which can be found in the Test Information Sheets, describe the preparation the student would likely need for the designated examination. Upon the advice of their teachers, students might take the certifying examination before completing their course of study, after the first 150 hours of class time<sup>2</sup>, because they may have gained the necessary knowledge and skills at nearly any point along the way. It is important to note that the length and packaging of course content may vary from state to state. Some courses are of shorter duration and are considered modules or half-courses that may cover a specialized topic. Thus, we focused the minimum preparation needed in terms of course time (150 contact hours), rather than number of courses, to signify a substantial classroom opportunity to learn career-related content in depth.

- **The blueprint information and sample examination questions reveal a level of work and understanding appropriate for the high school level.** We stipulated that examination review would include, at a minimum, a study of blueprint information and sample questions found on Web sites and in consultation with examination representatives. The sample questions, blueprints and conversations with examination owners enabled us to understand the complexity of terminology and the technical materials that students would need to read and understand to answer examination questions. A review of the documents and other information provided clues to the academic content that would be required in the examination, allowing us to ascertain a level of work and understanding consistent with what might be expected of a junior or senior in high school.

### *Desirable Criteria*

The final criteria used in this review were designated as *desirable criteria*. These criteria were established to ensure that a certain threshold of test quality, development and support was met. We were concerned about the process of test development, the nature and role of test development committees, statistical maintenance and support, and accommodations for non-native speakers and people with disabilities. Information was also obtained about the steps taken to protect examination security and verify test candidates' identity. A brief data collection questionnaire was created to document as much information as was available about the technical aspects of each examination.

#### DESIRABLE CRITERIA

- Follows appropriate psychometric and test development procedures
- High quality is continually maintained
- Includes accommodations
- Protects candidate's identity

It is important to note that although this brief technical review was based on a selected portion of the standards set forth by the American Psychological Association, this limited verification cannot be considered to be a thorough psychometric review or audit. Not only was such an exhaustive review beyond the scope of this report, the proprietary nature of the vast majority of the examinations reviewed prevented adequate access to the examinations and technical manuals or reports to complete such a review. During telephone conversations with owner representatives, enough information was gained in most cases to enable us to verify that responsible psychometric and test development procedures were being followed.

<sup>2</sup> One Standard Carnegie Unit is defined as 150 classroom hours for this report.

# The Examination Review Process

## *Developing a Master List of Examinations*

After establishing the three levels of criteria with state leaders, we adopted several states' master lists of organizations and examinations to review, including those of Oklahoma, Pennsylvania and Virginia. The compilation of these lists produced considerable overlap of examinations recognized by and used in state programs. As the data collection phase of the project progressed, more organizations and examinations were discovered and considered. Nevertheless, we were aware that we would unintentionally omit certain examinations from consideration because their existence was not known or sufficient information about the exams was unavailable.

## *Data Collection*

To ensure we could concentrate on examinations that seemed to qualify for further review, the team removed from the list those examinations that, on first review, clearly did not meet the essential criteria. Many of these examinations provided no certification or endorsement or were designed as classroom tests with answer keys available to teachers as part of their instruction strategies. A Test Information Sheet was not prepared for these examinations.

Allowances were made for examinations that, by reputation, were of solid quality and were used by several states as end-of-program examinations or were listed as appropriate for program certification purposes. Examples are examinations made available by Cisco Systems and Adobe. Although the project team sought to cull the list of non-qualifying examinations, it was careful not to drop from consideration examinations that might have a plausible opportunity to qualify for recommendation. This more flexible step, before data collection began, led to the eventual establishment of a middle ground — the second category of provisional recommendation. (See page 15 for a description of the categories of provisional recommendation.)

A Certified Novell Administrator has a strong working knowledge of computer networking and an in-depth knowledge of Novell software in either Netware or Open Enterprise for Netware. Novell provided us with access to the senior developer of their examinations; however, due to the sensitive nature and the security of their examinations, the information necessary to make a suitable decision was not available at the time.

## *The Test Information Sheet*

To organize our work, we established a Test Information Sheet containing the criteria and psychometric questionnaire as a worksheet for collecting examination information. (A sample Test Information Sheet can be found in Appendix A on page 24, and the completed Test Information Sheets are available electronically from SREB.) A contact log kept information about Web site links, personal contacts and telephone numbers used. Completed profiles for proposed examinations are included in the electronic materials that accompany this report. Each profile is five to seven pages in length and contains descriptions, sample questions and other data.

Gathering the necessary information to make a recommendation decision about an examination required considerable research. Most of the data collection effort involved the study of one or more Web sites for each examination (a home Web site and a separate site hosted by the contractor for test administration, scoring and reporting); however, telephone calls and electronic conversations with examination owners also were necessary.

The ways in which information was embedded in examination Web sites posed a challenge in finding the data needed. In nearly every instance, Web sites directed information toward candidates interested in applying for the qualifying examination and focused on how certification could benefit personal careers. Very little information was immediately available about the nature of the examinations. The site directed visitors and candidates to the shopping pages for the purchase of sample questions or sample examinations. Even such rudimentary information as the length of the examinations or the number and type of questions was rarely presented.

The telephone conversations with owners gave team members the opportunity to ask questions about the technical quality of their examinations. Few owners had been asked to support the psychometric undergirding of their test development process, studies about item performance, scaling, equating, reliability and subgroup statistics. Many were unprepared for this level of vetting of their examinations.

Although some examination representatives were quite helpful and informative during the conversations, others said that the information sought was of a proprietary nature. In these cases, we determined whether the information already collected was sufficient to make a recommendation. If the information was insufficient, the examination was either dropped from the list or was recommended provisionally, pending the availability of additional information.

### *Course and Classroom Contact Hour Linkage*

We worked with one state to match preparatory courses and classroom contact hours to each examination title and honored the criteria of rigor by verifying the learning needed to succeed when taking the respective examinations. This step allowed us to confirm the extent of preparation staff believed was necessary for successful completion of the certifying examination and, further, presented a logical progression of courses leading to program completion. Through this step, we also were able to confirm the examinations' relevance to the curriculum. Particularly in the case of examinations identified by other states, we needed to demonstrate that examinations were linked to course offerings. If no courses could be linked to the examination, the examination was determined to be currently irrelevant for students completing a concentration in the field. Courses and contact hours required for each examination based on one state's courses are listed in the electronic Test Information Sheets.

CTE department leaders in one state established a list of courses and corresponding classroom contact hours they determined to be necessary preparation for each examination. The various sequences of courses to prepare students for an end-of-program certifying examination might vary with analysis by other states.

### *Analysis and Recommendation*

Once the examination profiles were completed, we developed a summary sheet that contains the titles and a brief description of the examinations. Each member of the project team reviewed the examination profiles, including the three levels of criteria and any data assembled, and proposed a recommendation for each examination. Independently, each reviewer proposed that the examination be recommended, provisionally recommended or not recommended, annotating the reasons, reservations and suggestions for further review. When independent recommendations differed, the SREB team discussed the disparity and reasons for the differences until agreement was reached. The results of this work can be found in the Recommendation Summary in Appendix C, beginning on page 28.

# Recommendations

We established two categories for recommending examinations: recommendation without reservation and provisional recommendation. A summary list and descriptions of these examinations are presented in Appendix C. The examination titles are presented by career clusters. A more extensive profile for each examination — containing detailed descriptions, blueprints, sample questions, and test development and a psychometric summary — can be obtained from SREB.

## *Recommended Examinations*

**In total, 86 examinations are recommended without reservation.** Based on the review of information at our disposal, we are confident that the recommended examinations meet the essential criteria and most, if not all, necessary and desirable criteria.

### EXAMINATIONS RECOMMENDED WITHOUT RESERVATION

- AAMA Certified Medical Assistant
- AAVSB Veterinary Technician
- ADDA CAD Cert
- Adobe ACE Acrobat Professional Print Production
- Adobe ACE After Effects
- Adobe ACE Illustrator
- Adobe ACE InDesign
- Adobe ACE Photoshop
- Adobe ACE Premiere
- Adobe ACP Macromedia Dreamweaver
- Adobe ACP Macromedia Flash
- AIPB Bookkeeper
- AMT Registered Medical Assistant
- ARDMS Diagnostic Medical Sonographer
- ARRT Radiologic Technologist
- ASCP Phlebotomy Technician
- ASK Bundled Series\*
- ASE Mechanical & Electrical Components Technician
- ASE Non-Structural Analysis and Damage Repair Technician
- ASE Painting and Refinishing Technician
- ASE Structural Analysis Damage Repair
- ATRA Transmission Certification\*
- AWS Certified Welding Inspector
- AWS Welding
- AYES Brakes
- AYES Electrical
- AYES Engine Performance
- AYES Steering & Suspension
- CETA Electronics Technician Associate
- CETA Student Electronics Technician
- Cisco Certified Network Associate
- Cisco Certified Network Professional
- CompTIA A+ 220-602 Technician Level
- CompTIA A+ 220-603 Remote Technician
- CompTIA A+ 220-604 Depot Technician
- CompTIA Linux +
- CompTIA Network +
- CompTIA Server +
- DANB Certified Dental Assistant: Radiation Health and Safety Examination
- DANB Certified Dental Assistant: Infection Control Examination
- EMT Basic
- EMT Emergency Medical Technician
- EMT Paramedic
- FSBPT Physical Therapy Assistant
- GAERF PrintEd Certification\*
- HVAC Excellence: Electric Heat Certification
- HVAC Excellence: Electrical Certification
- HVAC Excellence: Gas Heat Certification
- HVAC Excellence: Heat Pump Certification
- HVAC Excellence: Oil Heat Certification
- IFPS Hydraulic Power Specialist
- IFPS Hydraulic Power Technician
- IFPS Pneumatic Power Specialist
- IFPS Pneumatic Power Technician
- MDHT Brakes Technician
- MDHT Diesel Engine Repair Technician
- MDHT Drive Train Technician

- MDHT Electrical & Electronics Systems Technician
- MDHT Gasoline Engines Technician
- MDHT Heating Ventilation, and AC Repair Technician
- MDHT Preventive Maintenance Technician
- MDHT Suspension & Steering Technician
- Microsoft Certified Desktop Support Technician
- Microsoft Certified Professional
- Microsoft Certified SQL Server Administrator
- Microsoft Certified Systems Administrator
- Microsoft Certified Systems Engineer
- NALS Legal Professional
- NBRC Respiratory Care Therapist
- NBSTSA First Medical Surgical Technologist
- NCCER Carpentry Level I
- NCLEX Practical Nurse
- NOCTI Carpentry
- Novell Certified Administrator
- Novell Certified Engineer
- Oracle Certified Database Associate
- Oracle Forms Developer Associate
- Oracle PL/SQL Server Associate
- Prosoft CIW Professional
- Prosoft CIW Security Analyst
- Prosoft Master CIW Administrator
- Prosoft Master CIW Designer
- Prosoft Master CIW Enterprise Developer
- Prosoft Master CIW Website Manager
- PTCB Pharmacy Technician
- SUN Certified Java 2

\* Bundled examination series recommended without reservation.

## *Provisionally Recommended Examinations*

The list of provisionally recommended examinations contains an enviable number of good instruments that can easily achieve full recommendation status. None of the provisionally recommended examinations fall short of meeting essential criteria, except for the requirement of an endorsement or other recognition by a state or national organization. We recommend that provisionally recommended examinations be considered as alternative examinations for an operational period of up to five years, during which states can complete a more thorough evaluation of the examination.

**Ninety-one examinations are recommended provisionally** because they have particular merit but fall short of full recommendation for one of three general reasons: 1) Although the certification examination is well known and respected nationally, the examination owners did not provide sufficient critical information to verify examination quality for a full recommendation. 2) The examination is too narrow in scope or depth to stand on its own for recommendation, but has sufficient implied merit to qualify for a recommendation if bundled with other related examinations. If the examination and its bundled examinations carry an endorsement or certification, the bundled series is recommended without reservation. 3) The examination has excellent quality, but is not nationally or internationally endorsed by an employer- or employee-based organization.

### EXAMPLES OF PROVISIONALLY RECOMMENDED EXAMINATIONS

- 1) IFPS's Hydraulic Power Mechanics Certification exam is the first exam in a series of three. The information available to the project team for this examination was insufficient to make a full recommendation; however, there was enough information from the team's research with IFPS and other states to make recommendations for the other two exams in the series.
- 2) Automatic Transmissions Rebuilder Association's (ATRA) Transmission/Transaxle Rebuilder examination may qualify for recommendation without reservation; however, the brevity of the exam requires a more thorough review to ensure its quality.
- 3) NOCTI's Welding exam is a highly qualified exam and is on par with several recommended welding examinations; however, because it lacks national or international endorsement, the project team placed this exam on the provisionally recommended level.

## PROVISIONALLY RECOMMENDED EXAMINATIONS

- ASK Fundamental Business Concepts\* 2
- ASK Fundamental Marketing Concepts\* 2
- ATRA Transmission Axle Rebuilder 2
- ATRA Transmission R & R Installer 2
- Brainbench 3D Studio Max\* 3
- Brainbench Accounts Payable\* 2 3
- Brainbench Accounts Receivable\* 2 3
- Brainbench Adobe Dreamweaver\* 3
- Brainbench Adobe Fireworks\* 3
- Brainbench Adobe FLASH\* 3
- Brainbench Adobe Illustrator\* 3
- Brainbench Adobe InDesign\* 3
- Brainbench Adobe Photoshop CS\* 3
- Brainbench Benefits Management\* 2 3
- Brainbench CAD Series\* 3
- Brainbench Checkpoint Firewall Administration\* 3
- Brainbench Cisco Network Design\* 3
- Brainbench Cisco Network Support\* 3
- Brainbench Client/Server Opsys\* 3
- Brainbench Compensation Management\* 2 3
- Brainbench Computer Forensics\* 3
- Brainbench CSS & CSS2\* 3
- Brainbench Data Modeling Concepts\* 3
- Brainbench Disaster Recovery and Planning\* 3
- Brainbench Employee Labor Relations\* 2 3
- Brainbench Financial Accounting\* 2 3
- Brainbench Foundations of Medical Office\* 2 3
- Brainbench HTML\* 3
- Brainbench Human Resource Concepts\* 2 3
- Brainbench Human Resource Information Systems\* 2 3
- Brainbench IP Routing & Switching\* 3
- Brainbench Java 2\* 3
- Brainbench Java Script\* 3
- Brainbench Legal Issues of Human Resources and Management\* 2 3
- Brainbench Medical Billing 3
- Brainbench Medical Insurance\* 3
- Brainbench Medical Transcription 3
- Brainbench MySQL Administration\* 3
- Brainbench Network Monitoring\* 3
- Brainbench Network Security\* 3
- Brainbench Oracle DB Administration\* 3
- Brainbench Oracle PL/SQL\* 3
- Brainbench Payroll Accounting\* 2 3
- Brainbench Perl\* 3
- Brainbench Programmer Analyst\* 3
- Brainbench Quark Xpress\* 3
- Brainbench Relational DBMS\* 3
- Brainbench Server Administrator\* 3
- Brainbench SQL ANSI Fundamentals\* 3
- Brainbench TCP/IP Administration\* 3
- Brainbench VB Script\* 3
- Brainbench WAN Technologies\* 3
- Brainbench WWW Concepts\* 3
- Brainbench XHTML\* 3
- CompTIA HTI+ 2
- CompTIA Security+ 1
- EMT First Responder 2
- GAERF Digital File Preparation\* 2
- GAERF Graphics Communications Technology\* 2
- GAERF Press Operations\* 2
- IFPS Hydraulic Power Mechanic 1
- IFPS Pneumatic Power Mechanic 1
- MSSC Certified Production Technician 1
- NATEF Automatic Transmission Transaxle 2 3
- NATEF Brakes Technician 2 3
- NATEF Electrical Electronics Systems 2 3
- NATEF Engine Performance 2 3
- NATEF Engine Repair 2 3
- NATEF Heating, Air Conditioning Tech 2 3
- NATEF Manual Drive Train Axles Tech 2 3
- NATEF Suspension, Steering Technology 2 3
- NCCER Heavy Equipment Operator 1
- NOCTI CNC Programming 3
- NOCTI Agriculture Mechanics 3
- NOCTI AV Communications Assessment 3
- NOCTI CAD CAM 3
- NOCTI Computer Repair 3
- NOCTI Criminal Justice: Law Enforcement or General Version 3
- NOCTI Early Child Care & Education Director 3
- NOCTI Electrical Construction 3
- NOCTI Floriculture 3
- NOCTI Floriculture Greenhouse Assessment 3
- NOCTI Forestry Products and Processing 3
- NOCTI Graphics Communications Technology 3
- NOCTI HVAC 3
- NOCTI Masonry Brick\*\* 2 3
- NOCTI Masonry Block\*\* 2 3
- NOCTI Networking Fundamentals 3
- NOCTI Plumbing 3
- NOCTI Welding 3
- Prosoft Certified Internet Web Associate 2

\* Part of a bundled series that is recommended without reservation when bundled

\*\* Part of a series that is provisionally recommended when bundled.

1 Examination had insufficient information to recommend without reservation

2 Examination information appeared to be too narrow in scope or breadth to recommend without reservation

3 Examination was not endorsed by a national or international organization

## *Suggested Guidelines for Accepting Student Performance on Alternative Examinations*

Once recommended examinations have been approved as alternative examinations, states should consider the following guidelines when reviewing examinations that students present for graduation.

1. Students eligible to take an approved alternative certification examination should do so upon the recommendation and advice of one or more teachers and should have completed a minimum of 150 hours of class time in the chosen CT examination field.
2. When examinations are recommended only as part of a bundle, students must successfully complete the entire examination series or bundle to be approved as passing an accepted alternative examination.
3. A student may not present two approved alternative examinations that cover the same topic and receive credit for both. A student may, however, present passing scores for two recommended examinations that cover different areas within the same field. Similarly, a student may present a higher-level certification through an industry-recognized program by accumulating several certifications within the field.
4. Certain recommended examinations, if approved, should carry a higher cut score than the national average for high school students who may ordinarily take the examination in “low-stakes” environments. In these cases, we recommend that the national average of postsecondary students be applied. These stipulations are presented, where applicable, in the Recommendation Summary.

## *Examinations Not Recommended or Not Reviewed*

It is important to note that a number of examinations were not recommended at either level. The team found some of the examinations reviewed to be superficial or of marginal quality. In these cases, we could find no statistical support for or continuous monitoring of the quality of test content. We also found a number of examinations offered by associations that had the primary intended purpose of encouraging membership in the organization, rather than verifying accomplishments in the career/technical field.

We encountered organizations that provided the opportunity for teachers and others to publish locally-produced examinations. Although some of these examinations offered certification, a closer study showed that the organization received raw questions written by an individual and provided the uncritical process of test assembly, sale and some administration support. These examinations were rejected outright, because there was no evidence of committed and continuous psychometric support or maintenance, nor any indication of responsibility for the quality of the examination beyond its publication. These examinations may have been reasonable classroom or teacher-made tests, but their ease of entry into a national marketplace and apparent lack of test security and commitment to statistical integrity fell below the threshold of the standards we set.

Still other examinations were not assigned to either level of recommendation because they were beyond the reach of high school students, requiring, for example, a bachelor’s degree or a number of years experience. It seemed improper to mislead high school students by listing examinations that they could not take. While the recommendations may include examinations that are out of a high school student’s reach, we could not determine with absolute certainty that a high school student could not pass such examinations — particularly because more and more students are enrolling in formal sequences of dual-credit CT courses — and thus did not exclude them from the recommendations.

# Observations About CTE and Industry-Based Examinations

## *The Risks of Using Industry-Based Examinations as Alternative Examinations and Program Accountability Measures*

The student high school experience must be the primary focus of any discussion about qualifying measures for graduation and program accountability. It is reasonable to begin that discussion with an interest in aligning CT examination requirements with those used for the development of more familiar academic examinations. Assumptions about what students in CT programs need to know and be able to do must be grounded in readiness standards for continuous learning and transitioning into a career field. Such assumptions also must focus on the reality of what can reasonably be expected within the time constraints of a high school CT program of study.

**The danger of basing program quality or student graduation options on industry-based certification programs, as indicated earlier, lies in the fact that entry or elevated recognition within a given field often assumes greater experience and preparation than is offered in secondary education.** Educational leaders in Virginia, for example, have found many of the certifying and licensing examinations recognized or endorsed by professional organizations to be too difficult, covering advanced content beyond the scope of materials, curriculum and instruction that high school career/technical programs are able to offer. In some instances, passing certification examinations as alternative assessments for graduation will prove more difficult for students than passing the state-developed examination that is based on well-researched, state-approved curriculum objectives. To pass some of these certification examinations, students will be required to participate in specialized studies, apprenticeships, or internships, or to attend a technical or community college. Students and parents need to be fully aware that some students may need to continue their education experience beyond high school in order to acquire both the depth of technical content knowledge and the experience necessary to pass an alternative certification examination.

States may also need to consider developing a strong technical adult instruction component wherein students can return for a 13th year of education to become better prepared for certification examinations. The exploration of certification examinations as alternative examinations for graduation reveals three opportunities to maximize the impact of these examinations and a 13th-year program. First, adoption of certification examinations will provide an opportunity for states to better emphasize their apprenticeship programs with employers and credit programs with community and technical colleges.

Second, to address examinations that may require further technical preparation beyond high school, educational leaders will need to explore opportunities to work directly with examination owners to develop reasonable cut scores that would qualify a student for high school graduation, if not for full certification.

Finally, these examinations provide an opportunity to evaluate and hold accountable the effectiveness of CT programs of study by measuring the number of high school graduates achieving industry certification. While most students will pass academic exit examinations to graduate, rather than industry-based examinations, students completing a concentration in CT studies should be encouraged to take industry-based examinations as part of an overall system to provide students with a credential that gives them an edge in their career field. These examinations can be provided as part of a high-stakes assessment for graduation or as a low-stakes assessment to certify that the career/technical programs are preparing students to meet the demands of the labor market.

## *The Broad Reach of CTE and Industry Examinations*

Business and industry examination designers want their examinations to cover the essential content for workplace success. Many blueprints and test specifications we received covered a wide range of topics related to the career field. The topics included safety measures on the job, code or legal requirements, the nature and care of equipment, and troubleshooting when emergency events occur. Although a case can be made that these topics relate in some way to the knowledge and skills required in the field, they risk crowding out questions that pertain directly to the substance and content knowledge of the field.

We found (and rejected) examinations that contained a very small percentage of content- or knowledge-based questions, even though they may have been legitimate certifying examinations. It was often difficult to discern whether or not the weight given to these arguably divergent questions was equal to that given to the knowledge-based questions. In cases in which the owner indicated that a specific percentage of the questions had to be answered correctly for certification, simple logic suggests that each question was given equal weight, regardless of varying difficulty or importance. The motivation on the part of credentialing agencies is likely one of ensuring that all materials and contingencies are covered in the examination. Such examinations that attempt to cover too many dimensions or skills can become too broad, resulting in poor measurement that does not clearly represent what knowledge or skill generated the final score.

### *The Proprietary Nature of Industry-Based Examinations*

Few of the industry-based examinations reviewed were designed with the educational arena as the primary customer. Because they compete in a more commercial environment, industry-based examination owners seem more protective of the security in the examination to reduce their commercial vulnerability and properly guard the integrity of the field or skill area. The examination transparency, disclosure and access to technical information that may be made available by educational test publishers are, in the case of industry-based examinations, limited. Educational test publishers, by contrast, are eager to supply committees and adoption representatives with all necessary information to secure test and textbook contracts. Further, there is a general expectation that externally developed examinations have been fully vetted; the post-administration information supplied by the test provider is robust, easily interpreted and integrated with school databases; and back-up validity and longitudinal studies are ongoing and readily available.

Between these two postures are several CT examination providers that develop examinations based on industry standards and translate them into education-related objectives and specifications. The National Occupational Competency Testing Institute (NOCTI), for example, provides schools with a wide range of examination titles in many fields, but also directly serves the industrial sector through a companion organization. Because organizations such as NOCTI serve customers in these two different environments, they are able to share supporting information more openly and leverage that dual relationship to the benefit of test development that more closely reflects current expectations in the field. Examinations produced by these organizations were provisionally recommended for approval because they do not provide industry-recognized certification or endorsement. Their purpose is to measure student accomplishment. In these cases, we recommended that industry panels be convened, with proper guidance, to establish cut scores that they would be willing to accept as credentials of eligibility for employment. State staff would then be in a position to work with the state manufacturing association and other related business associations to secure official organizational endorsements.

### *Program Examination Coverage and the Realities of Scale*

To have a full range of valid and reliable examinations that cover all CTE programs, state officials must rely on the availability of national examinations that are aligned to career concentrations and to the ever-increasing list of career specialties. Supporting the state development of end-of-program examinations for a wide array of CT fields becomes an overburdening task due to the challenge of examination development, strains on the budget, and strains on staff time to provide the ongoing technical support needed to comply with higher psychometric and content quality standards equal to the more narrow array of traditional academic measures.

Even when accepting a combination of national and state-developed examinations, states will be challenged to provide appropriate, up-to-date examinations for all career fields. Both examination publishers and state-level test developers struggle with the economic and staffing reality of low-volume examinations that may be taken by 100 or fewer students in a state in a given year. As career/technical education makes greater use of certification examinations to measure student learning and to improve curriculum and instruction, such examinations must withstand careful inspection of quality and of relevant, challenging content.

# General Recommendations and Next Steps

## **Adopt employer certification examinations.**

States wishing to adopt employer certification exams as alternative graduation exams will need to communicate this option to students, parents, counselors and local school teachers. All teachers will need to be informed of the types of examinations that students are expected to pass for graduation well in advance of the time the new policy takes effect. Expectations and procedures that support the provision then can be refined as experience is gained through the initial implementation of this program.

## **Review provisionally recommended examinations for full recommendation status.**

States may choose to approve provisionally recommended examinations for a five-year period. These are high-quality examinations and are recognized and approved for similar programs in at least one other state. The examinations meet the test of rigor and the requirement of a significant number of CT courses and classroom contact hours of preparation. During the five-year approval period, state staff would need to conduct a more thorough review of these examinations to clarify or resolve apparent shortcomings that resulted in the examinations not being fully recommended at this time.

- **Missing information:** There are a few instances noted in which more technical or descriptive information is needed to complete the review and recommendation process. States could work with examination providers to obtain additional information needed to warrant a full recommendation.
- **Endorsements:** Because some high-quality examinations met all criteria except the requirement for endorsement, states can convene a task force to secure endorsements, certification and content alignment. The work of this task force needs to be an ongoing effort and should involve an industry representative, educators, statistical and content experts, and perhaps a member of the state board of education. The task force will need to provide a rigorous and defensible definition of what endorsement means and use that as a basis for securing a meaningful endorsement by a state or national agency or a business group. At a minimum, an endorsement should represent a seal of approval by the endorsing organization and recognition that the rigor of the examination represents a students' eligibility for employment in a given career field. Passing an endorsed examination must bring additional benefit and recognition of the student's accomplishment and preparation for further study and careers.

Several of the examinations in the provisional category represent strong examinations that are nationally available, but lack an external endorsement. Although each state should be able to secure these internal or external endorsements on its own, the process may be eased by collaborating with other states that have similar measurement and endorsement missions.

- **Rigorous cut scores:** States will need to establish defensible cut scores through a detailed and transparent process. There are a number of procedures that the testing industry uses, but the process selected should be equal to those used for establishing cut scores for traditional academic examinations.

Once a judgment about the quality and coverage of examination blueprints is established, the task group needs to reach consensus about the number or percentage of correct responses within each blueprint section that would represent proficiency in the field. This fairly detailed process will involve discussion and independent judgment on the part of the participants, along with the use of item analysis data for determining high, middle and low student performance for each question. Additional performance levels might also be established, such as a Basic level of understanding near the low end of the score scale and Advanced understanding at the high end of the score scale. If data are available, the task force can use national samples from high-performing secondary and postsecondary students to confirm the cut scores.

As it determines cut scores, each state will need to consider carefully how to weigh questions and sections of the test, as not all questions and sections should carry the same value or weight. Certain categories may have greater substance to determine direct knowledge and skills related to the career field, while other areas may focus more on soft skills that are embedded in the examination. Scoring algorithms can account for differences in question value within an existing examination without unnecessarily extending the length of the section. Without differential weighting, the task force will have to use a percent correct solution, setting a cut-off score that relates only to the number or percentage of correct answers without taking into account the varying difficulty of questions. Most modern examinations have moved beyond the simple percent cut-off score used in classroom quizzes by giving greater value to more difficult items.

### **Explore new and additional examination recommendations for approval.**

This study was undertaken to establish a vetting process for CT examinations. Subsequent efforts for vetting and recommending examinations will need to refine and enrich the procedures that produced the current recommendations. Nevertheless, the steps used in this project provide a foundation for states to continue review of those examinations currently recommended and the recommendation of new and additional examinations not covered here. SREB recommends each state continue to explore and evaluate new and existing CT examinations to be used as alternative examinations.

The primary criteria for further recommendations should be the essential criteria and the examinations' linkage with course work students would need in preparation for the examination (beginning with a minimum of 150 contact hours). Examination quality also must remain an important criterion. When other aspects of the examination — psychometric quality, statistical support, scoring, reporting and continuing research — are faulty, the value of the examination's congruence with the career field content is severely diminished. As the measurement of CTE learning gains greater visibility and import, the examinations must meet ever-increasing standards.

### **Build new relationships with owners of industry-based examinations.**

Within the larger educational measurement community, it is appropriate and often necessary for state officials to build productive relationships with examination owners. Their respective organizational missions are aligned, and each understands the benefits that immediately accrue when a working relationship is forged. These test publishers are already attuned to the needs of educators and of their requirements for full disclosure and the need for a full array of test reporting and analysis services.

Building those same relationships with business and industry certification organizations, however, is a greater challenge, as many of these organizations view the individual candidate as their sole customer. The goal of building stronger working relationships is to broaden these organizations' views of their customers to include state agencies and educational institutions that serve potential candidates.

State career/technical educational leaders must build a strong case to convince certifying organizations that a working relationship can broaden their mission in appropriate and productive ways. Working with schools and states extends the reach of these organizations for attracting new cohorts of high-achieving students into their fields. Some of these organizations already offer curriculum subscriptions and teacher training. If revenue and greater visibility within the state are part of the strategic plan of these organizations, they may respond to coordinated contact by state officials.

In return, state agencies need to establish their areas of interest, including access to information about students and graduates who take industry examinations. This information is essential if states are to have the basis to make judgments about the exams. Educators might also push for important disclosure of technical information that substantiates the quality and nature of the examinations and seek greater openness with respect to performance information that needs to be shared with students to help them identify the gaps in their knowledge and skills. A new and closer relationship will also provide yet another avenue for educators to confirm the emergence of new skill areas and requirements.

The effort to build relationships with owners of industry-based examinations will benefit greatly from the involvement of groups of states, since a single state may not have sufficient student enrollment in a given career field to leverage needed information. This can be done best by a group of states with a coherent goal of encouraging the provision of services to state-level education divisions. At a time of severely limited budgets, greater calls on the time of state and local educators, and increased interest in and requirement for measuring the effectiveness of CT programs, a broader and stronger relationship with these organizations is needed.

### **Establish high school student standards for certification examinations.**

As the relationship between examination owners and state education staff strengthens and data about student and candidate performance begin to flow, credentialing organizations should be encouraged to establish a two-tiered system of score reporting that would be acceptable for selected examinations in career fields that require knowledge beyond the scope of current high school CT programs of study. The higher cut scores would honor the level of accomplishment by which the examination-owning association or corporation awards a full credential or certification. A lower cut score might be established to confirm an acceptable level of proficiency for high school students and verify significant progress toward full certification. Along with the student's level of accomplishment, information about learning and experience gaps that stand between the student performance and a full credential would be reported both to the student and to the school. This two-tiered system already exists for certain examinations.

The educational value of such a practice is straightforward, particularly for those certifying examinations that assume content and experience beyond those offered in high school experiences. This approach will encourage students to proceed with earning full certification, an associate's degree, or a bachelor's degree and above. It would let students know that they have reached a threshold on one tier toward obtaining full certification in a high-demand, high-wage field and would encourage them to pursue further study with an employer, an apprenticeship, or a community or technical college to achieve full certification.

### **Continually review industry-based examinations.**

As national career/technical examinations become more visible in the wider education community, they will come under greater scrutiny. We found that, while state leaders are knowledgeable about test content related to their fields, they, too, are confronted with overcoming the proprietary barriers to confirm test quality.

Certification and licensing is a fast-moving assessment field in the world of business and industry. New certification examinations emerge as technology and public interest in credentialing continue to increase. With greater interest in and demand for these examinations, there are opportunities for amateur test developers to enter the field and to drive out responsible measurement with examinations of lower and questionable quality. Greater vigilance and deeper review of examination quality will protect educational systems from adopting examinations on the basis of a welcome and familiar title and blueprint, rather than confirmed substance and measurement quality, which may not be confirmed upon closer inspection.

To support the use of external examinations for additional or new purposes and to verify their quality, a concerted effort is needed to carry out a program of continual examination review. Although staff assigned to specific fields may be in the best position to expand monitoring of these examinations, their likely focus will be parochial and the work may be undertaken in isolation within department silos. Information and effective strategies for maintaining the quality of these investigations will benefit from more centralized direction.

Although intentional coordination within a state is fundamental, that solution may not be sufficient. A state staff member with expertise in measurement and assessment should be designated to monitor the quality and relevance of industry-based examinations and to develop strong and responsible relationships with examination owners. The person would become the central resource for discovering new examinations in new fields and would be able to verify the quality and monitor the nature of services examination owners offer states and high schools. This person would coordinate the effort as a clearinghouse with counterparts in other states to stay abreast of developments and expressed needs.

While each state may have different uses for this information, the interest in securing adequate test information about content and validity is common across states. As the utility of such a concerted effort becomes more widely known and used, credentialing organizations will not ignore the collective interest and influence of several states. They may see the benefit and efficiency of working with a single coordinating agency at the state or regional level.

### **Establish course lists leading to certification examinations.**

As states adopt industry certifying examinations it will be necessary to prepare a list of courses that students will need to complete before they can take each examination. This information can be posted on state web sites and will be of great interest and use to teachers, administrators, students, counselors and parents. This information will help students and counselors fully understand the courses needed to pass an examination.

### **Conduct follow-up validation studies of high school career/technical graduates.**

Employer certification exams can provide important feedback to policy-makers and educators about the outcomes of the CTE delivery system. Examination data give a snapshot of the current accomplishments of graduates as they leave high school; however, further proof of program effectiveness and student readiness comes with information about student success after they leave high school. Students graduating from traditional academic and career/technical programs often vanish once diplomas are given out. Unless there are excellent working articulation agreements with postsecondary institutions within and outside the state, little is known about the consequence of student success in postsecondary studies. For students who completed a major in CT studies, less is known about their success in a work setting after high school.

Follow-up studies with receiving institutions, employers and students need to be implemented to verify and validate the use of alternative examinations. Outcome measures offer confidence that learning objectives were met, but fall short of confirming students' success in training or other learning and work environments. How did high school CT graduates fare in their postsecondary studies and careers? Did they need remediation? Did they remain in school and graduate with a degree? Were they successful in entering the workplace? Did certification make a difference in entering into a career field? What do graduates say about their high school preparation after two or five years?

Such validation studies provide detailed information about how well an educational system serves individuals and the public good. Education, in this sense, is more than opportunity. It is more than an institutional process that policy-makers and citizens construct. It is our best mechanism for improving our communities and our lives together.

## Appendix A: Test Information Sheet

The Test Information Sheet served as the main data-collection record for each examination that was reviewed by the project team. Electronic files of the completed profiles for those examinations are available electronically from SREB upon request. Each profile is typically four to seven pages in length and contains descriptions, sample questions and other data. The following is a sample completed Test Information Sheet.

**Examination Name:** Certified Professional Bookkeeper  
**Cluster(s):** Business, Management & Administration  
**Pathway(s):**  
**Recommendation: Recommended without reservation**  
**Date:** February 2, 2008

**Examination Owner:** American Institute of Professional Bookkeepers  
**Contact Information:** John Doe, www.aipb.org, (800) XXX-XXXX

**Examination Description:**

This four-hour online and two-hour workbook case examination is largely a multiple-choice examination with some writing of descriptions of solutions or problems required. The examination is part of a rigorous curriculum program available to community colleges and schools. The areas covered include: adjusting entries, error correction, payroll, depreciation, inventory control, internal management controls and fraud prevention. The applicants also are given case studies to solve.

**Primary Purpose of the Examination:** Certify professional bookkeepers

**Intended Test Population:** Adults

### *Essential Criteria:*

**Standardized:** Yes

**Independently Graded:** Yes

**Knowledge-Based:** Yes, accounting and mathematics skills, including simple calculations, the use of ratios and equations

**Administration Range:** International

**Additional Cost to School:**

**Additional Cost to Student:** \$200

**Total Cost:** \$200

**Test Results Available Immediately:** Yes

**Cut Score:** 75% correct on the closed-book portion and 70% on workbook cases

**Employer Relevance:** Based on industry standards; certification is recognized

**Correlations Available:** Accounting and mathematics skills, including simple calculations, the use of ratios and equations

*Necessary Criteria:*

Established in agreement with state officials

**Class Contact Hours Equal or Exceed 150 Hours:**

Must take three courses, 360 hours

**Relevant Preparatory Courses and Hours:**

Accounting I  
Accounting II  
Computerized Accounting  
Payroll Accounting

**Sample Questions or Blueprints:**

Received a workbook of quizzes and explanations from AIPB. Many of the questions are more of an accounting nature than simple journal entries. They were all couched as word problems with charts or graphs or tables of information from which the student needed to form a strategy and a solution. A good deal of algebra was required, working through equations and several multiple-step calculations to arrive at an answer. For example, the questions dealt with various methods of calculating depreciation following GAAP and IRS rules.

*Desirable Criteria:***Data Collection Questionnaire: Attached**

**Have teachers who are instructing students taken this or a similar examination?** Yes

**Do teachers generally hold certificates or recognized licenses in this area?** Frequently

**Data Collection Questionnaire – Overall Evaluation:**

Meets Criteria:  
Substantially meets Criteria:  
Does not meet Criteria or Not Available:

(See separate proposed data-collection schedule containing specific questions)

**Annotation, if any:***For Analysis and Recommendation Purposes Only***Final Recommendation with annotation:**

Recommended without reservation

*Data Collection Questionnaire***1. How are items on this test developed?**

Items are part of a curriculum package or part of regular bookkeeping coursework.

**Committee of teachers and practitioners:** Yes

**Computer-generated from item bank:** Yes

**Test specifications based on curriculum objectives or job requirements:** Yes

**2. How are questions on this test pre-tested?**

Items are field-tested by being embedded into administered tests.

**Special administration prior to fielding the examination:**

**Post-field administration:** Embedded in administered tests

**Other:**

**3. In general, how is the performance of items on the test evaluated, including timing?** Item analysis**4. How often is the test revised or replaced with a new form?**

Each test is different, pulling from a pool of tagged items as a computer-assisted examination.

**5. Are there multiple forms of this test?** Yes**6. Are the forms statistically equated and placed on a common scale?** Yes**7. Are there accommodations for people with disabilities and non-native speakers?**

Extra time and physical accommodations are granted.

**8. Do you conduct statistical studies on demographic group performance?** Yes**9. What do you consider to be logical or empirical evidence to support validity —**

**Construct and Content? Explain:**

Content based on accounting and bookkeeping standards in the field

**10. How do you estimate reliability? What process do you follow?**

Did not have a ready answer

**11. When and how often are statistical studies undertaken for this test?**

Maybe annually

**12. What norm group or judgments are used to establish performance comparison or cut-scores?**

Criterion referenced test based on judgments by practitioners

**13. How, how soon, and by what means are score results explained to test takers?** 30 days**14. How is the security of the examination protected in its development and administration?**

Secure test centers are used to administer the test.

**15. What steps are taken to assure the identity of the test taker?**

Personal identification

## Appendix B: Organizations and Professional Associations

The organizations and professional associations listed below own the examinations considered by the project team during this study.

American Association of Veterinary State Boards	International Society of Meeting Planners
American Bus Association	Joint Commission of Allied Health Personnel in Ophthalmology
American Culinary Federation	Lodging Management Program
American Design Drafting Association	Marketing Education Resource Center
American Hotel & Lodging Association	Manufacturing Skills Standards Council
American Institute of Professional Bookkeepers	National Alliance of Business
American Medical Technologists	National Athletic Trainers Association
Automotive Oil Change Association	National Board for Respiratory Care
American Registry of Diagnostic Medical Sonographers	National Business Travel Association
American Registry of Radiology Technologists	National Concierge Association
Institute for Automotive Service Excellence	National Center for Construction Education & Research
Assessment of Skills & Knowledge for Business Institute	National Council Licensure Examination
Advanced Technological Literacy	National Home Builders Association
American Transmission Rebuilders Association	National Institute for Metalworking Skills
American Welding Society	National Occupational Competency Testing Institute
Child Development Association	National Restaurant Association
Center for Early Childhood Professional Development	National Registry of Emergency Medical Technologists
Convention Industry Council	National Standards for Family & Consumer Sciences Education
Cisco Systems, Inc.	Partnership for Air-Conditioning, Heating, Refrigeration Accreditation
Council on Law Enforcement Education & Training	Professional Photographers of America
Computing Technology Industry Association	Graphic Arts Education Council
CareerTech Testing Center	Pharmacy Tech Certification Board
Dental Assisting National Board	Quarter Horse Racing Association
Electronics Technicians Association	Retail Bakers Association
Greenhouse Grower's Association	State Florist Association
International Festival and Events Association	State Nurserymen's Association
International Fluid Power Society	Thoroughbred Association
International Food Service Executives Association	

## Appendix C: Recommendation Summary

The Recommendation Summary contains the names of specific examinations recommended for use either as alternatives to certain academic exams (other than reading, writing and mathematics) for high school graduation or as low-stakes exams that give students an opportunity to obtain a credential with value in the workplace. These examinations also can be used by career/technical leaders to make continuous improvements in their curriculum and instruction.

**After considering 541 examinations, the project team recommends 177 examinations for approval. Of the 177 recommended examinations, 91 are provisionally recommended for approval for a period of five years.** During this period, state staff will have the opportunity to review the provisional recommendations, make adjustments, and secure endorsements or industry recognitions to meet the requirements of all the criteria.

### *A Guide to the Recommendations Summary*

1. The examination entries are arranged by career clusters. Not all clusters have recommended examinations because either no certification examination met the essential criteria or none was found during the data collection period. The project team is mindful of the likelihood that it may have overlooked examinations that would have qualified.
2. The summary includes the title of each examination, its recommendation and, where applicable, a brief description of why the examination is recommended for approval on a provisional basis. In nearly all cases, examinations that received a provisional recommendation were of satisfactory quality, but did not have a national or state endorsement. The final column contains a brief description of the examination, a listing of the academic skills that are required (if available), and the summary of the number of courses and classroom hours that are associated with preparation for the examination by a selected state. Upon the advice of their teachers, students might take the certifying examination some time before completing their course of study, after the first 150 hours of class time, because they may have gained the necessary knowledge and skills at nearly any point along the way.
3. The description of most tests includes the number of questions composing the test and the amount of time offered; however, if the test is a computer-adaptive test, this information is not included. This is because the length of a computer-adaptive test or the number of questions posed is an irrelevant measure of the quality of the examination. Computer-adaptive tests are based on a strategy for examinations that capitalizes on the efficiency of tailoring the questions posed to the candidate by the person's skill level. As calibrated questions are posed, the correctness of the response governs the nature and difficulty of the next question the candidate receives. Once the computer has determined the candidate's skill in one area, it moves to another until all areas of the test are covered and the confidence level concerning the candidate's accomplishment has been reached. The benefit of such a testing strategy is that the examinations can become much shorter and results determined and reported more quickly with greater precision.
4. A number of recommendations (including provisional recommendations) require a student to take more than one examination (a series of examinations) in order for the results to qualify as an alternative examination for graduation. This *bundling* of examinations is necessary if the certifying organization presents the series as being required for full certification or if, in the judgment of the project team, adequate coverage, depth or rigor is achieved by linking the examinations. Nevertheless, an examination series may have received a provisional recommendation for approval if the examinations lack industry or other endorsements.

5. A number of certifications listed are labeled as *diploma* certifications. These are second-tier certifications based upon a student passing several first-tier recommended certifications. There is no examination for a diploma certification; a student receives the diploma once he or she has passed specific certification exams. The diploma certifications are not counted toward replacing an alternate examination because the first-tier recommended certifications composing the diploma are counted towards this goal. Diploma certifications are included in this study because they were included in the list provided to the project team.
6. The project team recommends that a student not be permitted to take two recommended or provisionally recommended examinations that cover the same subject matter or blueprint, such as Adobe Dreamweaver and Dreamweaver by Brainbench. The project team proposes, however, that a student be able to present two passing scores from two separate examinations within his or her field, such as presenting a Cisco Systems Certified Network Associate examination and a CompTIA Server + certification examination. A student may also be able to substitute up to two alternative examinations when a combination of examinations qualifies the student to a higher level of certification, as in the case of an Adobe Web Specialist, which requires an applicant to pass two examinations and one elective examination.
7. The project team recommends that the national average for postsecondary students — a slightly higher cut score — be used for NOCTI and some other examinations, rather than the national average for high school students. These instances are stated in the description column of the affected examinations. With respect to the NOCTI examinations, the project team proposes that students meet or exceed the college student national average score, because it raises the performance standard beyond the aggregate national average of high school students who may take the test in “low-stakes” environments.

## AGRICULTURE, FOOD &amp; NATURAL RESOURCES

Examination	Final Rec	Comment
-------------	-----------	---------

AAVSB Veterinary Technician

Recommend

**Description**

Parts of this exam may not be viable because they require access to specialized labs, which would require access to technical high schools or community colleges. The exam contains deep biology and chemistry components and knowledge of drug and other toxic substances, medical applications, disease diagnosis, and laboratory procedures and decisions. It meets Essential and Necessary criteria and has acceptable statistical support. *3 courses, 360 hours*

Examination	Final Rec	Comment
-------------	-----------	---------

NOCTI Agriculture Mechanics

Provisional

Needs endorsement

**Description**

If this national examination is recommended, students will need to exceed the college student national average score. It covers the areas of safety, the understanding of mechanical requirements of motors and major equipment, electrical power and processing, agriculture structures, and soil and water management. This examination requires the use of mathematics, science and the physics of electricity, welding and the maintenance of agricultural equipment. The exam includes a performance section, which does not affect the final score. *3 courses, 360 contact hours*

Examination	Final Rec	Comment
-------------	-----------	---------

NOCTI Floriculture

Provisional

Needs endorsement

**Description**

If this national examination is recommended, students will need to exceed the college student national average score. This three-hour paper-and-pencil and online examination covers design of floral displays and biological knowledge of flowers and plants, and concentrates on running a sole-proprietor business or partnership. The examination covers areas such as salesmanship, customer relations, merchandise display, advertising, inventory control, invoicing, accounting, and wholesale and retail pricing. The examination requires business-level mathematics concerned with invoicing, tax, payroll and business accounting. The examination covers plant nomenclature (Latin and common names), plant physiology and anatomy, life cycles, sexual and asexual reproduction, insect anatomy, identification and life cycles. Consider obtaining support from the state or local florists for this exam. *3 courses, 360 contact hours*

Examination	Final Rec	Comment
-------------	-----------	---------

NOCTI Floriculture Greenhouse

Provisional

Needs endorsement

**Description**

If this national examination is recommended, students will need to exceed the college student national average score. Though this exam covers more information than the Floriculture exam, it could also benefit from a state or local florist endorsement. There is quite a bit of overlap with the Floriculture test. The unique part of this test includes greenhouse maintenance and business management. This three-hour paper-and-pencil and online examination contains 183 questions. The examination requires business-level mathematics concerned with invoicing, tax, payroll and business accounting. In addition, this examination covers all the topics of the NOCTI Floriculture examination, along with greenhouse operation topics, including watering techniques, crop production, propagation, use of fertilizer, pest management and worker protection standards. It also includes an understanding of soil microbiology, classification of soils, pH testing and other soil properties. *3 courses, 360 contact hours*

Examination	Final Rec	Comment
-------------	-----------	---------

NOCTI Forestry Products &amp; Processing

Provisional

Needs endorsement

**Description**

If this national examination is recommended, students will need to exceed the college student national average score. This three-hour paper-and-pencil and online examination covers the areas of logging and harvesting, equipment and field safety, sawmill operations, diesels and hydraulics maintenance and repair, forest protection, silva-culture, forest management and ecology, surveying, wildlife and business management skills. Mathematics skills required for this examination relate primarily to the surveying activities of identifying methods of calculating elevation, slope, forest acreage, basal areas and board feet, and using wood volume weights to estimate board foot weight. *3 courses, 360 contact hours*

**ARCHITECTURE & CONSTRUCTION**

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
ADDA CAD Cert	Recommend	
<b>Description</b>		
This highly technical examination requires online performance in addition to answering questions. The examination includes mathematics in the areas of computation, algebra, geometry and trigonometry, in addition to CAD software. Clearly, this is designed as an end-of-program examination for entry into the profession. <i>7 pathways available: 8 to 12 courses, 705 to 1,185 contact hours</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
IFPS Hydraulic Power Specialist	Recommend	
<b>Description</b>		
This three-hour written examination and three-hour performance examination leads directly to certification at the Hydraulic Specialist level. Questions are focused on diagnosis, evaluation of problems, selection of repair strategies, and the skill to determine causes and solutions. The examination also requires an understanding of the characteristics of fluids under pressure and the ratios of power to pressure exerted by various equipment configurations. This examination requires an understanding of algebra, geometry and physics — particularly with respect to pressure, power ratios, algebraic equations, electrical diagrams and graphics, pressure, loads, and effects on electric motors and gears. <i>2 pathways available: 4 or 13 courses, 240 or 1,290 contact hours, respectively</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
IFPS Hydraulic Power Technician	Recommend	
<b>Description</b>		
This three-hour written examination and three-hour performance examination leads directly to certification at the Hydraulic Technician level. Questions are focused on diagnosis, evaluation of problems, selection of repair strategies, and the skill to determine causes and solutions. The examination also requires an understanding of the characteristics of fluids under pressure and the ratios of power to pressure exerted by various equipment configurations. This examination requires an understanding of mathematics and science — particularly with respect to pressure, power ratios, highly technical interactions of fluids, pressure, loads, and effects on electric motors and gears. <i>5 pathways available: 4 to 21 courses, 280 to 1,695 contact hours</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
IFPS Pneumatic Power Specialist	Recommend	
<b>Description</b>		
This three-hour written examination and three-hour performance examination leads directly to certification at the Hydraulic Specialist level. Questions are focused on diagnosis, evaluation of problems, selection of repair strategies, and the skill to determine causes and solutions. The examination also requires an understanding of the characteristics of fluids under pressure and the ratios of power to pressure exerted by various equipment configurations. This examination requires an understanding of algebra, geometry and physics — particularly with respect to pressure, power ratios, algebraic equations, electrical diagrams and graphics, pressure, loads, and effects on electric motors and gears. <i>3 pathways available: 4 to 21 courses, 280 to 1,695 contact hours</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
IFPS Pneumatic Power Technician	Recommend	
<b>Description</b>		
This three-hour written examination and three-hour performance examination leads directly to certification at the Pneumatic Technician level. Questions are focused on diagnosis, evaluation of problems, selection of repair strategies, and the skill to determine causes and solutions. The examination also requires an understanding of the characteristics of fluids under pressure and the ratios of power to pressure exerted by various equipment configurations. This examination requires an understanding of mathematics and science — particularly with respect to pressure, power ratios, algebraic equations, electrical diagrams and graphics, pressure, loads, and effects on electric motors and gears. <i>5 pathways available: 4 to 21 courses, 280 to 1,695 contact hours</i>		



ARCHITECTURE & CONSTRUCTION (continued)

Examination	Final Rec	Comment
NCCER Heavy Equipment Operator	Provisional	Need more information for a permanent recommendation

**Description**

Not enough is known about this examination to verify its rigor. This is an entry-level examination and covers the following areas: introduction to the construction trade, heavy equipment safety, knowledge of heavy equipment components, basic operational techniques, tractor maintenance and functions, and knowledge of grades. *14 courses, 885 contact hours*

Examination	Final Rec	Comment
NOCTI CAD CAM	Provisional	Needs endorsement

**Description**

If this national examination is recommended, students will need to exceed the college student national average score. There are two components to this examination: a three-hour written assessment that contains 190 questions and a three-hour performance section that requires the completion of three CAD jobs and one CAM job. The written assessment requires the knowledge and use of hardware and operating systems, interpreting and reading blueprints, creating and manipulating mechanical drawing information, drawing and designing assemblies, and using 3-D modeling. It also requires knowledge of machining fundamentals, CNC Operation, programming preparation and using a CAM system. Students must understand Cartesian Coordinate systems; create and edit basic geometry by inputting coordinates; generate and modify geometric components on construction planes; and read and interpret diagrams, drawings and set-up instructions. *16 courses, 1,785 hours*

Examination	Final Rec	Comment
NOCTI Electrical Construction	Provisional	Needs endorsement

**Description**

If this national examination is recommended, students will need to exceed the college student national average score. The three-hour test includes general information about safety; meters, measures and related mathematics, identification of tools, materials, and components; National Electric Code blueprints, drawings, diagrams, and symbols; planning layout and estimating; AC theory; conductors and magnetic theory; electronics; DC; basic electric and electron theories, low-voltage systems; wiring; circuits and installation; raceway and conduit bending; transformers; motors; motor control circuits and PLCs; lighting; and basic computer skills. Also covered are electrical quantities and Ohm's Law; resistors, series and parallel and combination circuits; measuring instruments and meters, using wire tables and determining conductor sizes; magnetic induction; inductance in AC schedules; resistance-inductive series circuits; capacitors; single-phase transformers; and single phase motors. *14 courses, 870 contact hours*

Examination	Final Rec	Comment
NOCTI HVAC	Provisional	Needs endorsement

**Description**

If this national examination is recommended, students will need to exceed the college student national average score. This three-hour online or paper-and-pencil examination contains 200 questions. The test requires the student to identify, understand and demonstrate knowledge of the major areas relating to HVAC, including basic electricity. These include the understanding of electricity, refrigeration, motors, pipefitting and safety. This examination requires students to use mathematics and science skills by converting temperature scales (including joules); identify modes of heat transfer; and demonstrate understanding of BTU, compression ratios, measurement, and calculation of GPM, CFM, and CFM per ton. *2 pathways available: 22 or 23 courses, 1050 or 1200 contact hours, respectively*

ARCHITECTURE & CONSTRUCTION (*continued*)**Examination**

NOCTI Masonry Bundled Series

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

This certification bundle is the combination of NOCTI Masonry Block and NOCTI Masonry Brick certification exams. Both exams must be passed by the college student national average score to qualify as one exit exam.

**Examination**

NOCTI Masonry Block

**Final Rec****Comment**

Content focus too narrow — exam should be bundle with Masonry Brick

**Description**

Student must also pass the NOCTI Masonry Brick examination. If this national examination is recommended, students will need to exceed the college student national average score. This three-hour online or paper-and-pencil examination covers the use and proper application of hand and power tools, scaffolds and ladders, the understanding and application of blueprints and specifications, and project layout. The test also covers the installation of lintels, flashing, weeps and insulation; the construction of fireplaces and chimneys, door and window frames; and general craft knowledge. Mathematics and measurement account for 5 percent of the examination. The examination requires the student to be able to read and interpret written specifications, drawings and plans, and building codes and requirements. *12 courses, 600 contact hours*

**Examination**

NOCTI Masonry Brick

**Final Rec****Comment**

Content focus too narrow — exam should be bundle with Masonry Block

**Description**

Student must also pass the NOCTI Masonry Block examination. If this national examination is recommended, students will need to exceed the college student national average score, and possibly the need to pass two NOCTI construction examinations to qualify. This four-hour online or paper-and-pencil examination covers the knowledge, proper application and use of hand and power tools; knowledge of and uses of materials; the understanding of blueprints, specifications and project layout; and the proper installation of lintels, flashing, weeps, insulation, door and window frames, joints, fireplaces and chimneys. Mathematics and measurement accounts for five percent of the examination. The examination requires the student to read and interpret written specifications, drawings and plans, and building codes and requirements. *12 courses, 600 contact hours*

**Examination**

NOCTI Plumbing

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

If this national examination is recommended, students will need to exceed the college student national average score. This three-hour written examination measures all the areas of residential plumbing installations. It covers the following areas: mathematics associated with plumbing; plumbing drawings and blueprints; plastic pipe and fittings; copper pipe and fittings; cast-iron pipe and fittings; carbon steel pipe and fittings; fixtures and faucets; drain, waste and vent (DWV) systems; and water-distribution systems. The test also requires skills of reading blueprints, interpretation of plumbing codes and manufacturer's specifications, and isometric views of draining systems and water-supply lines. It requires the use of formulas, arithmetic calculations and measurement conversions. *2 pathways available: 19 or 20 courses, 615 or 660 contact hours, respectively*

**Examination**

NOCTI Welding

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

If this national examination is recommended, students will need to exceed the college student national average score. This three-hour Online or written examination requires knowledge of the main areas of welding nomenclature and blueprint reading. It also covers oxyfuel cutting and processes, the physical characteristics and mechanical properties of metals, and the specialty areas of shielded, gas metal, flux core and gas tungsten arc welding. The student must understand the science of welding and metal behavior. Among the mathematics skills are the applications of geometry, proportions, measurement conversions, estimation, and the calculation of the amount of materials needed in construction applications of welding. *11 possible pathways: 12 to 29 courses, 330 to 1,320 contact hours*

**ARTS, A/V TECHNOLOGY & COMMUNICATIONS**

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
GAERF PrintEd Certification Bundled Series	Recommend Bundle	
<b>Description</b>		
GAERF PrintEd Certification requires students to take two of the three exams in the series (Digital File Preparation, Graphics Communication Technology and Press Operations) to qualify as one exit exam.		
<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
GAERF Digital File Preparation	Provisional	Exam should be bundled
<b>Description</b>		
This detailed examination must be bundled with the Graphics Communication Technology examination and requires an understanding of the basic principles of publishing design — including software skills for page layout — and proficiency with desktop publishing software — including illustration and image editing, sketches, and computer-generated layouts. The applicant must demonstrate the ability to use color, proofread using basic editing marks and use advanced PDF methods. This examination is mostly language- and logic-based and requires basic mathematics. <i>11 courses, 600 contact hours</i>		
<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
GAERF Graphics Communications Technology	Provisional	Exam should be bundled
<b>Description</b>		
This is the introductory examination that requires an additional GAERF specialty examination for full certification. The examination covers every area of graphic design and production. <i>2 pathways: 11 or 18 courses, 600 or 1,200 contact hours, respectively</i>		
<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
GAERF Press Operations	Provisional	Exam should be bundled
<b>Description</b>		
This specialty examination, coupled with the Graphics Communication examination, qualifies for certification by PrintEd. The examination requires the applicant to demonstrate knowledge and skill in operating printing and other press machines. The applicant must demonstrate knowledge of sequential press operations and procedures, degrees of roller pressure, the characteristics of different paper types and grains, the properties and application of different ink colors, types, powders and ink additives, including driers. The applicant must know solutions to common print production problems and maintenance procedures. <i>11 courses, 600 contact hours</i>		
<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
NOCTI Graphics Communications Technology	Provisional	Needs endorsement
<b>Description</b>		
If this national examination is recommended, students will need to exceed the college student national average score. This three-hour online or paper-and-pencil examination contains 193 questions. There is also a two-hour performance component. This examination is an end-of-program examination for graphic arts, printing and related digital media. It covers electronic imaging, copy presentation, image assembly and plate-making, press operations, finishing processes and electronic publishing. The test requires the demonstration of mathematical skills relating to materials estimation, service costs and options, and preparing work orders. It also requires an understanding of the legalities of copyright and of basic computer knowledge. <i>2 pathways: 11 or 18 courses, 600 or 1,200 contact hours, respectively</i>		
<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
NOCTI AV Communications Assessment	Provisional	Needs endorsement
<b>Description</b>		
If this national examination is recommended, students will need to exceed the college student national average score. This three-hour online or written examination contains 195 questions. The examination requires knowledge of the main areas of composition, lighting and exposure control in photography; the application of computer peripheral devices and software, combined media production, film/video production (including preparing scripts, storylines, editing, production and A/V engineering); designing presentations; areas of visual design (concepts of forms, shapes, light, color, texture and composition); project management concerning budget and personnel considerations; quality control, copyright and licensing requirements; creating and using Web technology, and digital television production. Among the mathematics skills are the applications of geometry, proportions, measurement conversions, estimation, and the calculation of the amount of materials needed in creating, refining, and producing audio and visual material. <i>8 courses, 960 contact hours</i>		

## BUSINESS MANAGEMENT &amp; ADMINISTRATION

**Examination**

AIPB Bookkeeper

**Final Rec**

Recommend

**Comment****Description**

This is a long and challenging examination. Questions reviewed were all couched as word problems with charts, graphs or tables of information, which the student must use to form a strategy and solution. The exam requires a strong knowledge of Algebra and the ability to solve equations and multiple-step calculations to arrive at an answer. *3 courses, 360 contact hours*

**Examination**

ASK Bundled Series

**Final Rec**

Recommend

**Comment**

Requires passing both ASK examinations

**Description**

ASK Bundled Series requires passing both the ASK Fundamental Business Concepts and the ASK Fundamental Marketing Concepts.

**Examination**

ASK Fundamental Business Concepts

**Final Rec**

Provisional

**Comment**

Exam should be bundled with Marketing Concepts

**Description**

This examination meets the essential requirements, but lacks the robust rigor that was preferred. The blueprints suggest a business course as well as content beyond a normal introductory business course. The exam has breadth and some depth because of the areas dealing with economics. Student should pass both the Business and Marketing Concepts exams to qualify. *4 courses, 480 contact hours*

**Examination**

ASK Fundamental Marketing Concepts

**Final Rec**

Provisional

**Comment**

Exam should be bundled with Business Concepts

**Description**

This examination meets the essential requirements, but lacks the robust rigor that was preferred. The blueprints suggest a business course as well as content beyond a normal introductory business course. The exam has breadth and some depth because of the areas dealing with economics. Student should pass both the Business and Marketing Concepts exams to qualify. *4 courses, 480 contact hours*

**Examination**

NALS Legal Professional

**Final Rec**

Recommend

**Comment****Description**

This four-hour, 200-question online examination covers the abilities to perform written communication and legal research tasks; maintain office records; use real-life scenarios; and understand office procedures, legal terminology, legal complexities and use of supporting documents. The examination also requires the applicant to be familiar with administrative law, bankruptcy, business, organizations and corporations, contracts, family law, criminal law and procedure, litigation, probate and estate planning, and real estate. The examination requires skills in language arts, writing, and some basic office accounting. *6 courses, 970 contact hours*

**Examination**

Brainbench Accounting Bundled Series

**Final Rec**Provisional  
Bundle**Comment**

Needs endorsement

**Description**

Students should take at least the standard accounting examination, both the Accounts Receivable and Payable examinations, or one of the remaining examinations listed below. These assessments provide certification of specific skills and knowledge in various areas relating accounting, auditing concepts, and payroll fundamentals. Specific examinations in this series: Accounts Payable, Accounts Receivable, Bookkeeping, Financial Accounting, Auditing and Payroll Fundamentals. These examinations require mathematics, some algebra-related equations and some understanding of economics. There is an emphasis on generally accepted business procedures and business law. *10 courses, 345 contact hours*

**Examination**

Brainbench Accounts Payable

**Final Rec****Comment**

Exam should be bundled

**Description**

The Accounts Payable examination measures the test-taker's knowledge of processing payables and vendor invoices and the posting of journal entries. Designed for accounting clerks and others who handle the processing of accounts payable, this test covers assets, cash management/reconciliation, controls, expenses, purchases and recording. A calculator is needed for this examination. This is a computer-adaptive test. *4 courses, 360 contact hours*

**BUSINESS MANAGEMENT & ADMINISTRATION (continued)**

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench Accounts Receivable		Exam should be bundled
<b>Description</b>		
This Accounts Receivable/Billing Fundamentals test is part of an accounting fundamentals series. The tests in the series measure knowledge of processing receivables and invoices. Designed for accounting clerks and others who handle the processing of accounts payable, this test covers A/R principles, applying cash, bad debt and collections, cash flow, credit, general ledger, invoicing and reconciliation of customer accounts. A calculator is needed for this exam. This is a computer-adaptive test. <i>4 courses, 360 contact hours</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench Financial Accounting		Exam should be bundled
<b>Description</b>		
The Financial Accounting test measures American financial accounting rules and procedures. Designed for the experienced accounting professional, this test covers A/R and A/P, budgeting, cost accounting, GAAP, journal entries, tax and payroll. This is a computer-adaptive test. <i>5 courses, 600 contact hours</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench Payroll Accounting		Exam should be bundled
<b>Description</b>		
The Payroll Fundamentals test measures knowledge of processing receivables, invoices and payroll. Designed for payroll clerks and others who handle payroll processing, this test covers bookkeeping, the Fair Labor Standards Act, payroll calculation, tax forms and worker status. A calculator is needed when taking this exam. The examination uses a highly sophisticated computer-adaptive testing strategy that tailors the questions posed to the ongoing performance of the student. This highly efficient and effective strategy probes the range and depth of student knowledge within a short space of time. When the algorithm meets an appropriate level of confidence in assessing the student's knowledge, the examination ends. <i>4 courses, 360 contact hours</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench Foundations of Medical Office	Provisional	Needs endorsement; Bundle with Brainbench Medical Insurance, Medical Transcription or Medical Billing
<b>Description</b>		
This exam should be offered as part of a bundle. The Medical Office Skills test measures the office skills needed in medical offices. Designed for office personnel, this test covers: operations, facility maintenance/safety, patient charts and medical records, collections, billing, insurance coverage, biomedical waste, medical terminology, employee relations and ethics. The results of this test do not imply that the individual possesses the necessary skills to perform a specific procedure or treatment, nor is the individual licensed or authorized to practice any health care profession under any applicable laws. <i>3 courses, 290 contact hours</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench Medical Billing	Provisional	Needs endorsement
<b>Description</b>		
The Medical Billing test measures knowledge of medical billing procedures and regulations under the various health plans popular in the United States. Designed for experienced hospital administrators, this test covers the following topics: HIPAA, managed care, Medicaid, medical billing basic knowledge, medical billing documents, medical billing process, medical terminology, Medicare, specialty billing, and TRICARE. <i>4 courses, 630 contact hours</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench Medical Insurance	Provisional	Needs endorsement
<b>Description</b>		
The Health Insurance test measures knowledge of the health care industry medical insurance concepts, procedures, and regulations under the various health plans popular in the United States. This test covers HMO, PPO and POS concepts and Medicare/Medicaid items. Designed for experienced health insurance specialists, this test covers medical insurance concepts, health care administration, health care management, communication and workplace fundamentals, including common areas such as presentation skills, business writing, interpersonal skills, time management and managing people. The examination is a computer-adaptive test. <i>5 courses, 630 contact hours</i>		

BUSINESS MANAGEMENT & ADMINISTRATION (*continued*)**Examination**

Brainbench Medical Transcription

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

The Medical Transcription test measures knowledge of medical transcription procedures and as well as general medical field knowledge. Designed for experienced medical transcriptionists, this test covers the following topics: AAMA grammar, law and ethics, letter transcription, medical report transcription, and medical terminology. This test will verify an individual's knowledge of the concepts and subjects tested. The results of this test do not imply that the individual possesses the necessary skills to perform a specific procedure or treatment, nor is the individual licensed or authorized to practice any health care profession under any applicable laws. *6 courses, 870 contact hours*

**Examination**

Brainbench Human Resource Bundled Series

**Final Rec**

Provisional Bundle

**Comment****Description**

Students must take at least two of the six exams below (Benefits Management, Compensation Management, Employee Labor Relations, Human Resource Concepts, Human Resource Information Systems, and Legal Issues of Human Resources & Management) to qualify as one exit exam.

**Examination**

Brainbench Benefits Management

**Final Rec****Comment**

Exam should be bundled; Needs endorsement

**Description**

Designed for experienced human resource professionals and managers, this test covers: benefits administration, social insurance programs, COBRA, ERISA, HIPAA, FMLA, Pension Plans, and ADA. This is a computer-adaptive test. *6 courses, 920 contact hours*

**Examination**

Brainbench Compensation Management

**Final Rec****Comment**

Exam should be bundled; Needs endorsement

**Description**

Designed for experienced human resource professionals and managers, this test covers the following topics: communicating compensation programs, executive compensation, expatriate compensation, job analysis and design, legal compliance, performance appraisals, salary administration, sales compensation, variable compensation, and wage level decisions. The examination is a computer-adaptive test. *4 courses, 530 contact hours*

**Examination**

Brainbench Employee Labor Relations

**Final Rec****Comment**

Exam should be bundled; Needs endorsement

**Description**

This assessment provides certification of specific skill set knowledge in legal issues faced by employers. Designed for human resource professionals and managers, this test covers the following topics: EEOC, FLSA, ADA, safety and compensation benefits and labor unions. Employees are encouraged to complete the Legal Issues for Employees test. The examination is a computer-adaptive test. *2 courses, 240 contact hours*

**Examination**

Brainbench Human Resource Concepts

**Final Rec****Comment**

Exam should be bundled; Needs endorsement

**Description**

Designed for human resource professionals and experienced managers, this test covers recruiting, compensation, benefits, job analysis, labor relations, managing employees, occupational safety and health, training and development and strategic HR. The examination is a computer-adaptive test. *4 courses, 530 contact hours*

**Examination**

Brainbench Human Resource Information Systems (HRIS Concepts)

**Final Rec****Comment**

Exam should be bundled; Needs endorsement

**Description**

Designed for experienced human resource professionals, this test includes functions of an HRIS, installation and maintenance, selection steps, effect on the workforce and technology. The examination is a computer-adaptive test. *4 courses, 530 contact hours*

**BUSINESS MANAGEMENT & ADMINISTRATION (continued)**

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench Legal Issues of Human Resources and Management <b>Description</b> Designed for both human resource professionals and managers, this test covers: EEOC, FLSA, ADA, safety and compensation benefits, and labor unions. Employees are encouraged to complete the Legal Issues for Employees test. The examination is a computer-adaptive test. <i>4 courses, 530 contact hours</i>		Exam should be bundled; Needs endorsement

**HEALTH SCIENCE**

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
AAMA Certified Medical Assistant <b>Description</b> This comprehensive examination covers human biology and medical terminology and procedures. It seems to have adequate statistical analysis and support. <i>7 courses, 525 contact hours</i>	Recommend	

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
AMT Registered Medical Assistant <b>Description</b> This examination requires a good knowledge of biology, medical terminology, practice, drugs, illness, office procedures and safety. <i>7 courses, 525 contact hours</i>	Recommend	

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
ASCP Phlebotomy Technician <b>Description</b> This examination requires detailed knowledge of the circulatory system and the diseases inherent in blood systems. There is a concentration on the procedures for drawing blood and the techniques for specimen collection and preservation. <i>7 courses, 480 contact hours</i>	Recommend	

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
ARDMS Diagnostic Medical Sonographer <b>Description</b> This challenging examination requires knowledge of the physics of wavelengths, frequency, amplitude, compression, chart reading, mathematics, biology and human anatomy. It offers two tiers: The first is for everyone and is general, and the second tier is a highly specialized area for full certification. This allows students to enter the field and work to full credential and attend school if necessary. <i>15 courses, 1,905 contact hours</i>	Recommend	

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
ARRT Radiologic Technologist <b>Description</b> This examination may be out of high school students' reach. The ARRT Radiologic Technologist exam is composed of 220 questions, including 20 pilot questions, and requires knowledge of radiological effects on human biology, radiology procedures, safety and exposure reduction. A good deal of physical science and biology is involved. It is unknown whether or not secondary students will have access to the lab necessary to prepare themselves for the certification and work, especially since this exam requires equipment that uses low levels of radiation. <i>18 courses, 2,535 contact hours (includes 1 clinical practice course requiring 1,290 contact hours)</i>	Recommend	

HEALTH SCIENCE (*continued*)

Examination	Final Rec	Comment
DANB Certified Dental Assistant	N/A	Diploma

**Description**

Only select portions of the DANB Certified Dental Assistant examination are recommended because high school students cannot sit for one examination. This four-hour examination is composed of three parts that are approved by state boards for certification. The first part covers a general chairside component that includes dental procedures, materials, oral health management, and prevention and management of emergencies. **This part of the exam cannot be taken by high school students.** The second part is an hour-long exam that covers radiation health safety and procedures for x-ray operation. The third part, the Infection Control examination, requires knowledge for preventing cross contamination and transmission of infection.

Examination	Final Rec	Comment
DANB Certified Dental Assistant: Radiation Health and Safety Examination	Recommend	

**Description**

The Radiation Health and Safety exam includes 100 multiple-choice items and lasts one hour and 15 minutes. It focuses on how to expose and evaluate x-rays, radiation safety for the patient and operator, and other procedures and safety steps necessary on x-rays. *6 courses, 975 contact hours (includes 1 practical course, 300 contact hours)*

Examination	Final Rec	Comment
DANB Certified Dental Assistant: Infection Control Examination	Recommend	

**Description**

The Infection Control exam includes 100 multiple-choice items and lasts one hour and 15 minutes. It focuses occupational safety, preventing cross contamination and transmission, and other skills and knowledge necessary to prevent infections. *6 courses, 975 contact hours (includes 1 practical course, 300 contact hours)*

Examination	Final Rec	Comment
EMT First Responder	Provisional	Credit should be issued only if passing EMT Basic

**Description**

The First Responder examination is the first in a series of four exams that qualify the individual to handle pre-hospital care. This exam does not qualify for credits on its own; however, if a student passes the second exam of the series, the project team believes the exam should be approved. This requirement exists to give value to past accomplishments for students invested in a career pathway. All EMT exams are computer-adaptive exams and cover the topics of airway/breathing, cardiology, trauma, medical procedures, OB/GYN and EMT operations. *5 courses, 447 contact hours*

Examination	Final Rec	Comment
EMT Basic	Recommend	

**Description**

The Emergency Medical Technician — Basic Level exam is a computer-adaptive test, and students usually answer 70 to 120 questions. This is a basic (second level) examination for EMT, which covers entry-level knowledge in airway/breathing, cardiology, trauma, medical procedures, OB/GYN and EMT operations. This examination also includes a practical portion administered by trained instructors. The main course, Health Careers Core Curriculum (225 hours), is offered at a technology center. The rest of the courses are additional information specific for EMTs. *11 courses, 446 contact hours*

Examination	Final Rec	Comment
EMT Emergency Medical Technician	Recommend	

**Description**

The Emergency Medical Technician — Intermediate 85 and 99 examination is a new combined computer-adaptive test based on the two tests that formed it: EMT Intermediate 85 and EMT Intermediate 99. This exam represents a higher level of knowledge and skill in the areas of pre-hospital care, specifically: airway/breathing, cardiology, trauma, medical procedures, OB/GYN, and EMT operations. This 2.5-hour examination also requires an additional practical examination. *11 courses beyond Basic, 354 contact hours*

HEALTH SCIENCE (continued)		
Examination	Final Rec	Comment
EMT Paramedic	Recommend	
<b>Description</b>		
This computer-adaptive test certifies knowledge and skill at the highest level of pre-hospital care for EMT professionals and is composed of 85 to 120 questions. The examination covers airway/breathing, cardiology, trauma, medical procedures, OB/GYN, and EMT operations. This examination also includes a practical portion administered by trained instructors. <i>9 courses, 1,050 contact hours</i>		
Examination	Final Rec	Comment
FSBPT Physical Therapy Assistant	Recommend	
<b>Description</b>		
The examination requires understanding about the handling of hazardous substances, legal and regulatory requirements, health insurance documentation and database maintenance. The examination is primarily procedure-driven, although it does require some mathematics related to dosage and other formulary adjustments. There is an implied requirement of understanding about chemicals, drug effects, personal safety and patient safety. <i>10 courses, 1,042 contact hours</i>		
Examination	Final Rec	Comment
NBRC Clinical Respiratory Therapist Entry-Level	Recommend	
<b>Description</b>		
“The Entry-Level CRT Examination is designed to objectively measure essential tasks required of entry-level respiratory therapists. The examination consists of 160 multiple-choice questions (140 scored questions and 20 pretest questions) distributed among three major content areas: patient data, equipment and therapeutic procedures. Candidates will be given three hours to complete the Entry-Level CRT Examination.” ( <a href="http://www.nbrc.org">http://www.nbrc.org</a> ) Respiratory Care exam requires knowledge of health science and biology, including anatomy. <i>9 courses, 1,446 contact hours</i>		
Examination	Final Rec	Comment
NBSTSA First Medical Surgical Technologist	Recommend	
<b>Description</b>		
This is a highly technical examination covering peri-operative patient care and ancillary functions such as management, sterilization, and basic science. Applicants must demonstrate their ability to interpret diagnostic results from lab data and radiologic and pathological results. They must understand their roles in pre-, intra- and post-operative procedures, monitoring vital signs, instrument classifications, functions, and usability and the use of basic surgical techniques, and use of equipment. The examination also emphasizes safety, proper use of equipment, and methods of sterilization and disaster protocols. The examination relies heavily on the knowledge of anatomy and physiology, some microbiology, infection control, and surgical pharmacology, weights and measures, types and uses of drugs and hemostatic agents, antibiotics and other medications. <i>16 courses, 1,865 contact hours</i>		
Examination	Final Rec	Comment
NCLEX Licensed Practical Nurse	Recommend	
<b>Description</b>		
This sophisticated national licensing examination requires knowledge of health and human anatomy, infection control, growth stages, development, and prevention and early detection of health problems from aging to pre- and post-natal care. It also includes nutrition, palliative care, pharmacological therapies, medical emergency, safety, diagnostic tests and laboratory values and reports. Students who pass this test should be prepared to work in many different fields. <i>17 courses, 1,463 contact hours</i>		
Examination	Final Rec	Comment
PTCB Pharmacy Technician	Recommend	
<b>Description</b>		
This 100-question, two-hour online examination consists of three parts: assisting the pharmacist in serving patients, maintaining medication and inventory control systems, and participating in administration and management of pharmacy practice. Sixty-six percent of the examination covers the areas of federal rules and regulations concerning patient information, understanding side effects of drugs, and the use and interpretation of medical records and prescriptions. It requires an understanding of pharmacy procedures, measuring, formulary restrictions and conversions, calculations for radiopharmaceuticals and oral chemotherapeutic medications calibrating equipment, and compound medications and dosage restrictions. <i>12 courses, 540 contact hours</i>		

## HUMAN SERVICES

Examination	Final Rec	Comment
NOCTI Early Child Care & Education Director	Provisional	Needs endorsement

**Description**

If this national examination is recommended, students will need to exceed the college student national average score. This examination consists of 190 test items. The test includes program management, health and safety, intellectual (cognitive) development, physical development, social and emotional development, positive adult/child relationships and guidance, positive relationships with families, professionalism, language development and communication, creativity, and relevant care and education. The test also includes questions concerning children with special needs and curriculum planning. *4 courses, 1,370 contact hours*

## INFORMATION TECHNOLOGY

Examination	Final Rec	Comment
Adobe ACE Acrobat Professional Print Production	Recommend	

**Description**

This exam is composed 61 questions, which cover the topics of understanding Acrobat and being able to create, manipulate and manage PDF documents using Adobe Acrobat. This is a comprehensive examination for software used in many different business settings. The examination goes beyond basic familiarity to more advanced levels of content manipulation and connection. *3 courses, 360 contact hours*

Examination	Final Rec	Comment
Adobe ACE After Effects	Recommend	

**Description**

This Two-hour, 90-question online examination covers configuring Workspaces, importation of images and footage, building 2-D and 3-D compositions, layering, animating and key framing, masks and transparency, color management and HDR, and rendering and exportation. The sample questions reviewed were highly technical and required a fairly deep knowledge of the software. *3 courses, 360 contact hours*

Examination	Final Rec	Comment
Adobe ACE Illustrator	Recommend	

**Description**

This two-hour, 32-question online examination is focused on qualifying the application skills with specific Adobe software. The information available was severely limited, but it is certainly on a par with other Adobe tests. Logic, critical reasoning and product development management are key elements in this examination. *3 courses, 360 contact hours*

Examination	Final Rec	Comment
Adobe ACE InDesign	Recommend	

**Description**

The two-hour, 75-question online examination covers document layout; working with text, tables, color, and SML; transforming drawings and objects; managing assets with Bridge; and importing, exporting and converting files, including cross-media export. *3 courses, 360 contact hours*

Examination	Final Rec	Comment
Adobe ACP Macromedia Dreamweaver	Recommend	

**Description**

This two-hour, 71-question online examination covers understanding Web technology, planning sites, designing pages, and managing and maintaining sites. This exam relies more on logic, attention to presentation and succinct natural display than on mathematics. The skills fall into the category of logic and critical reasoning. *4 courses, 480 contact hours*

INFORMATION TECHNOLOGY (continued)		
Examination	Final Rec	Comment
Adobe ACP Macromedia Flash	Recommend	
<b>Description</b>		
This two-hour, 57-question online examination covers planning and designing Flash applications, creating and managing assets, creating Flash movies, programming with ActionScript3, testing publishing and deploying Flash Movies. The information available was severely limited, but it is certainly on a par with other Adobe tests. Logic, critical reasoning and product development management are key elements in this examination. <i>4 courses, 480 contact hours</i>		
Adobe ACE Photoshop	Recommend	
<b>Description</b>		
This two-hour, 74-question online examination covers painting and retouching, creating and using layers, supporting video, working with vector tools, using Smart Objects, managing assets with Bridge, and using camera raw and HDR. The information available was severely limited, but it is certainly on a par with other Adobe tests. Logic and critical reasoning and product development management are key elements of this examination. <i>5 courses, 600 contact hours</i>		
Adobe ACE Premiere	Recommend	
<b>Description</b>		
This two-hour online examination covers configuring user interface, capturing media, editing, working with effects, transitions, and audio. The information available was limited, but it is certainly on par with other Adobe tests. Logic and critical reasoning and product development management are key elements in this examination. <i>3 courses, 360 contact hours</i>		
Adobe Print Specialist	N/A	Diploma
<b>Description</b>		
This certification is not an examination, but a higher level of certification that results from an applicant successfully completing two required product examinations and one of two electives. Adobe InDesign and Acrobat are the two required exams and Adobe Photoshop and Illustrator are the two elective exams.		
Adobe Video Specialist	N/A	Diploma
<b>Description</b>		
This certification is not an examination, but a higher level of certification that results from an applicant successfully completing two required product examinations and one of two electives. Adobe GoLive and Photoshop are the two required product exams and Adobe Acrobat and Illustrator are the two elective exams.		
Adobe Web Specialist	N/A	Diploma
<b>Description</b>		
This certification is not an examination, but a higher level of certification that results from an applicant successfully completing three required product examinations: Adobe Photoshop, Premiere and After Effects.		
Cisco Certified Network Associate	Recommend	
<b>Description</b>		
This Network Associate examination, composed of 60 questions and taken over 90 minutes, confirms international certification and tests a candidate's knowledge and skills required to install, operate, and troubleshoot a small- to medium-size enterprise branch network. Questions include multiple-choice single answer, multiple-choice multiple answers, drag and drop, fill in the blank and simulations. The examination is challenging, going beyond simple recall and requiring candidates to engage in on-the-job types of problem-solving. This is an advanced examination that is recognized by industry. <i>3 courses, 390 contact hours</i>		

## INFORMATION TECHNOLOGY (continued)

Examination	Final Rec	Comment
Cisco Certified Network Professional	Recommend	

**Description**

This examination, composed of 100 questions and taken over 120 minutes, represents the next level beyond the Network Associate (CCNA) and may be above a high school level. This professional level examination validates a network professional's ability to install, configure and troubleshoot converged local and wide area networks with 100 to 500 or more nodes. The examination is challenging, going beyond simple recall and requiring candidates to engage in on-the-job types of problem-solving. *5 courses, 690 contact hours*

Examination	Final Rec	Comment
CompTIA A+ 220-602 Technician Level	Recommend	

**Description**

The CompTIA A+ 220-602 examination is composed of 90 multiple-choice, computer-based, linear format questions and is taken over 90 minutes. "This exam is targeted for individuals who work or intend to work in a mobile or corporate technical environment with a high level of face-to-face client interaction. Job titles in some organizations which are descriptive of the role of this individual may be: enterprise technician, IT administrator, field service technician, PC technician, etc. Ideally, the CompTIA A+ 220-602 candidate has already passed the CompTIA A+ Essentials examination. Individuals in some non-technical roles such as student, sales personnel or small business office managers may also find the validation of skills associated with the CompTIA A+ credential to be valuable." (<http://certification.comptia.org>) *1 course, 240 contact hours (Computer Repair and Troubleshooting I and II)*

Examination	Final Rec	Comment
CompTIA A+ 220-603 Remote Technician	Recommend	

**Description**

The CompTIA A+ 220-603 examination is composed of 90 multiple-choice, computer-based, linear format questions and is taken over 90 minutes. This examination confirms the skills of a Help Desk Technician who specializes in troubleshooting individual computer problems. This appears to be a higher level examination than 220-602 and goes beyond basic computer functioning to diagnosing problems and identifying strategies to achieve solutions. The student should pass CompTIA A+ Essentials examination before taking this test. *1 course, 240 contact hours (Computer Repair and Troubleshooting II and III)*

Examination	Final Rec	Comment
CompTIA A+ 220-604 Depot Technician	Recommend	

**Description**

This exam is composed of 90 multiple-choice, computer-based, linear format questions and is taken over 90 minutes. "The CompTIA A+ 220-604 examination is targeted for individuals who work or intend to work in settings with limited customer interaction where hardware related activities are emphasized. Job titles in some organizations which are descriptive of the role of this individual may be: depot technician, bench technician, etc. Ideally, the CompTIA A+ 220-604 candidate has already passed the CompTIA A+ Essentials examination." (<http://certification.comptia.org>) *1 course, 240 contact hours (Computer Repair and Troubleshooting II and III)*

Examination	Final Rec	Comment
CompTIA Linux+	Recommend	

**Description**

The CompTIA Linux+ exam is composed of 90 multiple-choice, computer-based, linear format questions and is taken over 90 minutes. This is an advanced examination that measures the skills of Linux. The examination covers the areas of knowledge of the system, installation, operation, security and troubleshooting. This test is designed to be vendor neutral (not specific to Red Hat, Mandrake or SUSE Linux distributions). *2 courses, 190 contact hours*

Examination	Final Rec	Comment
CompTIA Network+	Recommend	

**Description**

The CompTIA Network+ exam is composed of 90 multiple-choice, computer-based, linear format questions and is taken over 90 minutes. This is a complex examination that requires knowledge of layers of the OSI model and an understanding of the features and functions of network components, the skills needed to install, configure, and troubleshoot network hardware, protocols and peripherals. The exam also appears to be vendor neutral for handling network solutions. *3 courses, 360 contact hours*

**INFORMATION TECHNOLOGY (continued)**

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
CompTIA Server+	Recommend	
<b>Description</b>		
The CompTIA Server+ exam is composed of 90 multiple-choice, computer-based, linear format questions and is taken over 90 minutes. This is a challenging examination that requires a solid knowledge of server hardware as well as the skills necessary to install and configure elements and diagnose and troubleshoot operational problems. The examination also covers server maintenance and disaster recovery. <i>4 courses, 420 contact hours</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Microsoft Certified Desktop Support Technician	Recommend	
<b>Description</b>		
This certification requires the individual to pass two core on-line examinations: 70-271 Support Users and Troubleshooting and 70-272 Support Users and Troubleshooting Desktop Applications. This certification is a first step in professional development as it requires knowledge of current software available to the public and business. The examination emphasizes help desk support to end users. <i>3 courses, 360 contact hours</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Microsoft Certified Professional	Recommend	
<b>Description</b>		
This is not an examination, but a certification that represents an individual being certified in one of 129 Microsoft industry on-line certification “70-Series” examinations that lead toward a more advanced Microsoft certification specialty program. These are high-level examinations, requiring students to take specific course work and have practical experience. Certification requires numerous courses/hours depending on which pathways the student takes for one of the 129 certifications; however, every student must take <i>4 courses, 480 contact hours</i> .		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Microsoft Certified SQL Server Administrator	Recommend	
<b>Description</b>		
Certification requires the passing of one core SQL qualifying examination: Exam 70-431: Microsoft SQL Server 2005 — Implementation and Maintenance. This is a highly sophisticated examination that requires deep familiarity with server environments. The examination also requires logic and algebra skills. <i>3 courses, 360 hours specific to databases</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Microsoft Certified Systems Administrator	Recommend	
<b>Description</b>		
The Microsoft Systems Administrator certification, an untimed exam, requires a student pass three core examinations — two Networking examinations, one Client Operating System examination, and one elective examination, depending on anticipated specialty. This certification is targeted for professionals in the field, but people entering the field can also take it. <i>5 courses, 600 contact hours</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Microsoft Certified Systems Engineer	Recommend	
<b>Description</b>		
Certification may be beyond the reach of high school students. It requires the passing of five core examinations and two elective examinations. The candidate must pass the following exams:		
<ul style="list-style-type: none"> <li>■ four core exams on networking systems</li> <li>■ one core exam on client operating systems</li> <li>■ one core design exam</li> <li>■ one elective exam, depending on anticipated specialty</li> </ul>		
The Microsoft Certified Systems Engineer (MCSE) certification demonstrates an expert ability to design and implement an infrastructure solution that is based on the Windows operating system and Windows Server System software. Specializations include the MCSE: Messaging and the MCSE: Security. <i>4 courses, 480 contact hours</i>		

INFORMATION TECHNOLOGY (*continued*)

Examination	Final Rec	Comment
-------------	-----------	---------

Novell Certified Administrator

Recommend

**Description**

Certification is designed for network administrators and other network management professionals who have little or no experience with Novell products and services. It provides a high-level view of the Novell products and services (with a particular focus on Novell SUSE Linux Enterprise 10 and Open Enterprise Server for Linux). The NCA is the first step for candidates moving on to Novell's engineer-level skills certification, Novell Certified Engineer Enterprise Services (NCE-ES). Specific information was considered company property and would be released if the team agreed to a non-disclosure agreement. *3 courses, 360 contact hours*

Examination	Final Rec	Comment
-------------	-----------	---------

Novell Certified Engineer

Recommend

**Description**

Certified Novell® Engineer Certification is composed of two tracks: Novell® Open Enterprise Server for NetWare and NetWare 6. These two tracks are composed of four or five tests depending on which track the student picked. Questions on all these exams (excluding the Technical Skills Assessment) are composed of multiple-choice, multiple response, free response, hot area and matching. This certification may be beyond the high school level. Specific information was considered company property and would be released if the team agreed to a non-disclosure agreement. *3 courses, 360 contact hours*

Examination	Final Rec	Comment
-------------	-----------	---------

Oracle Certified Database Associate

Recommend

**Description**

Certification requires the passing of a two-hour examination containing 84 questions. This Associate level is a significant stepping stone entry examination series that can lead to a Professional-level status. The content covers database architecture, performance management, concurrency, managing schema objectives, installation, backup and recovery, moving data, storage, proactive maintenance, and user security. *3 courses, 360 contact hours*

Examination	Final Rec	Comment
-------------	-----------	---------

Oracle Forms Developer Associate

Recommend

**Description**

Certification requires the passing of a two-hour examination containing 69 questions. This Associate level is a significant entry examination series that can lead to a Professional-level status. The content covers the architecture of Oracle Forms services; writing flexible code and test items; producing, manipulating and debugging triggers; creating non-input items; managing menu modules; and creating windows and content canvases. The examination requires mathematics and logic skills. *5 courses, 720 contact hours*

Examination	Final Rec	Comment
-------------	-----------	---------

Oracle PL/SQL Server Associate

Recommend

**Description**

Certification requires the passing of two examinations: Intro to 09/SQL 1Z0-001 and Program with PL/SQL 1Z0-147. These examinations cover creating and managing tables; creating control structures and constraints; writing executable statements; controlling user access; managing subprograms; manipulating large objects, dependencies and triggers; and creating procedures and PL/SQL Programs. *1 course, 120 contact hours*

Examination	Final Rec	Comment
-------------	-----------	---------

Prosoft Certified Internet Web Professional

Recommend

**Description**

The Prosoft Certified Internet Web (CIW) Professional Certification is based on a student receiving a certification that is designed to be vendor/software neutral, which can complement a vendor/software-specific certification. This certification is received when a student passes two exams: the CIW Associate Foundations exam, and any other CIW certification exam (Site Designer, E-commerce Designer, Server Administrator, Internetworking Professional, Security Professional, Applications Developer, Database Specialist, Enterprise Specialist). *8 courses, 930 contact hours*

INFORMATION TECHNOLOGY (*continued*)

Examination	Final Rec	Comment
Prosoft Certified Internet Web Security Analyst	Recommend	

**Description**

The Prosoft Certified Internet Web (CIW) Security Analyst Certification is based on a student receiving a certification in which his or her exams are designed to be vendor/software neutral and are complimented by the vendor/software-specific certification. This certification is composed of three tests: CIW Foundations, CIW Security Professional and one industry standard certificate (CEH, CCSE, CCNP, CCNA, CCIE, CTP, GSEC, ISC2 CISSP, JNCIA-FWV, LPI Level 2, LPI Level 3, MCSA, MCSE, MCSE: Security, Novell Certified Linux Engineer, RHCS, or SCTS). *2 courses, 180 contact hours*

Examination	Final Rec	Comment
Prosoft Master Certified Internet Web Administrator	Recommend	

**Description**

The Master CIW Administrator certificate is granted when an individual has passed four CIW tests: Foundation, Server Administrator, Internetworking Professional and Security Professional. This certification is designed for people who have worked in the industry for a period of time and are familiar with the field. *3 courses, 300 contact hours*

Examination	Final Rec	Comment
Prosoft Master Certified Internet Web Designer	Recommend	

**Description**

The Master CIW Designer certificate is granted when an individual has passed three CIW tests: Foundation, Site Designer and Commerce Designer. This certification is designed for people who have worked in the industry for a period of time and are familiar with the field. *4 courses, 480 contact hours*

Examination	Final Rec	Comment
Prosoft Master Certified Internet Web Enterprise Developer	Recommend	

**Description**

The Master CIW Enterprise Developer certificate is granted when an individual has passed six CIW tests and one SUN test: Foundation, Application Developer, Database Specialist, Enterprise Specialist, JavaScript Fundamentals, Perl Fundamentals and SUN Certified Programmer for Java 2. The SUN Certified Programmer for Java 2 is not a Prosoft certification exam, but is required for certification. This certification is designed for people who have worked in the industry for a period of time and are familiar with the field. *6 courses, 900 contact hours*

Examination	Final Rec	Comment
Prosoft Master Certified Internet Web Website Manager	Recommend	

**Description**

The Master CIW Web Site Manager certificate is granted when an individual has passed five CIW tests: Foundation, Site Designer, Server Administrator, JavaScript Fundamentals, and Perl Fundamentals. This certification is designed for people who have worked in the industry for a period of time and are familiar with the field. *5 courses, 540 contact hours*

Examination	Final Rec	Comment
SUN Certified Java 2	Recommend	

**Description**

This 115-minute, highly technical online examination contains 51 questions. The questions are of a multiple-choice, drag-and-drop variety. This examination is for entry-level programmers interested in pursuing a career application development or software project management using the Java 2 Platform. *3 courses, 360 contact hours*

INFORMATION TECHNOLOGY (*continued*)**Examination**

Brainbench 3D Studio Max

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

Designed for everyday users of the software, this test covers animation, file management, MAXScript, lighting, 3-D modeling and rendering. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *5 courses, 600 contact hours*

**Examination**

Brainbench Adobe Dreamweaver

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

This topic is offered directly by Adobe. Designed for experienced designers, this test includes the following topics: adding interactivity, application environment collaboration, customizing and extending media, page authoring, page design, page management, and site management. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *8 courses, 840 contact hours*

**Examination**

Brainbench Adobe Fireworks

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

This examination is designed for experienced designers, but an average performer in this role should pass this test. This test covers animation, behaviors, commands, drawing, effects, exporting, setup, tools and Web images. It requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *5 courses, 600 contact hours*

**Examination**

Brainbench Adobe FLASH

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

This topic is offered directly by Adobe. Designed for experienced developers, this test covers advanced actions, animation, buttons, drawing tools, movie management, objects, publishing and exporting, sound and text. It requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *8 courses, 840 contact hours*

**Examination**

Brainbench Adobe Illustrator

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

This topic is offered directly by Adobe. Designed for experienced users, this test covers automation, customization, color, compiling objects, enhancing artwork, interaction with Web and other applications, interface, objects and shapes, and type. It requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *5 courses, 600 contact hours.*

**Examination**

Brainbench Adobe InDesign

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

This topic is offered directly by Adobe. It is designed for the experienced user, but an average performer in this role should pass this test. The examination requires skills in logic organization, language, problem-solving and some mathematics. It covers colors, document setup, and drawing, exporting documents, interface, multimedia objects and typography. The examination is a computer-adaptive test. *2 courses, 240 contact hours*

**Examination**

Brainbench Adobe Photoshop CS

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

This topic is offered directly by Adobe. Designed for experienced users, this test includes file management tools, text, filters and effects, efficiency and automation, image properties, color, layers, masks and channels, and user interface. It requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *5 courses, 600 contact hours*

INFORMATION TECHNOLOGY (*continued*)

Examination	Final Rec	Comment
Brainbench Checkpoint Firewall Administration	Provisional	Needs endorsement

**Description**

Designed for experienced Web administrators, this test covers authentication, FW-1 GUIs, FW-1 installation/architecture, FW-1 management, general knowledge, network address translation, and security policy/rule base. It requires skills in logic organization, language, problem-solving, and some mathematics. The examination is a computer-adaptive test. *5 courses, 450 contact hours*

Examination	Final Rec	Comment
Brainbench Cisco Network Design	Provisional	Needs endorsement

**Description**

Designed for experienced telecom engineers, this challenging test covers the following topics: Cisco Network Design Model, distance recovery, distance vector routing protocols, enterprise routing protocols, multicast protocols, network equipment, network security, OSI model, requirements gathering techniques, and switching and routing considerations. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *8 courses, 990 contact hours*

Examination	Final Rec	Comment
Brainbench Cisco Network Support	Provisional	Needs endorsement

**Description**

Designed for experienced telecom engineers, this test covers advanced technologies, hardware architecture, IOS/Command Line, LAN switching, OSI model, routing protocols, TCP/IP, traffic and device management, troubleshooting, and WAN connectivity. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *8 courses, 990 contact hours*

Examination	Final Rec	Comment
Brainbench Client/Server Opsy	Provisional	Needs endorsement

**Description**

Designed for individuals with basic knowledge of client server networks, this test covers questions on networks, processing, database and rapid application development. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *8 courses, 990 contact hours*

Examination	Final Rec	Comment
Brainbench CSS & CSS2	Provisional	Needs endorsement

**Description**

This test is designed for the experienced user, but an average performer in this role should pass this test. It includes the following topics: generated content, layout, markup, media types, selectors, syntax, text, and values. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *8 courses, 840 contact hours*

Examination	Final Rec	Comment
Brainbench Computer Forensics	Provisional	Needs endorsement

**Description**

This test is designed for the experienced user, but an average performer in this role should pass this test. It covers the following topics: analyzing evidence, collecting evidence, data types, examination procedures, forensic tools, initial analysis, investigative preparation, and report findings. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *5 courses, 450 contact hours*

Examination	Final Rec	Comment
Brainbench Data Modeling Concepts	Provisional	Needs endorsement

**Description**

Designed for both administrators and developers, this test covers the following topics: attributes and keys, entities, implementation and model notations, normalization, relationships, and uses and benefits. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *5 courses, 600 contact hours*

INFORMATION TECHNOLOGY (*continued*)

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench Disaster Recovery and Planning	Provisional	Needs endorsement

**Description**

Designed for administrators, this test covers the following topics: essential concepts and terminology, exposure and risk analysis, disaster prevention (avoidance), planning fundamentals, asset management, backups and offsite storage, communications, preparation essentials, recovery/Interim restoration and relocation to primary site/final restoration. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *8 courses, 990 contact hours*

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench HTML	Provisional	Needs endorsement

**Description**

Designed for experienced coders, this test covers the following topics: advanced HTML, browsers, components, document information, forms, frames, images, links, lists, page structure, style sheets, tables and text. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *8 courses, 840 contact hours*

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench IP Routing & Switching	Provisional	Needs endorsement

**Description**

Designed for experienced WAN engineers, this test covers the following topics: advanced routing, general knowledge, IP addressing, IP multicast, IP routing protocols, and layer 2 switching. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *8 courses, 990 contact hours*

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench Java 2	Provisional	Needs endorsement

**Description**

Designed for experienced programmers, this test covers the following topics: Applets, collections API, enterprise features, fundamentals, graphics programming, internationalization, JDBC, JFC, Java CORBA/IDL, programming, RMI, security, standard packages and threads. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *5 courses, 600 contact hours*

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench Java Script	Provisional	Needs endorsement

**Description**

Designed for experienced programmers, this test covers the following topics: components, controlling Windows, documents, events and event handlers, functions, integration with other technologies, objects, operators/variables, statements, and working with forms and frames. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *8 courses, 840 contact hours*

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench MySQL Administration	Provisional	Needs endorsement

**Description**

Designed for the experienced administrators, this test covers the following topics: administrative program usage, disaster prevention, installation and configuration, interfacing with other products, security, SQL usage, (data manipulation), SQL usage (other), SQL usage (table & administrative), and table and data types. The examination is a computer-adaptive test. *4 courses, 530 contact hours*

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench Network Monitoring	Provisional	Needs endorsement

**Description**

Designed for experienced network administrators, this test covers the following topics: architecture and terminology; SNMP background, components and commands; RMON background, components and commands; other monitoring and troubleshooting tools; system design and implementation; and using SNMP and RMON tools. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *8 courses, 990 contact hours*

INFORMATION TECHNOLOGY (*continued*)**Examination**

Brainbench Network Security

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

Designed for experienced network administrators, this test covers the following topics: business policy and procedure, cryptography, infrastructure, models, remote access, system management, threats and tools. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *14 courses, 1,320 contact hours*

**Examination**

Brainbench Oracle DB Administration

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

Designed for experienced administrators, this test covers the following topics: architecture, backup and recovery, DBA basics, and tuning. The examination is a computer-adaptive test. *5 courses, 600 contact hours*

**Examination**

Brainbench Oracle PL/SQL

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

Designed for entry-level programmers, this test focuses on the topics used daily by most professionals and does not include some of the advanced topics found in the Oracle PL/SQL test. Topics include data manipulation, datatypes, debugging, input and output, packages, program structure, SQL operations, security and tuning. The examination is a computer-adaptive test. *5 courses, 600 contact hours*

**Examination**

Brainbench Perl

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

Designed for experienced programmers, this test covers the following topics: basics, expressions, functions, literals, modules, statements and subroutines. The test requires the skill of logic organization, language, problem-solving, and some mathematics. The examination is a computer-adaptive test. *4 courses, 480 contact hours*

**Examination**

Brainbench Programmer Analyst

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

This test covers the following topics: abstract thinking, analytical reasoning, attention to detail, mathematical problem-solving and process-mapping. The examination is a computer-adaptive test. *5 courses, 600 contact hours*

**Examination**

Brainbench QuarkXPress

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

Designed for experienced users, this test covers the following topics: character formatting, color management, configuring and customizing, document management, graphics, miscellaneous, object placement, page layout, paragraph formatting, printing and output, text editing, and text and picture boxes. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *5 courses, 600 contact hours*

**Examination**

Brainbench Relational DBMS

**Final Rec**

Provisional

**Comment**

Needs endorsement

**Description**

Designed for both programmers and administrators, this test covers the following topics: data normalization, the logical data model, managing the RDBMS, performance, the physical and relational data model, programming, security, and structured query language. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *5 courses, 600 contact hours*

INFORMATION TECHNOLOGY (*continued*)

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench Server Administrator	Provisional	Needs endorsement

**Description**

This test measures the ability to administer a server using any platform. Designed for experienced administrators, this test covers disaster recovery, hardware, management process, network addressing and routing, optimization, security, storage, users and resources. The examination is a computer-adaptive test. *8 courses, 990 contact hours*

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench SQL ANSI Fundamentals	Provisional	Needs endorsement

**Description**

Designed for entry-level database programmers and administrators, this test covers the following topics: grouping and totaling, relational database and SQL basics, SQL data definition (DDL), SQL data modification, SQL queries and using SQL DML. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *5 courses, 600 contact hours*

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench TCP/IP Administration	Provisional	Needs endorsement

**Description**

Designed for experienced Network Administrators, this test covers the following topics: DHCP/BOOTP, DNS, general knowledge, IP addressing, IP security, IPv6, routing, subnetting, TCP/IP standards, TCP/IP suite, troubleshooting and WINS. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *8 courses, 990 contact hours*

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench VB Script	Provisional	Needs endorsement

**Description**

Designed for experienced programmers, this test covers the following topics: differences, errors, functions/statements, objects, operators, program structure, and script engine. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *8 courses, 840 contact hours*

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench WAN Technologies	Provisional	Needs endorsement

**Description**

Designed for experienced network administrators, this test covers the following topics: basic knowledge, choosing WAN Service, RAS, routing, WAN connections, WAN methodology, WAN support and WAN types. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *9 courses, 990 contact hours*

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench WWW Concepts	Provisional	Needs endorsement

**Description**

Designed for all Internet professionals, this test covers the following topics: architecture and design, browsers, cookies, distributed objects and components, links, messaging concepts, services, Web knowledge, Web languages and Web servers. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *9 courses, 840 contact hours*

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Brainbench XHTML	Provisional	Needs endorsement

**Description**

Designed for the experienced coder, this test includes the following topics: cascading style sheets, forms, miscellaneous XHTML issues, modularization, multimedia and objects, tables and XML compliance. The test requires skills in logic organization, language, problem-solving and some mathematics. The examination is a computer-adaptive test. *9 courses, 960 contact hours*

**INFORMATION TECHNOLOGY (continued)**

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
CompTIA HTI+	Provisional	Lacks content rigor on its own; Candidate for bundling; Focus appears to not be IT
<b>Description</b>		
CompTIA HTI+ is a 90-item, multiple-choice test taken over 90 minutes. This exam requires the successful completion of a prior examination, the DHTI Integrator examination, which was not reviewed. The HTI relies on technical information about software and installation. The team recommends that the student take both examinations to qualify as one exit exam. Sample questions imply recall, but are based on very specific knowledge and logic. The technical aspects of the examination seem carefully thought out and meet APA standards. <i>1 course, 120 hours (Audio-Visual Systems)</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
CompTIA Security+	Provisional	Needs more information
<b>Description</b>		
CompTIA Security is a 90-item, multiple-choice test taken over 90 minutes. This examination probes the foundation-level skills in communication and infrastructure security, the basics in cryptography and other skills that are closely aligned with the Network+ certification. <i>2 courses, 180 hours</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
NOCTI CNC Programming	Provisional	Needs endorsement
<b>Description</b>		
If this national examination is recommended, students will need to exceed the college student national average score. The three-hour Computer Programming examination is composed of 129 questions. The examination requires the student to analyze user requirements; prepare proposals; diagnose programming problems and design solutions with respect to data storage; code routines using structured logic; demonstrate knowledge of computer language, syntax and environment; test and evaluate programs; adjust existing programs when requirements change; correct program errors; and develop online help for users. An additional three-hour performance examination is also required to demonstrate programming and firefighting skills. <i>5 courses, 600 hours</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
NOCTI Computer Repair	Provisional	Needs endorsement
<b>Description</b>		
If this national examination is recommended, students will need to exceed the college student national average score. This three-hour online and written examination (2415) is composed of 117 questions and includes topics concerned with installation, configuring, upgrading, troubleshooting, preventive maintenance, system boards, processors and memory, I/O devices, printing, basic networking, security and customer support. The student must demonstrate the ability to diagnose and resolve computer failures, storage device issues, peripheral and connectivity failures, and execute recovery techniques. A three-hour performance examination is also included concerning diagnosing problems and devising solutions. <i>5 courses, 600 hours</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
NOCTI Networking Fundamentals	Provisional	Needs endorsement
<b>Description</b>		
If this national examination is recommended, students will need to exceed the college student national average score. This three-hour online and written examination covers the skills and knowledge for individuals who handle the day-to-day administration of an installed computer network. This 135-item examination includes knowledge of PC principles, network connections, physical connection types, network standards and devices, network terminology, network architecture, network addressing, security and network design. <i>5 courses, 600 hours</i>		

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
Prosoft Certified Internet Web Associate	Provisional	
<b>Description</b>		
This <u>Foundations</u> test is the first examination offered by CIW and is a pre-requisite for all other exams. The test is composed of 85 randomly selected questions. This initial examination covers the fundamental knowledge and skill to work in an internet environment including basic knowledge of Web browsers, FTP and e-mail, and Web page authoring using XHTML. <i>2 courses, 240 hours</i>		

## PUBLIC SAFETY, CORRECTIONS &amp; SECURITY

Examination	Final Rec	Comment
NOCTI Criminal Justice: Law Enforcement or General Version	Provisional	Needs endorsement

**Description**

If this national examination is recommended, students will need to exceed the college student national average score. This three-hour online or written examination contains 188 questions. The examination requires knowledge of the main areas of exhibiting and understanding of proper evidence collection procedures, preservation practices and initial crime scene management. The test requires the knowledge and understanding of civil liberties, levels of lethal and non-lethal force, defensive tactics, criminal law procedures, and techniques of law enforcement. The test probes court system terminology, procedures, warrants and the juvenile justice system. The student must have a grasp of some science, logic, current history and law. The examination needs an external endorsement. The pathway available for this examination is “criminal justice officer.” *18 courses, 1,035 hours (including a 390-hour criminal justice internship)*

## MANUFACTURING

Examination	Final Rec	Comment
AWS Certified Welding Inspector	Recommend	

**Description**

The six-hour CWI qualifying examination consists of three parts. The first is an open code book exam consisting of 46 questions intended to evaluate the applicant’s familiarity with the code and the individual’s ability to find and apply information. This requires the applicant to accurately read and interpret technical information and evaluate diagrams, figures and tables that relate to welding procedure, inspection, weld design and fabrication. The second portion of the test focuses on fundamentals and is a closed-book exam consisting of 150 questions designed to verify the applicants knowledge of heat control, metallurgy, reports and records, welding processes and procedures, knowledge of NDE symbols mathematical conversions and calculations, and the duties and responsibilities of welding inspectors. The third examination is the practical portion that requires the applicant to weld and inspect sample welds using measuring tools such as dial caliper, scale, micrometer and fillet weld gauges. *29 courses, 1,320 course hours*

Examination	Final Rec	Comment
AWS Welding	Recommend	

**Description**

The exam involves an open-book test of 46 questions intended to evaluate the applicant’s familiarity with the code and ability to find and apply information. This requires the applicant to accurately read and interpret technical information, understand and evaluate diagrams, figures and tables that relate to welding procedure, inspection, weld design and fabrication. The Fundamentals portion of the examination is a closed-book exam consisting of 150 questions designed to verify the applicants knowledge of heat control, metallurgy, reports and records, welding processes and procedures, knowledge of NDE symbols mathematical conversions and calculations, and the duties and responsibilities of welding inspectors. The third examination is the practical portion that requires the applicant to weld and to inspect sample welds using measuring tools such as dial caliper, scale, micrometer and fillet weld gauges. *11 pathways: 18 to 29 courses 330 to 1,320 course hours*

Examination	Final Rec	Comment
HVAC Excellence: Electric Heat Certification	Recommend	

**Description**

This examination qualifies the applicant to enter the field of residential and commercial electronic heating. In addition to specific elements of heating of buildings, the examination requires science (primarily physics) and mathematics knowledge; electrical, fluid and hydraulics knowledge; and the use of equations; and interpretation of charts and tables. The content of this test is very high level since it is targeted for postsecondary candidates, and the test objectives are very thorough in what is necessary for an individual to be work-ready. *2 pathways available: 22 or 23 courses, 1,050 or 1,200 hours, respectively*

MANUFACTURING (continued)		
Examination	Final Rec	Comment
HVAC Excellence: Electrical Certification	Recommend	
<b>Description</b>		
This examination is designed for postsecondary students and adult applicants. It requires knowledge of electrical theory, safety, the interpretation of electrical diagrams and schematics and the fundamentals of motors and capacitors. The examination also covers troubleshooting and problem-solving. It requires science and mathematics knowledge; electrical, fluid and hydraulics knowledge; the use of equations; and interpretation of charts and tables. <i>2 pathways available: 22 or 23 courses, 1,050 or 1,200 hours, respectively</i>		
Examination	Final Rec	Comment
HVAC Excellence: Gas Heat Certification	Recommend	
<b>Description</b>		
This examination requires knowledge of combustion theory and the wide variety of heating fuels and fuel gas codes. The applicant must understand proper chemical terminology, calculate BTU's and proper hardware fit, given the cubic feet to be heated, safety, and knowledge of heating systems and components, proper burner selection, installation and problem-solving. It requires science (physics) and mathematics knowledge; electrical, fluid and hydraulics knowledge; and the use of equations and interpretation of charts and tables. <i>2 pathways available: 22 or 23 courses, 1,050 or 1,200 hours, respectively</i>		
Examination	Final Rec	Comment
HVAC Excellence: Heat Pump Certification	Recommend	
<b>Description</b>		
This is an advanced test, as it is recommended that candidates first achieve a passing score on the Electrical, Electric Heat and Air Conditioning exams. Competencies tested include: theory, application, function, operational sequence, service, and installation of heat pumps. Troubleshooting and problem-solving questions involve diagnostic procedures requiring the use of test instruments, data plate information and wiring diagrams. Any or all of the heat pump system components, circuits, air distribution systems, water and/or power supply may be part of the troubleshooting and problem-solving question area. This exam requires knowledge in physics and mathematics; electrical, fluid and hydraulics knowledge; and the use of equations and interpretation of charts and tables. <i>2 pathways available: 22 or 23 courses, 1,050 or 1,200 hours, respectively</i>		
Examination	Final Rec	Comment
HVAC Excellence: Oil Heat Certification	Recommend	
<b>Description</b>		
This examination qualifies the applicant to enter the field of residential and commercial oil heating. This examination requires knowledge of combustion theory and the wide variety of heating fuels and fuel gas codes. The applicant must understand proper chemical terminology; calculate BTU's and proper hardware fit, given the cubic feet to be heated; and demonstrate knowledge of safety, heating systems and components, proper burner selection, installation and problem-solving. In addition to specific elements of heating of buildings, this exam requires science (physics) and mathematics knowledge; electrical, fluid and hydraulics knowledge; and the use of equations and interpretation of charts and tables. <i>2 pathways available: 22 or 23 courses, 1,050 or 1,200 hours, respectively</i>		
Examination	Final Rec	Comment
MSSC Certified Production Technician	Provisional	More information needed
<b>Description</b>		
The CPT is a "diploma" certification received when the applicant passes four assessment modules, each with their own certification: 1) safety, 2) maintenance awareness, 3) quality practices and measurements, and 4) manufacturing process and production. Each assessment is composed of approximately 75 multiple-choice questions and 20 to 30 computer simulated questions and takes about 75 to 90 minutes to complete.		

## SCIENCE, TECHNOLOGY, ENGINEERING &amp; MATHEMATICS

**Examination** **Final Rec** **Comment**

CETA Electronics Technician Associate Recommend

**Description**

This two-hour examination qualifies the student at the apprentice or Associate level and is primarily targeted for postsecondary students. High school students who meet the 65 percent to 75 percent performance qualify as a Student Electronics Technician certification. Examination requires a knowledge of physics, magnetism and electronics and the associated mathematics. *9 pathways available: 7 to 10 courses, 630 to 825 hours*

**Examination** **Final Rec** **Comment**

CETA Student Electronics Technician Recommend

**Description**

This two-hour examination is almost the same as the CETA examination, but has removed several items that were not appropriate for high school students due to lab costs. High school students who meet the 65 percent to 75 percent performance on the CETA-ETA test qualify with the SETA certification. Examination requires knowledge of physics, magnetism and electronics and the associated mathematics. *4 pathways available: 7 to 10 courses, 630 to 825 hours*

## TRANSPORTATION, DISTRIBUTION &amp; LOGISTICS

**Examination** **Final Rec** **Comment**

ASE Mechanical Electrical Components Technician Recommend

**Description**

This examination is one of four that must be taken for certification. Although this examination by itself qualifies as an alternative test, full certification from ASE is awarded when all four examinations are passed. The blueprint and sample questions project the requirement of detailed knowledge of diagnosis and problem-solving, highly technical language and judgment. *7 courses, 330 contact hours*

**Examination** **Final Rec** **Comment**

ASE Non-Structural Analysis and Damage Repair Technician Recommend

**Description**

This examination is one of four that must be taken for certification. Although this examination by itself qualifies as an alternative test, full certification from ASE is awarded when a student has passed all four examinations. The blueprint and sample questions project the requirement of detailed knowledge of diagnosis and problem-solving, highly technical language and judgment. *5 courses, 210 contact hours*

**Examination** **Final Rec** **Comment**

ASE Painting and Refinishing Technician Recommend

**Description**

This examination is one of four that must be taken for certification. Although this examination by itself qualifies as an alternative test, full certification from ASE is awarded when a student has passed all four examinations. The blueprint and sample questions project the requirement of detailed knowledge of diagnosis and problem-solving, highly technical language and judgment. *2 pathways available: 8 or 15 courses, 510 or 975 hours, respectively*

**Examination** **Final Rec** **Comment**

ASE Structural Analysis Damage Repair Recommend

**Description**

This examination is one of four that must be taken for certification. Although this examination by itself qualifies as an alternative test, full certification from ASE is awarded when a student has passed all four examinations. The blueprint and sample questions project the requirement of detailed knowledge of diagnosis and problem-solving, highly technical language and judgment. *14 courses, 765 contact hours*

TRANSPORTATION, DISTRIBUTION & LOGISTICS ( <i>continued</i> )		
Examination	Final Rec	Comment
<p>AYES Certification Series</p> <p><b>Description</b></p> <p>AYES patch is given when students pass all four examinations in this series and is recognized by automotive employers. Some employers will give pay raises to employees with an AYES patch.</p>		
<p>AYES Brakes</p> <p><b>Description</b></p> <p>This examination is normally used as an end-of-program examination as part of a prescribed curriculum and is composed of 75 to 80 multiple-choice questions. Based on industry standards, the examination is pitched at the high school level and includes particular attention to mathematics and science content. A certificate is awarded for passing this examination. <i>2 pathways available: 10 or 19 courses, 465 or 915 contact hours, respectively</i></p>	Recommend	
<p>AYES Electrical</p> <p><b>Description</b></p> <p>This examination is normally used as an end-of-program examination as part of a prescribed curriculum and is composed of 75 to 80 multiple-choice questions. Based on industry standards, the examination is pitched at the high school level and includes particular attention to mathematics and science content. A certificate is awarded for passing this examination. <i>2 pathways available: 8 or 10 courses, 420 or 630 contact hours, respectively</i></p>	Recommend	
<p>AYES Engine Performance</p> <p><b>Description</b></p> <p>This examination is normally used as an end-of-program examination as part of a prescribed curriculum. Based on industry standards, the examination is pitched at the high school level and includes particular attention to mathematics and science content. A certificate is awarded for passing this examination. <i>2 pathways available: 10 or 19 courses, 630 or 915 contact hours, respectively</i></p>	Recommend	
<p>AYES Steering &amp; Suspension</p> <p><b>Description</b></p> <p>This examination is normally used as an end-of-program examination as part of a prescribed curriculum. Based on industry standards, the examination is pitched at the high school level and includes particular attention to mathematics and science content. A certificate is awarded for passing this examination. <i>3 pathways available: 7 to 19 courses, 345 to 915 contact hours</i></p>	Recommend	
<p>MDHT Brakes Technician</p> <p><b>Description</b></p> <p>The examination demonstrates the applicant's understanding of and ability to apply proper procedures and precautions that must be followed in making repairs and adjustments. Areas covered include assembly, disassembly, reconditioning operations, and making major inspections and adjustments. The exam also tests the ability to use technical manuals to diagnose problems and select the appropriate strategy to solve the problem. The examination tests the ability to trace the effects of a particular condition and to find the cause of the symptoms. The examination covers air and hydraulic antilock brake systems, automatic traction control, electronic stability control systems, and wheel bearing diagnosis and repair. <i>2 pathways available: 12 or 13 courses, 780 or 1,065 contact hours, respectively</i></p>	Recommend	

TRANSPORTATION, DISTRIBUTION & LOGISTICS (*continued*)

Examination	Final Rec	Comment
MDHT Diesel Engine Repair Technician	Recommend	

**Description**

This is a fairly specialized examination that covers diagnosis, assembly, disassembly, reconditioning operations, and making major inspections and adjustments. The test also measures the ability to use technical manuals to diagnose problems and select the appropriate strategy to solve the problem. To do this, the examination tests the ability to trace the effects of a particular condition and to find the cause of the symptoms. The examination covers general engine diagnosis with respect to the cylinder head and valve train, engine block, lubrication and cooling systems, air induction and exhaust systems, the fuel system (mechanical and electrical), ignition and charging. *7 courses, 510 hours*

Examination	Final Rec	Comment
MDHT Drive Train Technician	Recommend	

**Description**

This is a specialized examination that covers diagnosis, assembly, disassembly, reconditioning operations, and making major inspections and adjustments. The test also measures the ability to use technical manuals to diagnose problems and select the appropriate strategy to solve the problem. To do this, the examination tests the ability to trace the effects of a particular condition and to find the cause of the symptoms. The examination covers diagnosis and selecting the proper repair solution for clutch, transmissions, drive shaft, universal joint and drive axle repair. *13 courses, 1,065 contact hours*

Examination	Final Rec	Comment
MDHT Electrical & Electronics Systems Technician	Recommend	

**Description**

This is a highly specialized examination requiring knowledge of electrical physics and mathematics. It covers diagnosis, assembly, disassembly, reconditioning operations, and making major inspections and adjustments. The examination also tests the ability to use technical manuals to diagnose problems and select the appropriate strategy to solve the problem. To do this, the examination tests the ability to trace the effects of a particular condition and to find the cause of the symptoms. The examination covers the diagnosis and selection of proper repair strategies and solutions in general electrical systems, battery technology, ignition and charging systems, lighting, gauges and warning devices. *3 pathways available: 7 to 13 courses, 510 to 1,065 contact hours*

Examination	Final Rec	Comment
MDHT Gasoline Engines Technician	Recommend	

**Description**

This examination covers diagnosis, assembly, disassembly, reconditioning operations, and making major inspections and adjustments. The examination also tests the ability to use technical manuals to diagnose problems and select the appropriate strategy to solve the problem. To do this, the examination tests the ability to trace the effects of a particular condition and to find the cause of the symptoms. The examination covers the diagnosis and understanding and selecting proper repair strategies and solutions for general engine repair, cylinder head and valve train, engine block, lubrication and cooling systems, fuel and exhaust systems, battery, ignition, charging systems, emissions and computerized engine controls. *15 courses, 705 hours*

Examination	Final Rec	Comment
MDHT Heating Ventilation, and AC Repair Technician	Recommend	

**Description**

This examination requires scientific understanding of temperature and pressure, the physics of heating and cooling, and the mathematics of proportion and simple equations. The areas covered include diagnosis, assembly, disassembly, reconditioning operations, and making major inspections and adjustments. The examination also tests the ability to use technical manuals to diagnose problems and select the appropriate strategy to solve the problem. To do this, the examination tests the ability to trace the effects of a particular condition and to find the cause of the symptoms. The examination covers the diagnosis and understanding and selecting proper repair strategies and solutions for general HVAC systems; AC systems and components; heating and engine cooling; operating systems and related controls; and refrigerant recovery, recycling, handling, and retrofitting. *12 courses, 780 contact hours*

TRANSPORTATION, DISTRIBUTION & LOGISTICS ( <i>continued</i> )		
Examination	Final Rec	Comment
MDHT Preventive Maintenance Technician	Recommend	
<b>Description</b>		
This comprehensive examination tests the ability to trace the effects of a particular condition and to find the cause of the symptoms of all vehicular systems. The examination covers problem diagnosis and selecting proper repair strategies and solutions for the complete engine system, instruments and controls, safety equipment, electrical and electronics systems, frame and chassis, brakes, tires and wheels, and suspension systems. The examination requires mathematics, the science of calibration and tolerances, and general physical science. <i>3 pathways available: 7 to 13 courses, 300 to 780 contact hours</i>		
Examination	Final Rec	Comment
MDHT Suspension & Steering Technician	Recommend	
<b>Description</b>		
The Suspension & Steering Technicians examination is composed of 50 questions taken over four hours and 15 minutes. The specialization test concerns the ability to use technical manuals to diagnose problems and select the appropriate strategy to solve the problem. To do this, the examination tests the ability to trace the effects of a particular condition and to find the cause of the symptoms. The examination covers the diagnosis of problems and selection of proper repair strategies for the suspension and steering systems, wheel alignment, wheels and tires and frame services. <i>2 pathways available: 12 to 13 courses, 780 to 1,065 hours, respectively</i>		
Examination	Final Rec	Comment
ATRA Transmission Certification Bundled Series	Recommend Bundle	
<b>Description</b>		
This certification is a bundled certification composed of ATRA Transmission Axle Rebuilder and Transmission R&R Installer certification exams. For a student to receive one credit, he or she must pass both certifications.		
Examination	Final Rec	Comment
ATRA Transmission Axle Rebuilder	Provisional	Content focus may be narrow; Requires more review; Bundle with ATRA Installer
<b>Description</b>		
The Transmission/Transaxle Rebuilder examination, one exam in a series of two exams, is composed of 30 questions based on ASE standards. This examination focuses on the diagnosis of electrical and hydraulic systems associated with transmissions and transaxle operation. There is an expectation that students will understand basic principles of electricity AC and DC current, including the science of cooling systems and their interaction with engine performance. Applicants will be required to determine the appropriate repair strategies, given information about operation difficulties; read metering devices; and calculate proper gear ratios, hydraulic and air pressure tolerances and formulas. <i>10 courses, 495 contact hours</i>		
Examination	Final Rec	Comment
ATRA Transmission R & R Installer	Provisional	Content focus may be narrow; Requires more review; Bundle with Axle Rebuilder
<b>Description</b>		
The Transmission/Transaxle R&R Installer examination, one exam in a series of two exams, is composed of 30 questions based on ASE standards. This examination focuses on the diagnosis of electrical and hydraulic systems associated with transmissions and transaxle operation. There is an expectation that students will understand basic principles of electricity AC and DC current, including the science of cooling systems and their interaction with engine performance. Applicants will be required to determine the appropriate repair strategies, given information about operation difficulties; read metering devices; and calculate proper gear ratios, hydraulic and air pressure tolerances and formulas. <i>10 courses, 495 contact hours</i>		

TRANSPORTATION, DISTRIBUTION & LOGISTICS (*continued*)

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
NATEF Automatic Transmission Transaxle	Provisional	Needs endorsement; Focused on student success completing the curriculum, rather than an industry certification

**Description**

This exam is based on the content learned in the prescribed curriculum provided to the school and is composed of 40 to 50 questions “pathway” that can lead to an ASE industry certification in the specialty area. The test (one of a series of eight examinations) includes a combination of theory and vehicle service related questions. These tests are appropriate for students who have nearly completed an individual automotive training course or who are preparing to graduate from a technician-training program. *10 courses, 495 contact hours*

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
NATEF Brakes Technician	Provisional	Needs endorsement; Focused on student success completing the curriculum, rather than an industry certification

**Description**

This exam is based on the content learned in the prescribed curriculum provided to the school and is composed of 40 to 50 questions over a 120-minute period (recommended in two 60-minute intervals). Passing this examination is considered a “pathway” that can lead to an ASE industry certification in the specialty area. The test (one of a series of eight examinations) includes a combination of theory and vehicle service related questions. These tests are appropriate for students who have nearly completed an individual automotive training course or who are preparing to graduate from a technician-training program. *2 pathways available: 10 or 19 courses, 465 or 915 hours, respectively*

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
NATEF Electrical Electronics Systems	Provisional	Needs endorsement; Focused on student success completing the curriculum, rather than an industry certification

**Description**

This exam is based on the content learned in the prescribed curriculum provided to the school and is composed of 40 to 50 questions over a 120-minute period (recommended in two 60-minute intervals). Passing this examination is considered a “pathway” that can lead to an ASE industry certification in the specialty area. The test (one of a series of eight examinations) includes a combination of theory and vehicle service related questions. These tests are appropriate for students who have nearly completed an individual automotive training course or who are preparing to graduate from a technician-training program. *10 courses, 630 contact hours*

<b>Examination</b>	<b>Final Rec</b>	<b>Comment</b>
NATEF Engine Performance	Provisional	Needs endorsement; Focused on student success completing the curriculum, rather than an industry certification

**Description**

This exam is based on the content learned in the prescribed curriculum provided to the school and is composed of 40 to 50 questions over a 120-minute period (recommended in two 60-minute intervals). Passing this examination is considered a “pathway” that can lead to an ASE industry certification in the specialty area. The test (one of a series of eight examinations) includes a combination of theory and vehicle service related questions. These tests are appropriate for students who have nearly completed an individual automotive training course or who are preparing to graduate from a technician-training program. *2 pathways available: 10 or 19 courses, 630 or 915 contact hours, respectively*

TRANSPORTATION, DISTRIBUTION & LOGISTICS (*continued*)

Examination	Final Rec	Comment
NATEF Engine Repair	Provisional	Needs endorsement; Focused on student success completing the curriculum, rather than an industry certification

**Description**

This exam is based on the content learned in the prescribed curriculum provided to the school and is composed of 40 to 50 questions over a 120-minute period (recommended in two 60-minute intervals). Passing this examination is considered a “pathway” that can lead to an ASE industry certification in the specialty area. The test (one of a series of eight examinations) includes a combination of theory and vehicle service related questions. These tests are appropriate for students who have nearly completed an individual automotive training course or who are preparing to graduate from a technician-training program. *15 courses, 705 contact hours*

Examination	Final Rec	Comment
NATEF Heating, Air Conditioning Tech	Provisional	Needs endorsement; Focused on student success completing the curriculum, rather than an industry certification

**Description**

This exam is based on the content learned in the prescribed curriculum provided to the school and is composed of 40 to 50 questions over a 120-minute period (recommended in two 60-minute intervals). Passing this examination is considered a “pathway” that can lead to an ASE industry certification in the specialty area. The test (one of a series of eight examinations) includes a combination of theory and vehicle service related questions. These tests are appropriate for students who have nearly completed an individual automotive training course or who are preparing to graduate from a technician-training program. *8 courses, 420 contact hours*

Examination	Final Rec	Comment
NATEF Manual Drive Train Axles Tech	Provisional	Needs endorsement; Focused on student success completing the curriculum, rather than an industry certification

**Description**

This exam is based on the content learned in the prescribed curriculum provided to the school and is composed of 40 to 50 questions over a 120-minute period (recommended in two 60-minute intervals). Passing this examination is considered a “pathway” that can lead to an ASE industry certification in the specialty area. The test (one of a series of eight examinations) includes a combination of theory and vehicle service related questions. These tests are appropriate for students who have nearly completed an individual automotive training course or who are preparing to graduate from a technician-training program. *15 courses, 705 contact hours*

Examination	Final Rec	Comment
NATEF Suspension, Steering Technology	Provisional	Needs endorsement; Focused on student success completing the curriculum, rather than an industry certification

**Description**

This exam is based on the content learned in the prescribed curriculum provided to the school and is composed of 40 to 50 questions over a 120-minute period (recommended in two 60-minute intervals). Passing this examination is considered a “pathway” that can lead to an ASE industry certification in the specialty area. The test (one of a series of eight examinations) includes a combination of theory and vehicle service related questions. These tests are appropriate for students who have nearly completed an individual automotive training course or who are preparing to graduate from a technician-training program. *3 pathways available: 7 to 19 courses, 345 to 915 contact hours*

