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**CULINARY PROFESSIONAL TRAINING: MEASUREMENT OF NUTRITION  
KNOWLEDGE AMONG CULINARY STUDENTS ENROLLED IN A  
SOUTHEASTERN CULINARY ARTS INSTITUTE**

**Marilyn Hill Hughes**

**A Dissertation submitted to  
The Graduate Faculty of  
Auburn University  
In Partial Fulfillments of the  
Requirements for the  
Degree of  
Doctor of Philosophy**

**Auburn, Alabama**

**May 10, 2003**

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SOUTHEASTERN CULINARY ARTS INSTITUTE**

Except where reference is made to the work of others, the work described in this dissertation is my own or was done in collaboration with my advisory committee.



Marilyn Hill Hughes

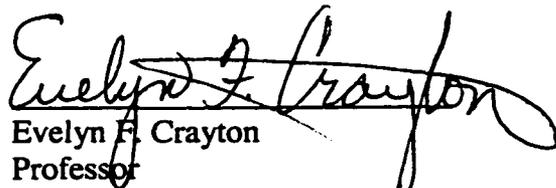
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**DISSERTATION ABSTRACT**  
**CULINARY PROFESSIONAL TRAINING: MEASUREMENT OF NUTRITION**  
**KNOWLEDGE AMONG CULINARY STUDENTS ENROLLED IN A**  
**SOUTHEASTERN CULINARY ARTS INSTITUTE**

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**Doctor of Philosophy, May 10, 2003**  
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**157 Typed Pages**

**Directed by Susan S. Hubbard**

**Nutrition training for culinary students has moved to the forefront as one of the more critical elements of the curriculum for chefs. In today's market, chefs are expected to be highly skilled in the preparation of appetizing meals that also meet current nutrition and health concerns (Baskette & Mainella, 1992).**

**This study investigated nutrition training as a part of the Culinary Arts curriculum in the Culinary Arts Department at the Art Institute of Atlanta. During culinary training for chefs, nutrition is a required course for certification through the National Restaurant Association (NRA) and the American Culinary Federation (ACF). Determining the value of this course will be of benefit in developing more advanced nutrition curriculum for culinary students in understanding the dietary needs of their customers.**

Americans are continuing to consume the majority of their meals away from home. According to the NRA annual trends report for 2001, 46% of the average American's household food budget is spent on eating out, with an expected increase to 53% in 2010. Also, 399 billion dollars was spent on eating out during 2001, while an expected 599 billion dollars are projected to be spent in 2010 (NRA, 2001).

Within the food industry, chefs are key culinary professionals in the commercial food service arena. These professional chefs are the vanguard of the restaurant industry responsible for developing, creating, and producing the foods being consumed (Kent, 1985). Their knowledge and attitudes toward the importance of good nutrition is a critical element to customers who consume meals on a regular basis in commercial eating establishments.

The culinary professional is faced with the challenges of understanding customers' dietary needs, modifying current food preparation practices relating to nutritional values of foods and implementation of healthful nutrition education messages through meal preparation. The extensive knowledge required to meet these challenges are included on the NRA nutrition examination. Results of this study indicate there is a relationship between enrollment in a nutrition course and improvement of scores on the NRA nutrition examination.

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## CHAPTER 1

### INTRODUCTION

With more and more people desiring to eat healthy foods and maintain a well balanced diet, a thorough understanding of nutrition has become increasingly vital for today's culinary arts and foodservice professionals. In a (2000) Nutritional Menuing survey of 499 operators by Food Service Director, 76 percent of operators expected their sales of and profits from nutritious entrees, snacks, and beverages to grow. Also, the percentage of operators promoting healthy selections on the menus grew from 84 to 90 percent. A solid foundation in foods and cooking is necessary in order to prepare healthy menus and recipes. Developing healthy entrees requires nutritional knowledge to select healthy ingredients, cooking techniques and methods. Training culinary staff to prepare healthy dishes correctly can be challenging. As managers have found during nutrient-content analysis, chefs do not always prepare recipes exactly as directed.

Healthy menu items often are more labor-intensive, and more training is needed. In most cases, culinary staff need training not only in making new menu items but also in understanding the importance of following recipes and serving the correct portion size (Drummond & Brefere, 2001).

Advancing healthy food production is a timely issue because according to the Department of Labor within the food industry, 5.3 million people are currently employed in the commercial food service arena. The culinary professionals in the restaurant industry are chefs who are developing, creating, and producing the foods being consumed

(Kent, 1985). The culinary professional is faced with the challenges of understanding consumers' dietary needs, modifying current food preparation practices relating to nutritional values of foods and the implementation of health messages through meal preparation. Culinary professionals will need a foundation in nutrition in order to be successful in today's food and beverage operations, (Drummond & Brefere, 2001). This study will seek to investigate the effect of nutrition training for culinary students.

This study discusses the benefits of including nutrition training as part of the culinary arts curriculum. Chapter One is an introduction to the study. This Chapter includes the following: (1) introduction, (2) statement of the problem, (3) purpose of the study, (4) research objectives, (5) definition of terms, and (6) limitations of the study.

Chapter Two is a review of literature relevant to this study. The literature addresses previous research in the culinary industry in the areas of: chef training, nutrition training, chef responsibilities, and career opportunities.

Chapter Three presents the methods and an explanation of the data collection procedures used in this study. It presents theoretical findings for the problem and addresses the following research questions and hypotheses in the study which include:

(1) Following formalized training in nutrition, will culinary students score significantly different on the post-test than on the pre-test as measured by the National Restaurant Association examination?

(2) Is there a significant relationship between pre-course scores, as measured by the NRA examination, of culinary students enrolled in a nutrition course for chefs and the pre-course scores of culinary students who have not enrolled in a nutrition course for chefs?

**(3) Is there a significant relationship between the post-course scores, as measured by the NRA examination, of culinary students who have completed a nutrition course for chefs and the post-course scores of culinary students who have not completed a nutrition course for chefs?**

**(4) Will culinary students, who have not completed a formal training course in nutrition, score significantly different on the post-test than on the pre-test as measured by the NRA examination?**

**Chapter Four discusses the results of the data collection and analysis. Also, this chapter addresses the following two objectives of the study: (1) to measure pre-course and post-course scores among the study population; (2) and to determine the relationship between culinary students enrolled in a nutrition course and participants who had never been enrolled in a nutrition course.**

**Chapter Five summarizes the findings and implications and develops conclusions and recommendations for further research and practice.**

### **Statement of the Problem**

**More Americans increasingly understand the connection between the food they consume and their health. Four of the top seven leading causes of death: heart disease, cancer, stroke and diabetes are affected by diet. According to a 1998 study by the International Food Information Council, three-quarters of consumers were able to name a specific food they believe enhances health. In addition, 75 percent said they changed their diets in the past five years for health reasons (Gardyn, 2002). Moreover, health statistics indicate an increased incidence of chronic diseases relevant to food consumption by adults who consume two or more meals per week in a commercial establishment (Palmer & Leontos, 1995).**

**The restaurant industry is paying particularly close attention to nutrition preferences of consumers. These consumers needs include inquiring about the calories, fat, sodium and even the nutritional composition of menu items. Restaurants may eventually offer menus tailored to health profiles. Effective nutrition courses are needed to give culinary students appropriate skills in preparing healthy menu items. It is only through these courses that soon-to-be professionals will be able to have the knowledge necessary to meet the consumers' health concerns in the food service environment. The level of nutrition knowledge gained by culinary students has intrinsic importance in the development of training curriculums for Culinary Arts degree programs in this country (Gardyn, 2002).**

## **Purpose of Study**

**Determining the most effective nutrition programs for the culinary students will contribute to alleviating consumers' health concerns about meals consumed in restaurants in the food service industry. Americans are continuing to consume the majority of their meals away from home. Recent reports indicate that nearly 50% of the American population is overweight (French, Story, & Jeffery, 2001).**

**This study examined the effect of a formal nutritional training course on the nutrition knowledge of culinary students enrolled in the Culinary Arts Department at The Art Institute of Atlanta. Knowledge assessment was attained through a survey instrument for pre and post testing. The survey instrument was a multiple-choice examination that was developed and validated by the NRA (Appendix C). This examination is a part of a series of tests, which lead to a Certified Chef credential through the NRA. It was given prior to and upon completion of didactic instruction in the basic nutrition course for culinary students. Furthermore, this study has the potential to lend perspective in determining the benefits of a nutrition course for culinary students.**

## **Research Questions and Hypotheses Investigated**

**A correlation research design was used to investigate the research questions and test the hypotheses in this study. Four research questions were investigated:**

- 1. Is there a significant relationship between pre-course scores, as measured by the NRA examination, of culinary students enrolled in a nutrition course for chefs and the pre-course scores of culinary students who have not enrolled in a nutrition course for chefs?**

2. Will culinary students, who have not completed a formal training course in nutrition, score significantly different on the post-test than on the pre-test as measured by the NRA examination?
3. Following formalized training in nutrition, will culinary students score significantly different on the post-test than on the pre-test as measured by the NRA examination?
4. Will culinary students, who have not completed a formal training course in nutrition, score significantly different on the post-test than on the pre-test as measured by the NRA examination?

Four null hypotheses were formulated from the research questions and tested in this study. The four null hypotheses were:

**H<sub>0</sub> 1:** There is no statistically significant difference between the pre-course scores, as measured by the NRA examination, of culinary students enrolled in a nutrition course for chefs and the pre-course scores of culinary students who have not enrolled in a nutrition course for chefs.

**H<sub>0</sub> 2:** There is no significant difference between the post-course scores, as measured by the NRA examination, of culinary students, who have completed a nutrition course for chefs and the post-course scores of culinary students who have not completed a nutrition course for chefs.

**HØ 3: There is no significant difference in the pre-course scores and the post-course scores of culinary students who enrolled and completed the nutrition course for chefs.**

**HØ 4: There is no significant difference in the pre-course scores and the post-course scores of culinary students who did not enroll and complete the nutrition course for chefs.**

**This study provides results which will contribute to culinary training for students preparing to become certified chefs in this industry.**

## Terms and Definitions

The following terms are used in this study:

**Apprentice chef** – assistant cook who has been given cooking assignments in a specialty area such as fry cook, sauce cook or vegetable cook.

**Caterers** – individuals who prepare meals for contracted special events.

**Certified Chef** – a chef who has completed an approved culinary education program and completed formal certification assessments in nutrition, sanitation and management.

**Culinary Arts program** – academic program that allows the student to master cooking skills and restaurant management through a two-year associate degree or four year bachelor's degree.

**Culinary students** - students enrolled in a post secondary education program in the study of culinary arts.

**Executive chef** - professional cook who is the first in command in the kitchen. This individual is responsible for managing, training and scheduling all kitchen staff, planning menus, determining the size of servings, and purchasing food and supplies.

**Flavor Profile** – identifiable or distinctive characteristics used to give food or drink a unique taste and smell.

**Garde Manger** – mastery of culinary skills in preparation of garnishes.

**Pastry chef** – a chef who has received specialized training in bakery skills.

**Personal chef** – a new career path that allows the chef to work for individual clients. This chef must plan the menus, shop for food and supplies and prepare the meals in the clients' home.

**Sous chef** – the chef who is second in command in larger kitchens.

### Limitations of the Study

In the matter of limitations of this study, considerations should be given to findings which may lack generalizability. The concerns addressed are the nature and size of the sample, the uniqueness of the setting, the time period during which the study was conducted and the study methods selected. Several limitations were identified as inherent to this study. The study participants were limited to high school graduates, aged 18 to 55 years old who were enrolled as culinary students in an accredited Culinary Art Institute in an urban southern city. All study participants were seeking an Associate Arts degree in Culinary Arts.

Data were derived from a convenience sample based on current enrollment or non-enrollment in a nutrition course at the culinary school. Thus, the study results may not be representative of the nutrition knowledge of culinary students in culinary schools in other settings.

The reliability of the instrument strengthens the internal validity of the study. As indicated by coefficient alphas obtained on the scale (Carmines & Zeller, 1979), the outcome results seem to reflect the reliability of the six domains included in the examination. However, this study relied on examination scores, therefore there was no direct observation of the application of the knowledge and practice. The outcome results could be strengthened with the addition of direct observation measures.

## CHAPTER 2

### LITERATURE REVIEW

#### Chef Training

Historically, the kitchen trade meant endless toil under imperious chefs who rarely shared their culinary secrets. But the institution of the culinary school has given those individuals seeking success in the restaurant and/or food service industry a solid base of skills that would have taken years to amass. Culinary schools have not just improved the quality of the labor pool, they have made cooking a profession in the eyes of the public. Curriculum was developed at The Cornell University Hotel School in 1922 when the program opened for enrollment in culinary arts. However, it was not until 1946 that the first residential culinary college, the Culinary Institute of America, came into existence.

It has been a slow but steady build since then, with Johnson and Wales University inaugurating its culinary program in 1973 and the California Culinary Academy opening its doors in 1977. Countless other schools on the local level have instituted cooking curricula along the way. Today, there are over 500 culinary programs in the United States that continue to improve the knowledge and skills of traditional restaurant employees (Durocher, 2001).

Significant changes in training approaches have occurred over the past twenty years. One such change occurred when the National Consortium of Competency Based Education (1973) changed the instructional focus from occupational to competency based. This transition in training requirements of the chef began to attract people who had

completed secondary and postsecondary degrees . With higher standards of education and a systematic approach to training, chefs are now recognized as a category of professionals by the U.S. Department of Education and the U.S. Department of Labor (VanLandingham, 1995a).

In 1976 the U.S. Department of Labor changed the status of cooks and chefs from domestic workers to professional culinary artists. This designation has helped to bring about a heightened awareness of the need to better train culinary professionals. Additionally, the many advances in food technology have increased the need to educate chefs even further.

The modern evolution in vocational culinary education has prompted the development of new programs. Formerly, most post-secondary culinary programs were two years, offering an associate degree. Johnson and Wales University began the first four-year Bachelor of Science degree in culinary arts of its kind in this country (VanLandingham, 1994). Other culinary schools, such as The Culinary Institute of America and the New England Culinary Institute have also developed four-year programs during the past decade (Livingston, 2000). The Culinary Institute of America (CIA) has become a training ground for aspiring chefs. This nationally renowned training organization leads the industry in its practices, philosophies and techniques for training chefs as team leaders (Zemke, 1997).

The United States is regarded as the leader in the field of culinary arts due to the development of vocational facilities, progress in the areas of food science and agricultural methods. Additionally, the industry has benefited from more refined techniques for professional training. The use of the competency-based curriculum is the most common tool used to assess the culinary student's capabilities (VanLandingham, 1995b).

To help ensure that today's American chefs stay in the forefront of the food industry, The American Culinary Federation (ACF) has assumed the leadership as the credentialing authority for programs training chefs. The ACF is a national organization whose mission is to promote career education and enhance the profession of cooks and chefs. It has proved to be the most effective organization in lobbying for the culinary profession (Ridge, 2001). In 1973, competency based career guidelines and standards were developed by the Educational Institute of the ACF for use in two-year colleges. The required knowledge and competencies for the ACF approved Culinary Arts programs are focused on a competency based system maintained by the Accrediting Commission for the ACF (American Culinary Federation, Inc., 2001). The required knowledge and competencies are available in Appendix E. This system is comprised of five components, which include:

- job titles competencies
- organized learning activities
- the organization of learning resources
- testing and evaluation of competency attainment and
- organized record keeping

The utilization of these components has provided a uniform curriculum base for use by all culinary programs in this country (Ridge, 2001).

Aggressive marketing by schools, colleges, and the industry, as well as the increasing celebrity status of many chefs, also have helped increase enrollment in hospitality and foodservice programs. Not only is enrollment rising, but also so are the number of culinary schools and programs in which students can choose to enroll.

Many people in the industry who have worked in the industry for some time are precluded from top management positions because they lack the educational experience. The complexity of the culinary industry has boosted the employment rates among college hospitality program graduates (Berta, 2002).

Attracting, training and retaining quality employees are some of the biggest challenges in the foodservice industry. The high cost, of recruiting and training new employees, is paramount in this industry due to the high turnover rate of staff. Today such training is becoming even more important as the industry and its customer base continue to expand on a global basis. Increasingly, customers demand not only more interesting, authentic and ethnic foods, but also have expectations that the culinary staff be able to educate them about taste, and provide respectful professional service (Ridge, 2001).

According to a study conducted by the American Dietetic Association, if customers do not feel they are getting their money's worth, it is fairly easy for them to take their business elsewhere. In summary, training benefits all parties involved, the employee, the company and most of all the customer (Palmer and Leontos, 1995).

More and more, Americans are beginning to understand the connection between the food they consume and their health. Four of the top seven leading causes of death- heart

disease, cancer, stroke and stroke and diabetes are directly affected by diet. According to a study by the International Food Information Council conducted in 1998, three-quarters of consumers were able to name a specific food or component they believe to enhance health. In addition, 75% of these consumers stated they changed their diets in the past five years for health reasons (Gardyn, 2002).

Furthermore, the study indicated that approximately 88% of consumers say they have become more conscious about what they eat, and 66 % say they worry more about their health, as they get older. The restaurant industry is paying particularly close attention to the preferences of older boomers (aged 45-55 years-olds), since they spend over \$2,600 on food away from home each year - more than any other group, according to the 2000 Bureau of Labor Statistics' Consumer Expenditure Survey (Gardyn, 2002).

Since Americans eat approximately three meals a week away from home, an excellent way of educating large numbers of people about healthy food choices is through restaurants (Gardyn, 2002). Furthermore, studies found that highlighting low fat/low cholesterol entrees and providing nutritional information in cafeterias stimulated significant increases in the selection of healthy foods because of the presence of labeled menu items (Colby et al., 1987).

Sneed and Burkhalter (1991) examined the attitudes toward nutrition, nutrition marketing practices and the relationship between attitudes toward nutrition training practices in restaurants. Their study indicated that consumers appear to bring nutritional expectations to the marketplace when they eat out. An additional survey found that 40% of restaurant consumers changed their eating habits to reflect their nutritional concerns. In 1989, a survey indicated that 42% of adult respondents had tried or were likely to try

restaurants that offer healthy choices (NRA, 1986). In a 1988 NRA/Gallop survey, 59% of participants said they were very interested in menu items for nutrition conscious consumers (NRA, 1990).

Furthermore, the 1987 Tastes of America survey indicated that consumers were looking for restaurants that offered foods that are low in sodium, fat, cholesterol, and calories. Restaurants are responding to consumers' increased interest in nutrition and fitness. This study also indicated that future restaurant trends predicted that nutritional concerns would be critical to menu development in all types of foodservice operations (NRA, 1988). Nevertheless, although nutrition is becoming more important in restaurants, little is known about restaurateurs' attitudes toward nutrition or about how their attitudes toward nutrition affect their menu planning decisions (Sneed & Burkhalter, 1991).

Albright, Flora, and Fortmann (1990) examined changes in sales of low fat/low cholesterol foods targeted in a restaurant menu-labeling program. The findings suggested that restaurants are part of environmental strategies to encourage dietary changes in the general population of restaurant patrons.

Over 85% of the entrees offered by the restaurants enrolled in this menu labeling program did not qualify as low in fat and cholesterol. However, the purpose of the heart healthy menu labels was well understood with over 60% of the patrons correctly identifying the entrees as low in fat and cholesterol or good for heart health. About one-fourth of the patrons reported selecting a labeled entrée. Again, these selections were similar amid all restaurant categories (Albright, Flora, & Fortman, 1990).

Increasing the proportion of healthy menu items that are available at restaurants would provide customers with an increased awareness of low fat/low cholesterol foods, reinforce the importance of eating these foods, and increase the probability of their selecting healthy foods (Albright et al, 1990). Even in fitness minded communities and environments such as health clubs, dishes low in fat and high in fiber are rarely selected if flavor is ignored. Many customers do not associate good taste with healthy menu items. Restaurants that emphasize the dishes' flavors with bold spice levels appear most appealing to customers (Dulen, 1998). Consequently, ingredients of the highest quality are necessary to continuously change and update menu items to meet customer's demand for healthy and tasty menu choice (Siguaw, J & Enz, C, 1999). Success with healthful menus requires commitment and persistence to obtain great flavor (Dulen, 1998).

The challenge of having the ability to intertwine the basics of nutrition with the art of food preparation are the key professional skills needed by today's chef. The result is a tasty and nutritious cuisine selection for a health conscious consumer. Both the dietitian and the chef are professionals that have this unique food service skill set.

During the past decade, culinary schools have employed registered dietitians to guide the education and training of culinary students. The dietitian can provide the chef with the science that helps to alter the tendency to cook with higher fat items and teach the chef the value of using flavor profiles and cooking techniques necessary for healthy menu choices (Bunce, 2001). Taste buds of baby boomer consumers are dulling, which is a reality that the food industry experts say is a key factor driving the future of food in this country.

The future adults of this world have palates that are so much more diverse and sophisticated than any other generation. The growing ethnic diversity in the United States population, as well as increased international travel and exposure to TV chefs have highlighted the various types of regional food in the restaurant industry.

Although one of the oldest flavour development techniques, Flavour Profile Method (FPM) is still used frequently in recipe development in the foodservice industry. The FPM was developed in the late 1940s, which was the first reported descriptive method. FPM was developed to complement existing formal and informal sensory techniques for the expanding food industry. FPM is a consensus technique, with vocabulary development and flavour rating sessions carried out during group discussions with panel members, to consider aspects of the overall flavour and the detectable flavour components of foods. FPM uses a panel of four to six judges, who are trained to precisely define the flavours of the product category in a 2-3 week period.

The expertise of the panel is critical to effective and productive flavor profile, therefore the selection criteria for the FPM panel are particularly rigorous. The panel is exposed to a wide range of samples in a selected product category during training. This process allows panelists to review and refine the flavour vocabulary. Term definition and reference standard selection also occur during the training and the temporal order of attributes is recorded (Murray, 2001).

The most recognized regional flavor profiles are distinctive ethnic flavor profiles. These distinctive flavor profiles are the result of combinations of spices, herbs and aromatic ingredients. The most common profiles are Caribbean, Chinese, Indian, Mediterranean, Mexican, Middle East, North African, Northern Europe and Thai.

The spices, herbs and aromatic ingredients included in these profiles are as follows:

- Caribbean: nutmeg, ginger and allspice, chiles, ginger, and garlic
- Chinese: star anise, Sichuan peppercorns, fennel seeds, cloves, cinnamon, garlic, ginger, scallions, and soy sauce.
- Indian: cardamom, cinnamon, cloves, coriander, cumin, fennel, mustard, and turmeric
- Mediterranean: black pepper, fennel seed, mustard, cayenne, saffron, anchovies, basil, garlic, olive oil and parsley
- Mexican: cumin, coriander, cinnamon, cayenne, black pepper, chiles, oregano and cilantro
- Middle East : allspice, cloves, cinnamon, cumin, garlic, mint, parsley and tahini
- Northern African: cumin, saffron, paprika, turmeric, black pepper, cinnamon and ginger
- Northern Europe: caraway, cardamom, cinnamon, dill, mustard, nutmeg, bay leaf, thyme, and tarragon
- Thai: cumin, star anise, turmeric, chiles, basil, cilantro, lemongrass and fish sauce

According to chefs who have mastered the skills in healthy meal preparation, “Healthy cooking is not so different from regular cooking but it is more complicated ” (Blake, 2001, p. 30). Success with healthy menus requires commitment and persistence to flavor while reducing fat and increasing fiber in menu ideas. Even in fitness minded communities and environments such as hospitals and health clubs, menu items low in fat and high in fiber can be commonly ignored unless bold flavor profiles are used as recipe ingredients.

Many health conscious customers are not willing to sacrifice flavor for bland nutritious menu items. Marketing menu items as healthy can limit their expectation of good taste by customers. Healthy food in restaurants is commonly viewed as bland and lacking variety. Healthy choices in foodservice are not limited to the salad bar. Now the emphasis is on fresh fish and bold flavors from ingredients such as chiles, lime juice and fresh fruit and vegetables. Also, half portions of regular menu items have become a success in meeting the dietary needs of customers (Dulen, 1998). Chain restaurants traditionally have struggled with lean options on their menus. Many of these restaurant operators feature at least one reduced-fat item. While not bound to limits on fat grams or calories, the items are lighter than their regular menu counterparts.

FPM marketing efforts are commonly focused on the reasons people choose lighter foods. However, women appear more receptive to healthy foods than men. Older customers appear uninterested in reduced-fat foods, despite the notion that aging baby boomers want to consume more healthy food, as they grow older. Lunch appears to be the most popular meal for healthier menus. Weaving low-fat items throughout a traditional menu without mention of nutrition has been effective when the restaurant emphasizes the dishes' flavors with bold spice levels (Dulen, 1998).

Several attempts have been made to influence the consumer's choice of foods in restaurants. The Minnesota Heart Health Program (MHHP) developed a menu-labeling program in 15 local restaurants. This program was well received by restaurant owners. Study results indicated that restaurant patrons selected healthful specials when the message noted on the menu choice was healthful but emphasized flavor.

Patrons were apparently more open to information about the palatability of the food than its healthfulness. The findings of this study concluded that the appeal of menu items was enhanced by a message that focused primarily on flavor, and notes as an afterthought that the choice is also healthful (Colby, Elder, Peterson, Knisley & Carleton, 1987). Because chefs are taught in classical cooking to rely on fat to balance flavors, the modification of fat is the major adjustment to gaining skills in healthy cooking (Blake, 2001). Furthermore, chefs do not want to sacrifice taste for dietary modification, therefore there is a need for skills in developing healthy enticing recipes for customers concerned with nutrition (Bellamy, 1992).

Knowledge gained through nutrition courses may be one of the most critical attributes needed by chefs who are successful in responding to the changing needs of the customer while maintaining culinary passion (Siguaw & Enz, 1999). Chefs can obtain training through numerous avenues, however the most recognized professional training association is the American Culinary Federation (ACF). The ACF is the largest and oldest organization dedicated to professional chefs in the United States. The ACF has more than 25,000 members and 300 individual chapters and the ACF runs the only comprehensive certification program for chefs.

A study was conducted to measure the culinary skills and the sequence in which these skills were comprehended by chefs. The study findings indicated that formally educated chefs have a better foundation than their counterparts in the dominance of the chef labor market. These conclusions offered a way of auditing skill levels in the labor market in relationship to the chef's culinary skills attained through education, continuing education training and experience. (Bradford, Sellah, & Riley, 1994).

However, the opportunity to gain valuable educational and internship experience is difficult because of the enormous financial debt and the small labor pool of chefs with extensive training. Thus, the foodservice industry continues to employ cooks who lack critical skills and experience in order to maintain staffing needs.

The ACF has continued to support employment of well-trained professionals in the kitchen versus non-trained employees. Their certifications are based on a rigorous evaluation of industry experience, professional education and thorough testing.

For individuals pursuing professional training in this industry, the ACF provides a broad range of certification awards from the certified culinarian to the prestigious certified master chef (Ridge, 2001).

Marriott Hotels has led the hotel and restaurant industry with its professional skills development initiative for chefs. Marriott is requiring all executive chefs of full-service domestic hotels to earn an ACF certification as an industry measure of work experience and education. This initiative is an important aspect of an employee motivation and recognition program. The program includes company sponsored awards such as Chef of the Year and the Award of Culinary Excellence given annually to Marriott chefs. Furthermore, the award program recognizes superior culinary achievement, creativity and personal development (Scarpa, 2000).

Rhea (1994) stated that too many restaurants hire people with no formal training and then expect them to train the rest of the kitchen staff. According to Sheridan (1999), most culinary students are more familiar with production cooking or sanitation than with ice carving or fine dining. "The tight labor market and enormous student financial debt often cause chefs to hire cooks who lack critical skills and experience"

(Sheridan, 1999, p. 58). This trend does not allow for adequate culinary education in evaluating recipes and improving the taste of food.

According to the NRA, the leading topics for training should be nutrition, sanitation, presentation and service to improve restaurant operations (Riehle, 2001). If well-trained professionals are hired the productivity efficiencies will be realized which will lead the restaurant to increase solid sales and profit.

Continuing education is also needed for chefs to sustain the quality of the culinary industry. The cost of providing such training should be accepted as the cost of doing business and as a career saving skill (Perlik, 2001). This training should be ongoing and not limited to three-day workshops or seminars (King, 1998).

In recent years, continuing education for chefs has resulted in the introduction of a global cuisine in the American consumer market. Furthermore, the introduction of international flavour profiles has caused a revamping of the definition of the American cuisine. The extensive use of herbs and spices used in this melting pot cuisine has enhanced the application of nutritional expertise by chefs as they continue to meet consumer demands (Yee, 2001).

### **Chef's Responsibilities**

The functions of the modern chef have widened considerably. In addition to being a highly skilled culinarian, the chef must serve as a supervisor, trainer, coach, and manager. In short, the chef is a front line leader with a major role to play in the development of the foodservice establishment (Cullen, 2000).

The job of a chef is physically demanding. These individuals stand on their feet in hot kitchens for long hours. Comfortable shoes are a must, and chefs commonly wear support

stockings. Besides physical strength and the willingness to put up with minor physical problems like chapped hands, burns, and cuts, chefs must have good management skills. They must also be able to work under pressure and overlook the irritability of other team members. Restaurant cooking is a team activity with many players necessary to fulfill customer needs. When successful recruitment of qualified culinary staff occurs, Goldstein (1998) reported “there is an alarming trend to give free reign to creativity above knowledge and skill” (p. 112). Successful chefs create a foundation of culinary excellence through dealing with more than just cost but also how culinary techniques affect taste and consistency while staying in tune with the market’s demands (Pond, 2000). It is no longer sufficient for a chef just to be able to prepare delicious food that is beautifully presented. “He or she has to understand how to turn a profit, how to manage and retain employees and how to be competitive” (Perlik, 2001, p. 39).

In this country, 43% of all food dollars are spent on meals outside the home. Weekdays, lunch is eaten out by 30% of all adults and dinner by 24%. The data supports the perception that restaurant excursions are no longer a splurge (Kurtzweil, 1997). A strong economy will keep this industry vibrant if consumers continue to dine out. “It is a challenge to stay ahead of consumer expectations in all areas because options of where and how people dine out will proliferate as never before” (Trotter, Benedetti & Anderson, 2000, p.50).

Customers have gained a new appreciation of how vital a variety of food is to good health. There will be more emphasis on natural, organic products and more ethnic influences will be incorporated into all levels of dining (Schrambling, 1992). This customer demand requires a higher degree of culinary skills to execute a cuisine that is

not overcooked, highly salted or rich in butter and high fat sauces (Baskette & Mainella 1992). According to Trotter et al (2000), in the very near future, the lines between different types of cuisine will soften and the type of restaurant will be associated more with the chef's style than with a specific cuisine.

According to The National Restaurant Association (1989), the primary influences and circumstances for dining out were identified as the following:

- **Having a fun time:** The consumer wants to go out for a treat, reward or celebration.
- **Having a nice meal out:** The decision is motivated by the expectations of good food, quality service, hearty portions and exceptional value.
- **Satisfying a craving:** This is the most impulsive decision, which can be triggered by the aroma or sight of a food.
- **Making sure everyone has something to eat:** The family group with fragmented schedules and preferences makes this decision on the basis of convenience and the ability of the restaurant to meet various needs.
- **Doing the easy thing:** Convenience and speed of service are critical to attract this group.

The chef has a dual role in the presentation of nutritional choices: first, in the construction of the menu through a variety of items, and in the design of the recipes and second, in the training of the staff that will ultimately produce and serve the food. Both roles can be guided by an understanding of basic nutritional guidelines and aided by simple culinary substitutions that can transform traditional recipes into formulas for good nutrition (Baskette & Mainella, 1992).

## Nutrition Training

An industry study of future restaurant trends predicted that nutritional concerns would be critical to menu development in all types of foodservice operations. Nevertheless, culinary skills and attitudes of chefs in nutrition will affect their menu planning decisions (Sneed & Burkhalter, 1991).

The National Restaurant Association Education Foundation's Professional Management Development Program has undertaken the leadership as the credentialing agency for the provision of a standardized nutrition examination used to provide certification to all chefs trained in this country. This organization is designed to provide foodservice students and professionals with a solid foundation of practical knowledge competencies for use in the restaurant industry. This credentialing agency requires enrollment and completion of a nutrition course offered by an accredited culinary school prior to completion of the nutrition certification examination.

This nutrition course covers many aspects of nutrition as it applies to the foodservice industry. Also, the course introduces the basic elements of nutrition, discusses nutritional menu planning and healthy recipe development, and describes marketing nutrition in the industry. The course consists of six lessons with specific objectives to meet the competencies measured by the NRA examination. The objectives indicate what the student can expect to learn from the course, and are designed to help organize study time on important concepts in each lesson in the course (Drummond & Breferre, 2001).

The lessons include the following:

### Lesson 1

#### Introduction to Nutrition and Nutrition Guidelines

- Outline the factors that influence food selection.
- Define nutrition and nutrients.
- Explain how calories measure energy in foods.
- List the major classes of nutrients.
- Describe the characteristics of a nutritious diet.
- Explain the importance and function of the recommended Dietary Reference Intakes.
- Describe the processes of digestion, absorption, and metabolism, and how the digestive system works.
- List and discuss the Dietary Guidelines for Americans.
- List the goals of the Food Guide Pyramid and describe how it encourages variety, proportionality, and moderation.
- Plan menus using the Food Guide Pyramid and food labels.
- Discuss how the Exchange System is used and compare and contrast it to the Food Guide Pyramid.
- Read and analyze food labels, nutrient claims, and health claims.

### Lesson 2

#### Exploring Carbohydrates and Lipids

- Discuss simple and complex carbohydrates and their occurrence in food.
- Identify foods high in added sugars, natural sugars, starch, and fiber.

- **Discuss the health benefits of increased consumption of complex carbohydrates and decreased consumption of added sugar.**
- **Describe how carbohydrates are digested, absorbed, and metabolized.**
- **State the dietary recommendations for carbohydrates.**
- **Discuss the purchasing, storing, cooking, and menu planning for grains, legumes, and pasta.**
- **Define lipid, fat, and triglyceride.**
- **Compare and contrast fats and oils.**
- **Explain the functions of lipids in foods and in the body.**
- **Define saturated, monounsaturated, and polyunsaturated fats, as well as trans fatty acids, and list foods in which each is found.**
- **Analyze the roles of lecithin and cholesterol in the body and list foods in which they are found.**
- **Discuss how fats are digested, absorbed, and metabolized.**
- **Discuss the role of lipids in a healthy diet, and state dietary recommendations for them.**
- **Discuss the purchasing, storing, cooking, and menu planning for meat, poultry, fish, and shellfish.**

### Lesson 3

#### Understanding the Roles of Protein and Vitamins

- Describe the structure and functions of protein.
- Discuss how protein is digested, absorbed, and metabolized.
- Distinguish between complete and incomplete protein.
- State the dietary recommendations for protein and explain the consequences of eating too much or too little of it.
- Discuss the purchasing, storing, cooking, and menu planning for milk, dairy products, and eggs.
- Examine the importance of vitamins for growth and good health.
- List the functions and the food sources of the fat-soluble vitamins - A, D, E, and K and the water-soluble vitamins C, thiamin, riboflavin, niacin, B6, folate, B12, pantothenic acid, and biotin.
- Analyze the American diet in terms of possible vitamin deficiencies.
- Describe methods for conserving vitamins in food during preparation and cooking.
- Discuss the purchasing, storing, cooking, and menu planning for fruits and vegetables.

## Lesson 4

### Water and Minerals and an Introduction to Healthy Cooking

- Recognize the importance of water and minerals to a healthy diet.
- List the functions and the food sources of the major minerals – calcium, phosphorus, sodium, potassium, chloride, magnesium, and sulfur – and the trace minerals – chromium, copper, fluoride, iodine, iron, selenium, and zinc.
- Discuss the effects of mineral deficiencies or excesses.
- Discuss the purchase, storage, and use of nuts and seeds in cooking.
- Develop and evaluate healthy menu selections.
- Suggest ingredients and methods to develop flavor.
- Identify techniques, cooking methods, and substitutions that are more healthful.
- Plan healthful selections for each section of a menu.

## Lesson 5

### Marketing Healthy Menus and Beverages and Nutrition's Relationship to Health

- Gauge customers' needs and wants for healthy menu options.
- Draw attention to healthy menu options.
- Communicate and promote a nutrition program to customers.
- Explain the importance and extent of staff training needed to successfully implement healthy menu options.
- Evaluate healthy menu options using two methods.
- Explain how nutrition, labeling laws impact restaurant menus.
- List lower-calorie and lower-alcohol drink options.
- Recommend steps to market light beverages and foods.
- Define cardiovascular disease and list its common forms and risk factors.
- Explain how diet can play a role in the prevention and treatment of cardiovascular disease and list menu planning guidelines to lower cardiovascular risk.
- Define cancer.
- Explain how diet can play a role in the prevention and treatment of cancer and list menu planning guidelines to lower cancer risk.
- Define diabetes and discuss principles of planning meals for people with diabetes.
- Identify vegetarian eating styles and the health benefits of a vegetarian diet.
- List menu planning guidelines for vegetarians.

## Lesson 6

### Weight Management and Nutrition Over the Life Cycle

- Define obesity and list its health implications and possible causes.
- List the six components of a comprehensive weight-reduction program.
- Describe seven basic concepts of nutrition education to keep in mind when planning diets.
- Explore the roles of exercise and behavior and attitude modification in weight loss.
- Discuss the five strategies that appear to support weight maintenance.
- Design menus for weight loss and maintenance.
- Explore the nutrition needs for athletes and those who are underweight.
- Explain the importance of nutrition during pregnancy and identify nutrients that must be supplemented during pregnancy.
- Plan menus for women during pregnancy and lactation.
- Describe what infants are fed during the first year.
- Plan menus for children and adolescents.
- Describe and distinguish among various eating disorders.
- Recognize factors that influence the nutritional needs of adults and older adults.
- Plan menus for healthy older adults.

The previously mention lessons provide student objectives, reading assignments and exercises to constitute the nutrition course study outline which prepares the student for the final examination which serves as the credentialing nutrition examination for the NRA.

The examination is the final section of the course which is the only industry sanctioned accredited training to provide certification in nutrition for chefs. This certification given by the National Restaurant Association is administered by local culinary schools and submitted to the Educational Foundation of the National Restaurant Association for grading.

The consumer trend toward healthful eating is affecting foodservice operations throughout the culinary industry. Future culinary professionals with a thorough knowledge of nutrition will be prepared to capitalize on this growing trend, as healthful eating becomes the standard in foodservice operations. Efforts have been undertaken by nutrition professionals to continue to educate chefs to change the nutrition environment and provide a healthy balance in all menu items. Chefs should have nutrition training to develop a nutritional menu as part of a nutrition promotion strategy (Carlson, 1987). Traditional recipes are the foundation of any nutritional program, however, most traditional recipes do require modification to increase the nutritional value and to lower the caloric content.

For chefs, the problem is based on two closely joined concerns. The first is a reluctance to change cooking styles. The second is a genuine concern that nutritionally prepared foods simply will not taste as good as those prepared using a more traditional approach. Once the initial reluctance to learn a new way of thinking about food is overcome, many chefs find the challenge of nutritional cooking to be an intriguing and creative opportunity (Culinary Institute of America, 1996).

The outgrowth of Americans' interest in health and nutrition reflects a concern with the nutritional value of food sold in restaurants. Restaurants are now required to

substantiate any health and nutrition claims that are made on any advertisement, including menus (Boger, 1995). Kurtzweil (1997) reported that the Food and Drug Administration (FDA) implemented federal regulations for nutrition labeling of restaurant menu items that bear a nutrient or health claim. FDA's regulations also permit restaurants to promote their healthier menu by making a specific claim about a menu item's nutrient content or a claim about the relationship between a nutrient or food and a disease or health condition.

In today's contemporary environment, the restaurant industry offers a variety of choices to customers concerned about calories, cholesterol, fat, and nutrients that may help reduce their risk of certain diseases (Blake, 2001).

Menus now carry items ranging from low-fat, low-calorie items to full course meals. Restaurants promote their nutritionally modified dishes with symbols signifying that the dish is consistent with general dietary recommendations or with claims such as low fat, light, or heart healthy. Nevertheless, menu items that are based solely on nutrition concerns or that emphasize nutrition over taste have rarely been successful (Boger, 1995).

Chefs have a specific role to play, when planning restaurant menus in order to guarantee the availability of nutritional choices to their customers. Although not every restaurant customer is counting calories or fighting high blood pressure, patrons with the desire should have the option of choosing a menu to meet their specific dietary needs. To remain competitive, savvy restaurant operators should recruit staff with nutrition knowledge in responding to customer requests. Subsequently, customers' interest in the nutritional value of food can be turned into a profitable promotional tool for the restaurant (Palmer & Leontos, 1995).

### Career Opportunities

The culinary industry has attracted a diverse student population. These students are a combination of people making career changes, young high school graduates, and people currently working in the industry with no previous formal training (Reill, 1997).

Demands for trained, certified, skilled chefs in the foodservice industry are increasing in the new millennium's workplace. Industry analysts predict that professional chefs will be the most sought after candidates to fill positions in the job market by the year 2005 (Livingston, 2000). Continued growth in the hospitality and tourism industry supports this trend.

Many employers seek out culinary education graduates for verification and assurance that new employees possess the basic skill sets and competencies. In order to market and promote culinary education, and to encourage diversity in culinary professionals, culinary schools should conduct talent searches and award scholarships to high school graduates in local communities (Kongshem, 1993).

“Approximately 96% of culinary graduates find jobs in foodservice upon graduation” (NRA, November 1999, p. 4). There is a demand in the culinary industry for the culinarian who can understand both the managerial business aspects of food as well as the required cooking skills (Perlik, 2001). During the past decade, the employment of culinary professionals has risen steadily, with a significant increase expected during the next decade (Kent, 1985).

According to Malone (1998), the job of cooking for a living can take as many forms as the different entrees on a menu. Chefs are the most highly skilled, trained and experienced of all kitchen workers. Although the terms cook and chef are often used

interchangeably, cooks usually are less skilled. In a large restaurant or hotel, the executive chef is responsible for the full operation of the kitchen.

The NRA reveals that 60% of employers require culinary professionals employed as chefs to have formal education in the form of a two-or four-year degree (Sabo, 1999). Thus, culinary professionals are being recruited while still studying for an associate's or bachelor's degree. This trend appears promising, even though the work hours are long and the initial pay is low. The pay improves with experience and education from \$26,000 per year for entry pay to \$100,000 per year for executive chefs in exclusive restaurants or the best hotels (Geshelin, 2000). Consequently, leadership skills are as important as culinary talent in order for the executive chef to attain success in this industry.

The executive chef is responsible for vendor procurements, menu planning, staff training and development of recipes for new dishes. Some kitchens also have a *sous* chef, who is an assistant to the executive chef and is second in charge in the kitchen. No one starts at the top in the culinary world. Paying your dues and gaining valuable work experience in a variety of kitchens seems to be the most common way chefs begin their careers. After experiencing various styles and methods of cooking, many chefs specialize in a certain cuisine or type of food. It usually takes at least five years, before a chef moves up into a full-charge position (Goldstein, 1998).

According to the American Culinary Federation, "many of the newest jobs for chefs are with supermarkets, health spas, and research laboratories" (ACF, 2002, p. 31). There is a growing trend in the industry for individuals to employ a personal chef. This chef differs from private chefs by working for multiple clients, most of whom are professionals or busy middle class families (Bernstein, 1999).

The personal chef works in the client's home once or twice per month, on average, cooks enough dinner entrees and side dishes to last until the next visit, freezes them and cleans up the kitchen. The personal chef must have an extensive passion and knowledge of cooking especially in the assessment of the client's food preferences, an entrepreneurial spirit and a service-oriented nature (Bernstein, 1999).

The spa chef commonly employed by resorts has to be skilled in teaching nutrition and food preparation classes to customers as well as planning a delectable low fat healthy cuisine to all resort guests. Some spa chefs develop individualized diet plans for each guest, while others cater meals for each guest based on customer preferences. Most spa chefs work with nutritionists who offer group lectures and individual consultation on health, diet and fitness (Morris, 1997).

The gourmet chef uses fat as the predominant seasoning in preparation of the true gourmet cuisine. Today the true gourmet chef has shown America how delicious healthy cooking can be in the gourmet cuisine through the reduction of fat in recipes.

The chefs at culinary schools across this country have embraced the latest nutrition message: Not all fats are bad for you. This philosophy is supported by four basic principles. " These principles are as follows:

- focus on grains and vegetables
- use fresh produce
- pump up the seasoning, and
- lighten up on fats" (Foltz-Gray, 1998)

The research chef represents the latest opportunity in the culinary industry. These chefs appear to thrive on the creativity required to develop flavoring profiles that meet current taste. The research chef accomplishes this through the unique use of seasonings and ingredients. The culinary skill needed to design sensory quality for food products is the key to work in this segment of the industry. No matter what research chefs do, they are usually trying to replicate a natural flavor (Helton, 2000).

#### **Culinary Arts Department at The Art Institute of Atlanta**

The application of nutrition principles in the culinary field will prove essential to training culinary professionals in commercial kitchens. This will enhance the leadership of the restaurant industry toward providing healthy menu options for the consumer. This major concern has led to the exploration of nutrition training and its role in training culinary professionals. For the purpose of this study, an investigation of the training requirements for culinary students to become professional chefs was initiated during the 2001-2002 academic year with the Culinary Department located in the Arts Institute of Atlanta.

The Southern Association of Colleges and Schools (SACS) accredits the Art Institute of Atlanta and the Culinary Arts department is accredited by the ACF. The Culinary Arts program at The Art Institute of Atlanta began in 1991. Currently, The Art Institute of Atlanta is one of 23 locations operated by Art Institutes around the country. The Art Institute of Atlanta Culinary Arts Department currently offers an Associate of Arts Degree in Culinary Arts with an Advanced Baking and Pastry option. Of the 23 Art Institute branches, 14 offer an Associate of Arts Degree in Culinary Arts, and 2 institutions offer a 4-year Bachelor of Arts Degree in Culinary Arts Management.

The remaining 7 Art Institutes offer a certificate program in Culinary Arts (Appendix D). The culinary arts program at the Arts Institute of Atlanta begins with basic food preparation skills and allows the student to progress to advanced food techniques for seven ten-week academic quarters accredited by the American Culinary Federation Commission (Appendix E). The advanced training includes *garde manger*, a la carte preparation, and international cookery, bakery and pastry.

This seven quarter academic program provides the requirements for the culinary arts Associate of Arts degree with 112 credits required for graduation. The academic period is based on four quarters per year with day and evening classes being offered Monday through Saturday.

The program includes basic education courses such as English, Physical Science, Algebra, World History and Psychology. Additional foundation courses such as Health, Food Sanitation, and Nutrition are requirements of the basic educational preparation for the culinary student.

As a component of the curriculum, students in the culinary arts program compete in local, regional and national culinary competitions. Graduates of this program are qualified for positions such as line cook, preparation cook, first cook, baking trainee, and catering assistant.

Upon completion of entry-level experience, graduates may become a *sous* chef, executive chef, pastry chef, food and beverage director or manager for a restaurant or catering business. Additionally, courses included in the program are:

- sanitation and safety
- application of culinary skills and equipment

- dining room operations
- introduction of baking and pastry
- American regional cooking
- international cuisine
- a la carte
- classical cuisine
- *garde manger*
- nutrition

The above mentioned courses include applications of the principles of food science and nutrition theories.

All culinary courses at the Arts Institute of Atlanta are taught by chefs with extensive experience in this industry. The basic nutrition course is taught by a registered dietitian and a certified executive chef. This course is based on the requirements necessary to pass the Nutrition Certification examination given by the NRA. The course syllabus also reflects the topics included in the examination (Appendix F).

The challenge in learning the basics of nutrition and the art of food preparation should enhance the skills of the culinary professional in meeting the requests of consumers with interest in healthy food selection.

The basic nutrition course allows the students to use culinary terms and cooking techniques to focus on implementing healthy food recommendations in menu planning for restaurants. Additionally, the course proposes to educate culinary students to change the nutrition environment in the restaurant industry by developing a responsibility to

provide a healthy balance in all their menu items. The course is taught in a lecture format with project presentations from multiple small group interactions over a ten-week period.

The small group projects allow for the development of low-fat menu items as class demonstrations of healthy recipe modification skills. Students are placed in groups and assigned the task of modifying the ingredients to lower the fat content of a high fat recipe. This activity allows each student to apply nutrition principles for menu development in a restaurant setting. The didactic method used with the students provides the knowledge in a manner that allows a broader and immediate application of nutrition principles. This method of teaching is supported by a study conducted by the University of Maryland. The study concluded that medical students participating in a cooking class conducted by a professional chef who included a visual demonstration, made a greater impact than reading a paper about how to prepare a healthy meal (Payne, 2002).

## CHAPTER 3

### METHODS

#### Purpose and Design of the Study

The overall purpose of this study was to examine the effect of a formal nutrition training course on the nutrition knowledge of culinary students attending an academic program through the Culinary Arts Department at The Art Institute of Atlanta. The benefits of the course were assessed using a survey instrument for pre and post testing. The survey instrument was a multiple-choice examination that was developed and validated by the NRA. This examination is a part of a series of tests, which ultimately leads to a Certified Chef credential through the NRA. The study uses a correlation research design and a focus on identifying the relationship between pre and post course examination scores.

The Auburn University Institutional Review Board for Research Involving Human Subjects approved the study. An information letter signed and dated by the investigator was used to inform the potential participants about the nature of the study and to request participation (Appendix A). Prior to administering the examination, the contents of the letter were orally disclosed by the investigator to each participant. The information letter served to ensure that the students' participation in the study would not affect enrollment or academic standing in the Culinary Arts Department.

### Study Population

Participants for this study consisted of volunteer culinary students (N=141) who are high school graduates, aged 18 years and older, attending a Culinary Arts Department in The Art Institute of Atlanta, Georgia. Students enrolled in a nutrition course for chefs were part of the intervention group. Students who had not previously attended a nutrition course for chefs participated in this study and served as part of the control group.

### Procedures

The participants were recruited by word of mouth, recruitment flyers posted on student area bulletin boards, and classroom announcements in the Culinary Arts Department. The investigator was seated at the entrance to the school to promote participation in the study at previously announced times to recruit potential participants. Once the investigator recruited students, they were provided with an information letter (Appendix A). The NRA nutrition examination was administered to the control participants by the investigator when the consent form was returned in a private dining room adjacent to the recruitment area. The nutrition instructors administered the pre-course NRA nutrition examination (Appendix C) at the beginning of the 10-week quarter for all intervention group participants enrolled in the nutrition course.

As each student returned the examination, they were provided a self-selected code in order to match their pre- and post- examination scores. Each participant in the control group was given a post course appointment date to complete the NRA nutrition examination at the end of the 10 week quarter which were administered by the investigator.

Each participant received an incentive upon completion of the administration of the pre and post examination. The incentive for the pre-examination was a chef's kerchief while the post-examination incentive was a chef's hat for each participant.

The participant identification remained anonymous throughout the study, and the examination results were not associated with the participant's school records. Each participant generated a random code that served as pre and post examination identifiers. There was no individual follow-up tracking system. The investigator conducted group follow-up through posted flyers to encourage completion of the post examination by all participants (Appendix B). The flyers were posted in student access areas throughout the school for two weeks prior to administration of the pre-examination to participants. Additionally, the flyers were posted in the above-mentioned areas in the school for two weeks prior to the administration of the post-examination to all participants.

#### Instrument

The investigator selected an industry established examination as the instrument for data collection in this study. The instrument is currently being used by the Culinary Arts Department as the standard examination for chefs who are seeking to gain national certification in nutrition from the NRA. The Culinary Arts Department purchased the examination for the 2001 academic year for use with students enrolled in the Arts Institute of Atlanta. The Arts Institute of Atlanta provided written permission to the investigator to use the examination as the instrument for this study (Appendix G). The research instrument was a multiple choice examination developed by the NRA with four answer choices for each question.

The examination contained 80 questions, which measured the participant's knowledge of nutrition principles and their applicability in the food service industry.

The instrument examines six cognitive domains of nutrition knowledge. These domains are: knowledge, comprehension, application, analysis, synthesis and evaluation.

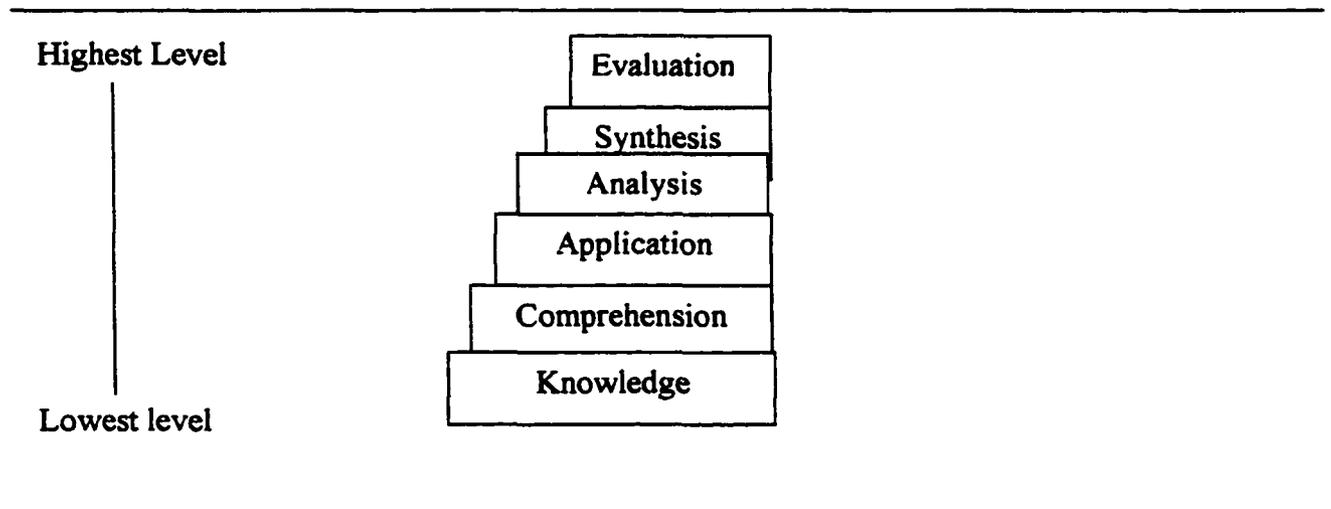
Establishing the link to cognitive learning is critical. Cognitive learning is demonstrated by knowledge recall and intellectual skills such as comprehending information; organizing ideas; analyzing and synthesizing data; applying knowledge; choosing among alternatives in problem-solving; and evaluating ideas or actions. The domain, which includes the acquisition and use of knowledge, is predominant in most academic courses.

In 1956, Benjamin Bloom headed a group of educational psychologists, who together developed a classification of levels of thinking behaviors thought to be important in the processes of learning. This taxonomy provides a useful structure to categorize test questions. The taxonomy identifies six levels within the cognitive domain, from the simple recall or recognition of facts, as the lowest level, through increasingly more complex and abstract mental levels, to the highest order, which is classified as evaluation. Bloom found that over 95% of the test questions students encounter require them to think only at the lowest possible level which is the recall of information (Bloom, Englehart, Hill, Furst, & Krathwohl, 1956)

The cognitive domain is an important area that should be addressed in curriculum development. Bloom's assumption is: abilities can be measured along a continuum from plain and simple to rather complex. The cognitive domain includes intellectual abilities and skills ranging from rote memory tasks to the synthesis and evaluation of complex information (Hastad & Lacy, 1998).

The taxonomy of educational objectives is the most popular system of classifying the levels of cognitive complexity. It delineates six levels of varying complexity from the knowledge level (simplest) to the evaluation level (most complex). The various levels of the taxonomy are illustrated in Figure 1.0 (Bloom, Madaus, & Hastings, 1981).

Figure 1.0 Taxonomy of educational objectives: cognitive domain.



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According to Bloom et al (1956), the taxonomy levels are hierarchical in that the higher level objectives include the lower level objectives. Each level of the taxonomy of objectives has different characteristics, which are associated with verbs at different levels. The definition of each domain are listed as follows:

Figure 2.0 Taxonomy of educational objectives: competencies and skills

Competence	Skills Demonstrated
<b>Knowledge</b>	<ul style="list-style-type: none"> <li>• observation and recall of information</li> <li>• knowledge of dates, events, places</li> <li>• knowledge of major ideas</li> <li>• mastery of subject matter</li> <li>• <i>Question Cues:</i> list, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.</li> </ul>
<b>Comprehension</b>	<ul style="list-style-type: none"> <li>• understanding information</li> <li>• grasp meaning</li> <li>• translate knowledge into new context</li> <li>• interpret facts, compare, contrast</li> <li>• order, group, infer causes</li> <li>• predict consequences</li> <li>• <i>Question Cues:</i> summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend</li> </ul>
<b>Competence</b>	<u>Skills Demonstrated</u>
<b>Application</b>	<ul style="list-style-type: none"> <li>• use information</li> </ul>

	<ul style="list-style-type: none"> <li>• use methods, concepts, theories in new situations</li> <li>• solve problems using required skills or knowledge</li> </ul> <p><i>Questions Cues:</i> apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover</p>
<b>Analysis</b>	<ul style="list-style-type: none"> <li>• seeing patterns</li> <li>• organization of parts</li> <li>• recognition of hidden meanings</li> <li>• identification of components</li> <li>• <i>Question Cues:</i> analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer</li> </ul>
<b>Synthesis</b>	<ul style="list-style-type: none"> <li>• use old ideas to create new ones</li> <li>• generalize from given facts</li> <li>• relate knowledge from several areas</li> <li>• predict, draw conclusions</li> <li>• <i>Question Cues:</i> combine, integrate, modify, rearrange, substitute, plan, create, design, invent, what if?, compose, formulate, prepare, generalize, rewrite</li> </ul>
<b>Competence</b>	<b>Skills Demonstrated</b>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• compare and discriminate between ideas</li> </ul>

	<ul style="list-style-type: none"> <li>• <b>assess value of theories, presentations</b></li> <li>• <b>make choices based on reasoned argument</b></li> <li>• <b>verify value of evidence</b></li> <li>• <b>recognize subjectivity</b></li> <li>• <b><i>Question Cues</i></b>  <b>assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize</b></li> </ul>
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- **Adapted from: Bloom, B.S. (Ed.) (1956) Taxonomy of educational objectives: The cognitive domain.**

In Bloom's Taxonomy (1956), the acts of recalling and reporting knowledge are seen as less sophisticated than the alternatives of translating information into new forms, applying it to new contexts, analyzing, synthesizing, and evaluating it. The chart below arranges Bloom's levels of cognitive activity in a grid moving (left to right) from simple to complex, and it lists a number of verbs describing its activities for each mode of thinking.

Figure 3.0 Bloom's Ranking of Thinking Skills

Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
List	Summarize	Solve	Analyze	Design	Evaluate
Name	Explain	Illustrate	Organize	Hypothesize	Choose
Identify	Interpret	Calculate	Deduce	Support	Estimate
Show	Describe	Use	Contrast	Schematize	Judge
Define	Compare	Interpret	Compare	Write	Defend
Recognize	Paraphrase	Relate	Distinguish	Report	Criticize
Recall	Differentiate	Manipulate	Discuss	Justify	
State	Demonstrate	Apply	Plan		
Visualize	Classify	Modify	Devise		

Bloom, B.S. (Ed.) (1956) Taxonomy of educational objectives: Vol.1: The cognitive domain. New York: McKay

### Reliability and Validity

The NRA endorsed nutrition examination meets validity criteria in the following categories:

- Content representativeness and relevance
- Appropriate thinking processes and skills
- Consistency
- Reliability and objectivity
- Fairness to different students

The content validity of the scale was determined through the subjective judgment of experts in the culinary field (Frier, personal communication, September 9, 2002 ; Carmines & Zeller, 1979). The internal consistency reliability and validity were determined by computing coefficient alpha on each of the subscale and the total scale (Nunnally & Bernstein, 1994).

### Data Collection

All study participants (N=144) enrolled in a ten-week nutrition course were administered the NRA nutrition examination at the beginning of the course. At the end of the ten-week nutrition course, the NRA nutrition examination was re-administered. The participants enrolled in the nutrition course were designated as the intervention group (n=72) and were administered the NRA nutrition examination at the beginning and the end of the ten week course by the nutrition instructor. Participants in the control group (n=69) were administered the NRA examination during the beginning and end of the ten-week course period by the investigator. The pre- and post-examinations were administered at the Culinary Arts Program in Art Institute of Atlanta in designated classrooms.

The investigator informed each participant about the following benefits from the study results: (1) assisting in the development of nutrition training for culinary professionals, (2) understanding consumers' dietary needs, (3) modifying current food preparation practices, (4) understanding nutritional values of foods, and (5) implementing health messages through meal preparation.

## CHAPTER 4

### Data Analysis

NRA examination data were analyzed using Statistical Package for Social Science (SPSS), Version 11.0. Cronbach's alpha test was conducted to determine the reliability of the instrument. Cronbach's alpha test was computed using the six domains of training within the instrument. The domains included in the examination are knowledge, evaluation, comprehension, analysis, synthesis, and application. The statistical techniques used for the correlation study included: the Pearson Product Moment Correlation ( $r$ ) coefficients and descriptive statistics (mean, median, mode, standard deviation).

The selected instrument was used for data collection because it is the only certification examination approved by the American Culinary Federation and the National Restaurant Association for chefs to obtain certification in nutrition. The examination is published annually and used by culinary schools throughout the United States.

Numerous data analysis applications were reviewed to determine the most appropriate analysis to be used. The following data analysis applications were explored: Pearson's Correlation Coefficient: A statistic, usually symbolized as  $r$ , showing the degree of linear relationship between two variables that have been measured on interval or ratio scales, such as the relationship between height in inches and weight in pounds.

It is called product-moment because it is calculated by multiplying the z-scores of two variables by one another to get their product and then calculating the average (mean value), which is called a moment of these products.

Internal consistency (reliability) is another commonly used psychometric measure in assessing survey instruments and scales. It is applied not to single items but to groups of items that are thought to measure different aspects of the same concept. Internal consistency is an indicator of how well the different items measure the same issue. This is important because a group of items that purports to measure one variable should indeed be clearly focused on the variable. Although single items may be quicker and less expensive to administer, the data set is richer and more reliable if several different items are used to gain information about a particular behavior or topic.

The most appropriate measurement selected for internal consistency is measure by calculating a statistics known as Cronbach's coefficient alpha. This measure was named for the 20th century psychometrician who first reported it in 1951. Coefficient alpha measures internal consistency reliability among a group of items combined to form a single case. It is a statistic that reflects the homogeneity of the scale. That is, it is a reflection of how well the different items complement each other in their measurement of different aspects of the same variable or quality.

Reliability is an indication of the extent to which a measure contains variable errors, that is, errors that differed from observation to observation during any measuring instance and that varied from time to time for a given unit of analysis measured twice or more by the same instrument (Carmines & Zeller, 1979).

The test retest method corresponds most closely to the conceptual definition of reliability. A measuring instrument is administered to the same group of persons at two different times, and the correlation between the two sets of observations (scores) is computed. The obtained coefficient is the reliability estimate (Litwin, 1995).

### **Group Differences between Pre and Post-Test Course Scores**

The differences between post-test scores were analyzed using a general linear model (Walsh & Betz, 2001). Pre-test scores were analyzed for comparability, the statistical two tailed t test was used. In the analysis of a two-tailed test, the region of rejection is located at both left and right tails. In the analysis of a one tailed test, extreme results leading to the rejection of the null hypothesis could be located at either tail. The decision to locate the region of rejection in one or two tails depended on whether the hypotheses implied a specific direction to the predicted results and whether it specifies large or small values. The use of this statistical analysis provided clarity for reporting changes in the pre - and post - examination scores in this study.

Table 1 shows the descriptive statistics (mean and standard deviation) of the analysis sample for the major domains of the NRA nutrition examination; knowledge, evaluation, comprehension, analysis, synthesis and application as well as for the total scale. Scores of the sample on the knowledge domain ranged from 2 to 24; on the evaluation domain 0-7; comprehension 1-14; analysis 0-10; synthesis 1-9; application 0-14. The total scale ranged from 12 to 73 with a mean of 50 (sd=14.3).

The range reflected all scoring combinations. None of the scales listed indicated a restricted range of scores. Thereby, this analysis reflects increased variability of post examination scores.

Table 1

**Descriptive Statistics of the Domains and Total Scores of the  
NRA Nutrition Examination**

<b>Domains</b>	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>SD</b>
Knowledge	141	2.00	24.00	15.8369	4.85302
Evaluation	141	.00	7.00	4.3404	1.58938
Comprehension	141	1.00	14.00	9.4610	3.01074
Analysis	141	.00	10.00	6.0922	2.03505
Synthesis	141	1.00	9.00	5.6879	1.85216
Application	141	.00	14.00	8.6809	2.89166
Overall Examination	141	12.00	73.00	50.4894	14.25162

Note: SD = Standard Deviation

**Evidence for reliability of the nutrition examination**

The total nutrition examination, in this sample, had an alpha reliability coefficient of .93. The alpha reliability coefficient of domains ranged from a high of .82 for knowledge to a low of .47 for evaluation

The Cronbach's alpha reliability coefficient for the overall examination indicated significant reliability for use of the examination in measuring the nutrition knowledge of students in the Culinary Department at the Arts Institute of Atlanta. The coefficient Alpha for the six domains demonstrated strong reliability in measuring the individual domain strength. Clearly, the knowledge results of the examination was the most favorable domain with the highest level indicated.

These results indicate that students in this study were more likely to score higher in questions relating to the knowledge domain.

**Table 2**  
**Reliability Analysis of NRA Nutrition Examination**

<b>Domain</b>	<b>Number of Items</b>	<b>Coefficient Alpha</b>
Knowledge	26	.82
Evaluation	7	.47
Comprehension	14	.75
Analysis	10	.56
Synthesis	9	.58
Application	14	.70
Overall examination	80	.93

Table 3 presents the correlations of each of the domains with each other and with the total scale. As indicated in the table each of the domains were highly and significantly correlated with each other. The knowledge domain was the most significant domain.

These correlations ranged from .82 for knowledge and .59 for evaluation.

The domains of knowledge and comprehension correlated very highly with the overall scale (.94 and .91, respectively). The evaluation domain correlated the lowest. This is predictable and due, in the large part, to the number of items that each domain contributes to the score.

Table 3

## Correlations between domains on the NRA nutrition examination

Domains	Pearson Correlation	Significance(2-tailed)
Overall	1	.000
Knowledge	.939(**)	.000
Evaluation	.676(**)	.000
Comprehension	.908(**)	.000
Analysis	.822(**)	.000
Synthesis	.821(**)	.000
Application	.868(**)	.000

Note: \*\* Correlation is significant at the 0.01 level (2-tailed): N=141

The between group differences at pre and post-test are presented in Table 4. The pre-and post-values, the standard errors, and the 95% confidence interval are also presented in Table 4. There are no significant differences between the groups on the pre-test examination (control group = 42.2 and the intervention group = 43.6.)

There were, however, significant differences between the intervention group and control groups on examination scores at post-test. The control group scores at post-test was 49.55; the post-test was 63.04 ( $p = 0.00$ ). The scores for the examination ranged from 16/80-65/80 points. The score of 80/80 reflects an error free score.

Table 4

## Test of Between Group Differences at Pre and Post Examination Scores

Control (N=69)	Means	Std Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Pre	42.21	1.27	39.69	44.73
Post	49.55	1.28	41.02	46.08
<b>Intervention (N=72)</b>				
Pre	43.55	1.26	47.07	52.03
Post	63.04	1.26	60.55	65.53

Note:  $P = 0.000$ ; F statistic = 69.03; Partial eta squared = 0.33

Figures 4-9 will depict a significant increase in domain upon completion of the post-examination.

Figure 4.0 Scores of Pre and Post Examination for Knowledge Domain

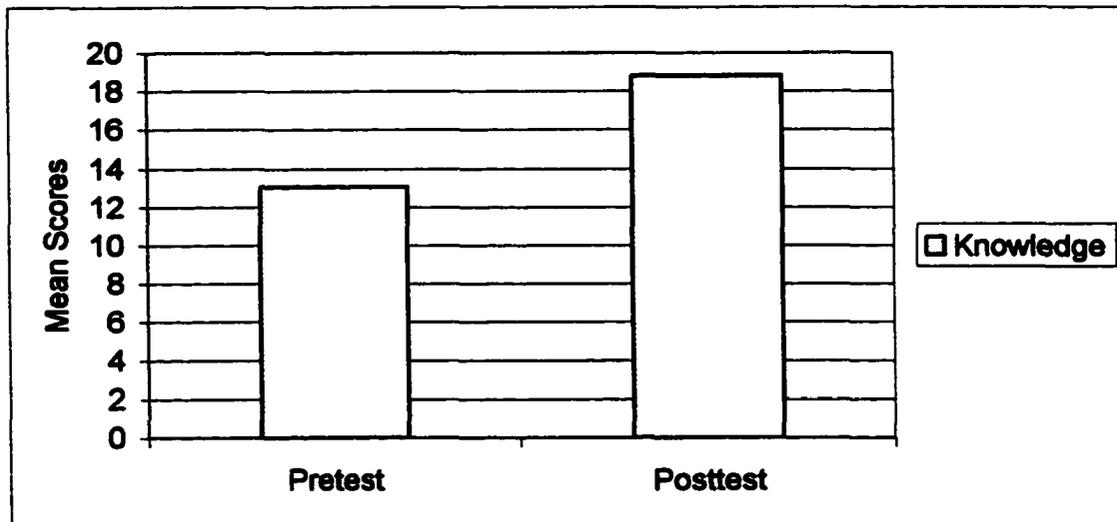


Figure 4 indicates an significant increase of scores in the knowledge domain of the post-examination.

Figure 5.0 Scores of Pre and Post Examination for Evaluation Domain

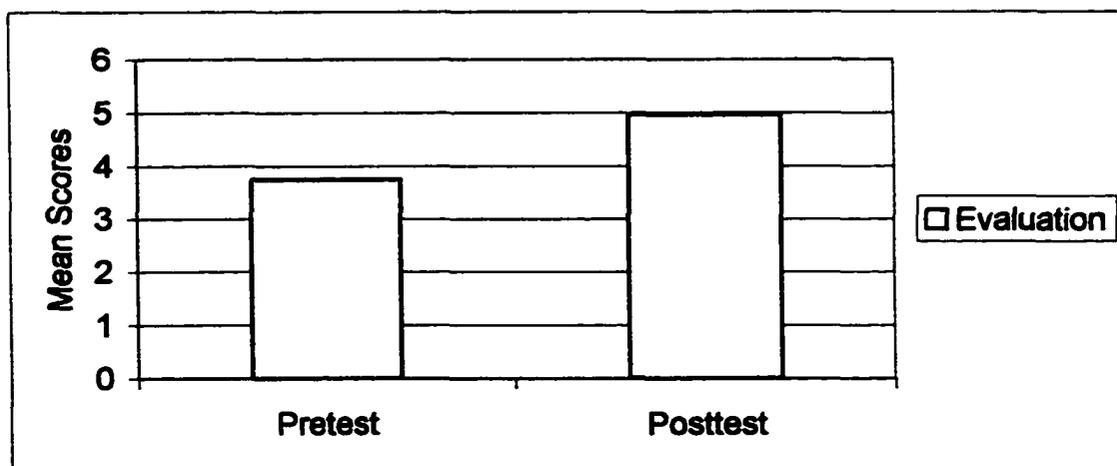


Figure 5 indicates a significant increase of scores in the evaluation domain of the post-examination.

**Figure 6.0 Scores of Pre and Post Examination for Comprehension Domain**

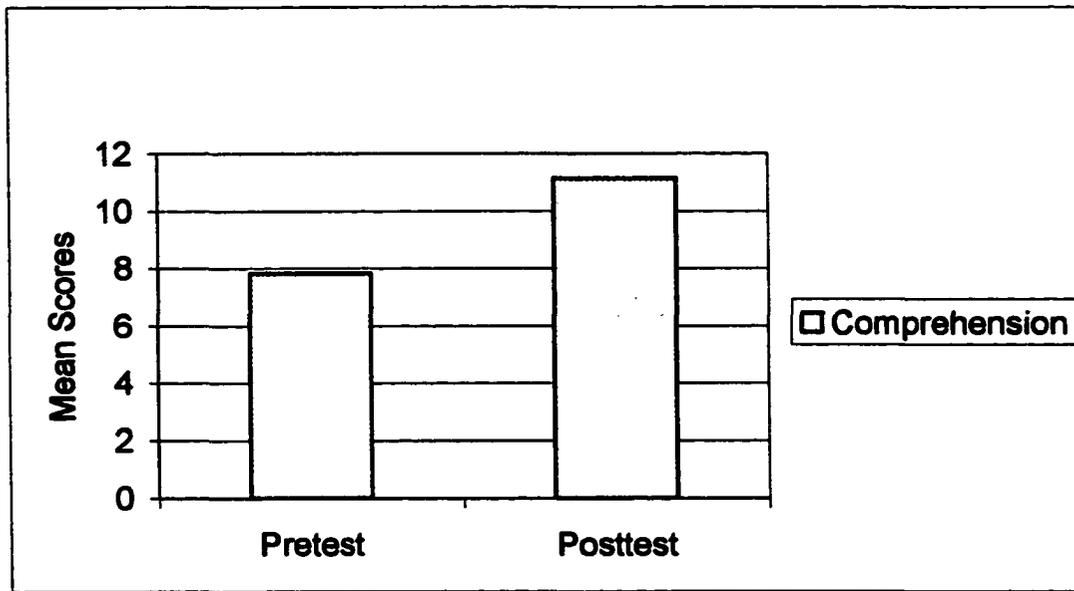


Figure 6 indicates a significant increase of scores in the comprehension domain of the post - examination.

**Figure 7.0 Scores of Pre and Post Examination for Analysis Domain**

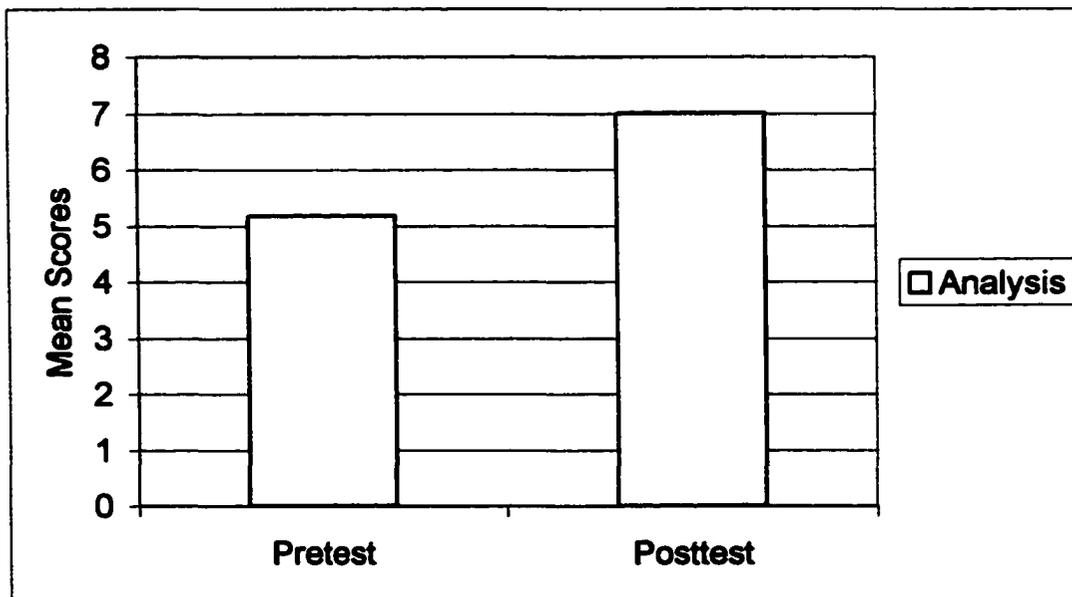


Figure 7 indicates a significant increase of scores in the analysis domain of the post - examination.

**Figure 8.0 Scores of Pre and Post Examination for Synthesis Domain**

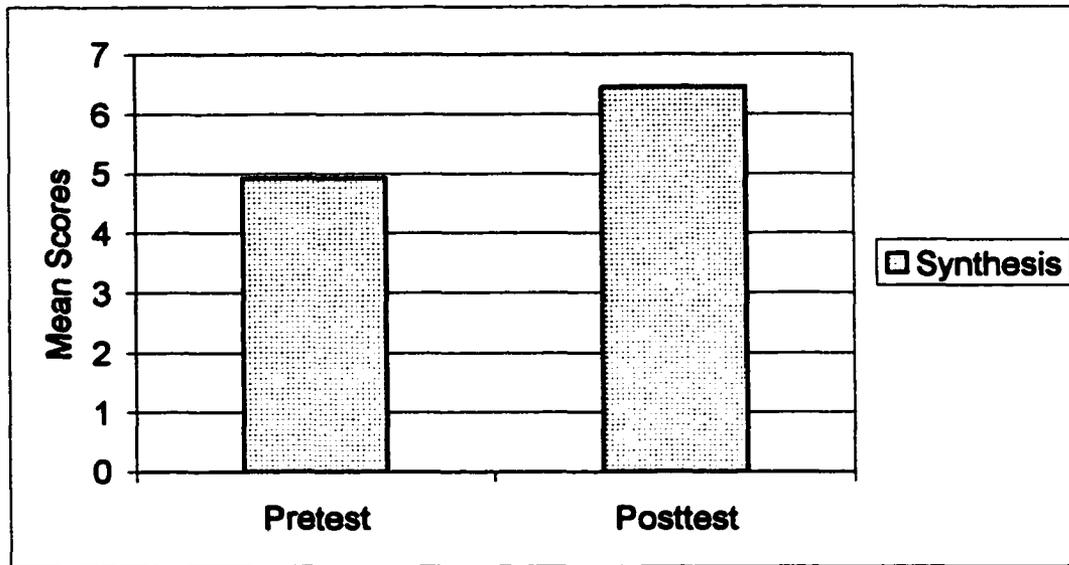


Figure 8 indicates a significant increase of scores in the synthesis domain of the post examination.

**Figure 9.0 Scores of Pre and Post Examination for Application Domain**

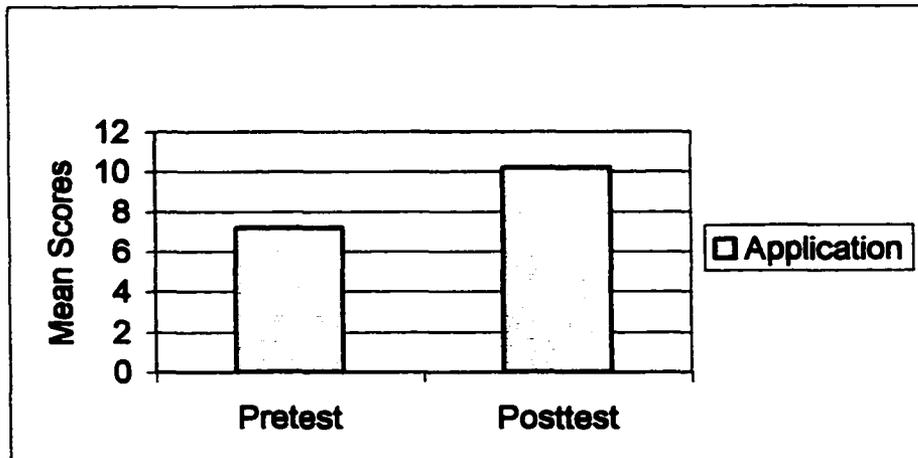
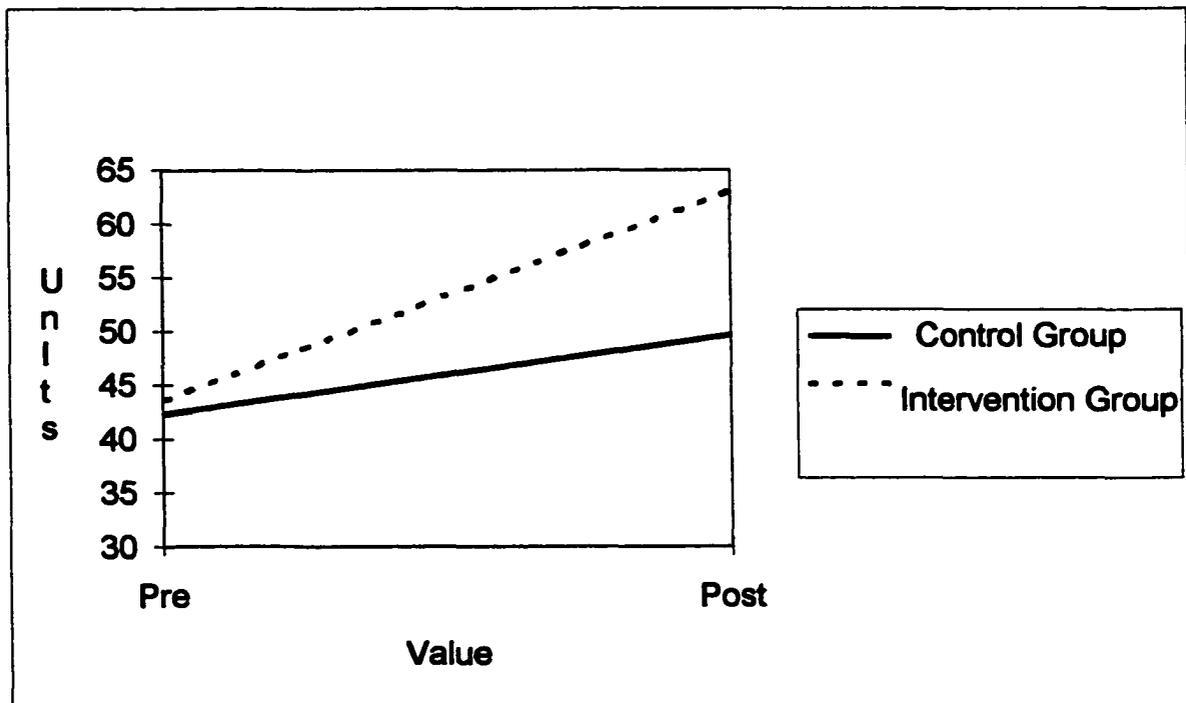


Figure 9 indicates a significant increase of scores in the application domain of the post - examination.

**Figure 10.0 Pre and Post Measures of Examination**

**Figure 10.0 illustrates visually the pretest and posttest exam values by intervention and control group. There were no significant differences between the groups on the pretest exam scores (control group= 49.05 intervention group 42.55).**

**Figure 11.0 - Mean Scores of Examination Domains**

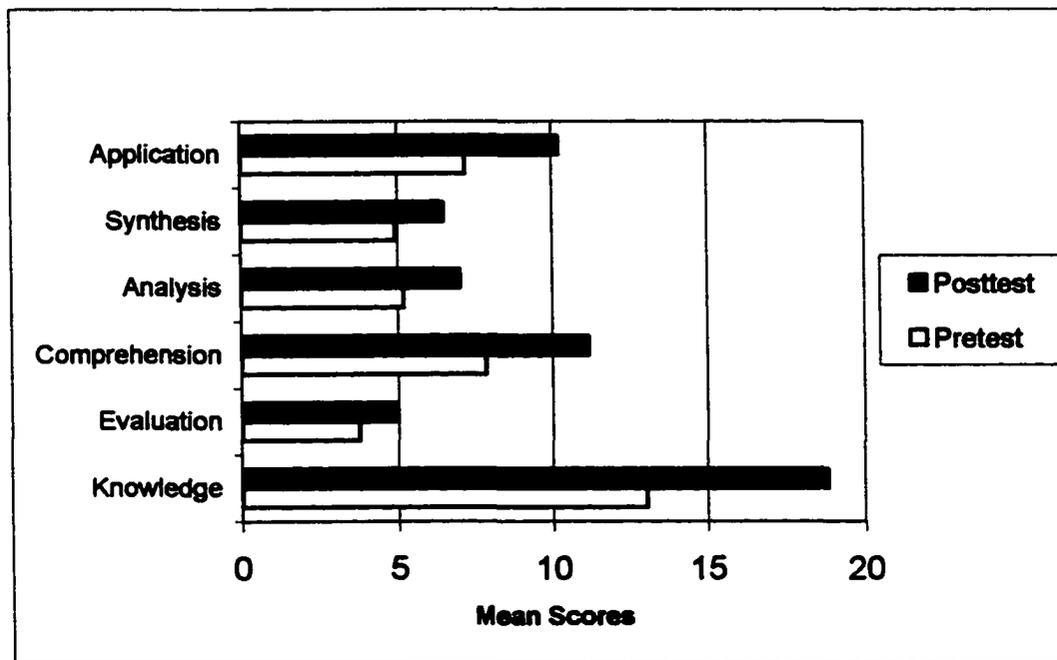


Figure 11.0 reflects the greatest degree of variation of change in the mean scores of the knowledge domain.

The data analysis reflects significantly increased scores in the post-test for all six domains examination. Additionally, the knowledge domain examination scores were most significant in both pre-and -post tests. The data analysis results indicates that there is a relationship between enrollment in a nutrition course and improvement of scores on the NRA examination.

## Chapter 5

### Summary and Discussion

#### Introduction

A review of industry literature revealed the current framework for nutrition training in the culinary industry. Additionally, health statistics indicate an increased incidence of chronic diseases relevant to food consumption by adults who consume two or more meals per week in a commercial establishment (Palmer & Leontos, 1995). Effective nutrition courses need to be developed to give culinary students appropriate skills in preparing healthy menu items. It is only through these courses that culinary professionals will be able to have the knowledge necessary to meet the consumers' health concerns in the food service environment (Drummond & Brefere, 2001).

Minimal research studies have focused on the relationship of the role of nutrition training for culinary professionals. Subsequently, this study's outcome will contribute base line findings for future research investigations on nutrition expertise in the culinary industry. Research questions addressed in the study include the following:

1. Is there a significant relationship between pre-course scores, as measured by the NRA examination, of culinary students enrolled in a nutrition course for chefs and the pre-course scores of culinary students who have not enrolled in a nutrition course for chefs?
2. Will culinary students, who have not completed a formal training course in nutrition, score significantly different on the post-test than on the pre-test as measured by the NRA examination?

3. **Following formalized training in nutrition, will culinary students score significantly different on the post-test than on the pre-test as measured by the NRA examination?**
4. **Will culinary students, who have not completed a formal training course in nutrition, score significantly different on the post-test than on the pre-test as measured by the NRA examination?**

#### **Research Question 1.**

**The study findings indicate no difference in the pre-course scores between students enrolled in a nutrition course. The scores for pre-course scores reported minimal differences between the students who did not enroll in the nutrition class and the students who did enroll in the nutrition course. Therefore, H<sub>0</sub> 1 was supported.**

#### **Research Question 2.**

**Study data indicated a significant improvement in the post-course scores of the students who completed the nutrition course while there was no significant change in the post-course scores of the students who did not complete the nutrition course. Therefore, H<sub>0</sub> 2 was rejected.**

#### **Research Question 3**

**Students who completed the formalized nutrition course in this study showed a significant increased post-course scores from the pre-course scores as indicated survey data. Therefore, H<sub>0</sub> 3 was rejected.**

#### **Research Question 4**

**Study data indicated that students who did not complete the formalized nutrition course in this study showed no significant change in their post-course scores from the pre-course scores. Therefore, H<sub>0</sub> 4 was supported.**

**Four null hypotheses were formulated from the research questions and tested in this study. The four null hypotheses were:**

**H<sub>0</sub> 1: There is no statistically significant difference between the pre-course scores, as measured by the NRA examination, of culinary students enrolled in a nutrition course for chefs and the pre-course scores of culinary students who have not enrolled in a nutrition course for chefs.**

**H<sub>0</sub> 2: There is no significant difference between the post-course scores, as measured by the NRA examination, of culinary students, who have completed a nutrition course for chefs and the post-course scores of culinary students who have not completed a nutrition course for chefs.**

**H<sub>0</sub> 3: There is no significant difference in the post-course scores and the pre-course scores of culinary students who enrolled and completed the nutrition course for chefs.**

**H<sub>0</sub> 4: There will be no significant difference in the post-course scores and the pre-course scores of culinary students who did not enroll and complete the nutrition course for chefs.**

### Summary of the Study

This study provides information that would seem to be of value to the culinary industry in training students to become certified chefs. The study suggests a significant relationship exist between enrollment and completion of a nutrition course and increased scores on the NRA examination.

The post scores were obtained after 10 weeks' enrollment in the course. Further study should be given to determining if the post score difference in the nutrition examination will remain over time. In addition, studies should be developed to determine if post scores translate into a change in the application of nutrition skills by chefs in the culinary industry. The reliability of the nutrition examination was significant with this study population, however further psychometric examination is needed. Additionally, further work on validity is recommended and should include in-depth content validity and retest studies. Further examination may determine the relationship of the content validity among each item in the instrument.

It is critical that the substantive theory concepts linked to the six domains are validated to enhance teaching nutrition skills to culinary students. For this reason, the nutrition course for culinary student is an effective didactic method in culinary training.

Developing a nutrition course will contribute to alleviating consumers' dietary concerns in the food service industry. To address the change in consumer habits, the culinary industry needs to modify attitudes and knowledge about menu items being offered. The knowledge and attitude of professional chefs toward the importance of good nutrition has a critical impact on consumers who eat meals in commercial eating establishments on a regular basis.

### Recommendations for Further Study

This study provides insight into methods to strengthen the linkage between nutrition skills and culinary training. Further study is needed in this area of culinary training as indicated by the following recommendations:

- (1) Chefs should have adequate nutrition knowledge in understanding the dietary needs of their customers. It is therefore vitally important that nutrition training for chefs is provided through effective teaching skills in developing and preparing low fat menu items for their customers. These skills will benefit the consumers' health, but most importantly, will benefit the food service industry profit margin.
- (2) Developing nutrition expertise would be of great benefit to culinary professionals in marketing healthy menu choices to their customers.

This expertise should allow the chef to address the consumer's dietary needs, adapt and modify current food preparation practices and create an awareness of nutritional values of healthy menu items.

**(3) The demands placed on chefs today have necessitated the development of more intense nutrition training programs for students entering the field of culinary arts. The Culinary Arts programs that existed in the past only prepared most students for entry-level positions with minimal nutrition training. However, with the emergence of health conscious dietary concerns in the United States today, the industry must improve the nutrition skills of culinary professionals.**

**(4) Continuing education targeted towards nutrition skill development for chefs must be initiated to sustain the quality of the culinary industry.**

**The development of staff nutrition training for the chef, cooks and servers should be a routine part of continuing education for all culinary staff. Experience is the key factor to success in the culinary field. Culinary schools should demand more hands-on kitchen experience as part of continuing education training to ensure application of didactic knowledge gained in nutrition training courses. The cost of providing such training should be accepted as a business expense and as a career saving skill.**

**(5) Chefs should utilize the services of registered dietitians to provide computerized nutrition analyses of restaurant menus.**

**Chefs and dietitians are challenged to educate both consumers and the restaurant industry about the importance of nutritious food choices and the influence that the restaurant industry has on the health of the general public. Consumers must be encouraged to tell restaurant managers that they are interested in nutrition and want accessible nutrition information to make knowledgeable menu choices.**

## Conclusion

Advancements in research from health experts will eventually propose food recommendations for individual health profiles. This concept will require restaurants to offer different menus tailored to fit individual health profiles. These advancements will necessitate collaboration between chefs and dietitians, ultimately greatly benefiting the restaurant industry.

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**Appendix A**

**Information Consent Letter**

.

# Auburn University

Auburn University, Alabama 36849-5605

College of Human Sciences

Department of Nutrition and Food Science  
328 Spidle Hall

Telephone: (334) 844-4261  
FAX: (334) 844-3268

## INFORMATION LETTER FOR

### Effect of Nutrition Training on the Knowledge of Culinary Students

You are invited to participate in a research study which will examine the effect of a formal nutrition training class on the knowledge of culinary students. This study is being conducted by Marilyn Hughes, PhD student majoring in Hotel and Restaurant Management, under the supervision of Dr. Susan Hubbard, Associate Professor at Auburn University. We hope to learn if there is a significant relationship between culinary students' pre and post-course scores on the National Restaurant Association examination. You were selected as a possible participant because you are enrolled in the Culinary Arts Institute at the Arts Institute of Atlanta.

If you decide to participate, we will ask you to complete the National Restaurant Association examination at the beginning and end of a ten-week course period. You will be given a neckerchief when you return the pre-course examination and a chef's hat when you return the post-course examination.

There are no risks associated with the completion of the above-mentioned examination. The examination scores will be summarized and reported only in-group form. The data collected may assist in the development of future nutrition training for culinary students.

Any information obtained in connection with this study will remain anonymous and will not be reported to others outside of the study.

You may refuse to participate, and may choose to stop at any time. If you refuse to participate or choose to stop, you will not be penalized and will not lose any benefits at the Culinary Arts Institute.

Your decision whether or not to participate will not jeopardize your future relations with the Culinary Arts Institute or Auburn University.

If you have any questions about this study, I invite you to ask them now. If you have questions later, the Principal Investigator, Marilyn Hughes, PhD student at Auburn University (404) 388-3135 ([mlhughes\\_us@yahoo.com](mailto:mlhughes_us@yahoo.com)) or Faculty Advisor, Dr. Susan Hubbard (334) 844-1333 ([hubbarsg@humandsciences.auburn.edu](mailto:hubbarsg@humandsciences.auburn.edu)) will be happy to answer them. This form is yours to keep.

For more information regarding your rights as a research participant, you may contact the Office of Research Programs by phone or e-mail. The people to contact there are Ms. Jeanna Sesser, IRB Administrator at (334) 844-5966 ([sassejb@auburn.edu](mailto:sassejb@auburn.edu)) or Dr. Steven Shapiro, IRB Chair (334) 844-6499 ([shapisk@auburn.edu](mailto:shapisk@auburn.edu)).

**HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. THE DATA YOU PROVIDE INDICATES YOUR WILLINGNESS TO PARTICIPATE.**

---

Marilyn Hughes, Principal Investigator

---

Dr. Susan Hubbard, Faculty Advisor

**Appendix B**

**Recruitment Flyer**



**ATTENTION:**  
**CULINARY STUDENTS**  
(WHO HAVE NOT TAKEN NUTRITION 101)

**FREE NECKERCHIEF**  
**FOR**  
**SURVEY**

**(ALSO ENTITLES YOU TO A FREE CHEF HAT**  
**AT THE END OF THE SEMESTER)**

**Survey table located in front**  
**of Creations Dining Room**

**Appendix C**

**National Restaurant Association  
Nutrition Examination for Culinary Professionals**

## I. INTRODUCTION TO NUTRITION AND NUTRITION GUIDELINES

1. **The science that studies nutrients and other substances in foods and how these nutrients relate to health and disease is called**
  - A. basal metabolism.
  - B. nutrition.
  - C. nutrient density.
  - D. adequacy.
  
2. **Why would a scientist burn a weighted portion of food and then measure the heat it produced?**
  - A. To determine the number of calories in the food
  - B. To determine the thermic effect of the food
  - C. To determine the essential nutrients of the food
  - D. To determine the amount of calcium in the food
  
3. **Which of the following is *not* one of the major classes of nutrients?**
  - A. Enzymes
  - B. Proteins
  - C. Vitamins
  - D. Water
  
4. **When discussing the characteristics of a nutritious diet, a doctor would describe a patient's diet as "adequate" but not "moderate" if**
  - A. the patient failed to receive enough essential nutrients.
  - B. the patient's dietary intake were below the RDA.
  - C. the patient's diet included large amounts of vitamins and fiber.
  - D. the patient's diet included an excessive amount of calories.
  
5. **Nutrients are important because they provide energy, and they**
  - A. increase the body's basal metabolism.
  - B. promote the body's growth and maintenance.
  - C. create the thermic effect of food.
  - D. promote the production of lipids.
  
6. **Which of the following correctly shows the order of food's journey through the human digestive system?**
  - A. Mouth, stomach, esophagus, rectum, intestines
  - B. Mouth, stomach, esophagus, intestines, rectum
  - C. Mouth, esophagus, stomach, intestines, rectum
  - D. Mouth, intestines, stomach, rectum, esophagus
  
7. **The Dietary Guidelines for Americans, published in 2000, encourage people to lower their intake of all of the following *except***
  - A. salt.
  - B. cholesterol.
  - C. whole grains.
  - D. saturated fat.
  
8. **The Food Guide Pyramid recommends 6–11 servings daily from which group?**
  - A. Bread, Cereal, Rice, and Pasta
  - B. Meat, Poultry, Fish, Dry Beans, Eggs, and Nuts
  - C. Milk, Yogurt, and Cheese
  - D. Vegetable

9. According to the Food Guide Pyramid, a dinner consisting of broiled chicken, a tossed salad, and skim milk should also include
- yogurt.
  - low-fat turkey.
  - brown rice.
  - brie cheese.
10. The exchange system categorizes and groups foods by the amount of carbohydrates, protein, fat, and
- vitamins.
  - minerals.
  - fiber.
  - calories.
11. In a typical "Nutrition Facts" panel on a food label, what is the first information that is listed?
- Calories
  - Serving Size
  - Total Carbohydrates
  - Sodium
12. Health claims on food labels are based on the relationship between the food and
- the age, gender, and expected life span of the individual consumer.
  - a daily exercise routine.
  - specific diseases or health conditions.
  - daily caloric intake.
13. The Dietary Guidelines for Americans, published in 2000, state that
- if alcoholic beverages are consumed, it should be done in moderation.
  - salt should be the primary seasoning for most foods.
  - alcoholic beverages should always be avoided.
  - fruits should be eaten three times per week.
14. The factors influencing an individual's food selection
- are numerous, and they include the cost of food.
  - do not interact with one another in any way when food decisions are being made.
  - can be categorized as ceremonial, political, and critical.
  - are objective and do not include the flavor of food.
- II. EXPLORING CARBOHYDRATES AND LIPIDS**
15. Which of the following foods contain saturated fat?
- Eggplant
  - Butter
  - Peas
  - Rice
16. The body digests and metabolizes fats
- almost immediately.
  - relatively easily.
  - with difficulty.
  - only in the stomach.

17. Starch and fiber are which of the following?

- A. Sugars
- B. Ketone bodies
- C. Monosaccharides
- D. Complex carbohydrates

18. An apple is a more healthful snack food than a chocolate chip cookie because

- A. the cookie contains more fiber.
- B. the cookie may cause hypoglycemia.
- C. all fruits contain less sugar than all cookies.
- D. the apple contains essential nutrients.

19. During digestion, the three enzymes in the intestinal wall

- A. produce bacteria and soluble fibers.
- B. break down all sugars into glucose, fructose, and galactose.
- C. gelatinize starches and produce gas.
- D. store glycogen and other polysaccharides.

Use the following scenario to answer questions 20 and 21.

Curtis eats about 2,200 calories daily. He wants to improve his eating habits, so he has decided to follow the dietary guidelines of the U.S. Department of Agriculture and the World Health Organization. Curtis is going to improve the quality of the foods he eats, but he is still going to consume 2,200 calories each day.

20. The maximum number of calories that Curtis should get from added sugars each day is

- A. 110.
- B. 220.
- C. 500.
- D. 800.

21. The minimum number of grams of fiber that Curtis should consume each day is

- A. 9.
- B. 18.
- C. 27.
- D. 54.

22. The common name for a lipid that is a solid at room temperature is a(n)

- A. fat.
- B. glycerol.
- C. oil.
- D. triglyceride.

23. Which of the following is true of linoleic acid and linolenic acid?

- A. They are found mainly in pork and beef.
- B. They provide little benefits besides enhancing the flavor of foods.
- C. They cannot be produced by the human body.
- D. They are components of bile that aid in digestion.

24. In scientific terms, a saturated fat is different from an unsaturated fat because it is saturated with

- A. oxygen atoms.
- B. carbon atoms.
- C. iron atoms.
- D. hydrogen atoms.

25. Cashew nuts do not contain any

- A. cholesterol.
- B. calories.
- C. fat.
- D. minerals.

26. Which of the following foods is high in starch?

- A. Peas

- B. Wheat
- C. Potatoes
- D. All of the above

- C. Yogurt
- D. Vegetable oil

27. **When purchasing meat for a restaurant, what is the difference between USDA Choice and Prime beef?**

- A. Choice contains more starch than Prime.
- B. Choice contains less fat than Prime.
- C. Choice must be stored at a lower temperature than Prime.
- D. Choice has a higher degree of rancidity than Prime.

32. **Which of the following foods is a good source of vitamin C?**

- A. Dry beans
- B. Potatoes
- C. Whole milk
- D. Eggs

### III. UNDERSTANDING THE ROLES OF PROTEIN AND VITAMINS

28. **Which of the following is a function of protein in the body?**

- A. Improving sensory function
- B. Building new tissue
- C. Irrigating the body
- D. Storing fat

33. **Which of the following are the building blocks of proteins?**

- A. Amino acids
- B. Antigens
- C. Folate and thiamin
- D. Pantothenic acid and biotin

29. **Which of the following is a common symptom of a person with a protein deficiency?**

- A. Difficulty breathing
- B. Poor blood clotting
- C. Stiffness in the joints
- D. Stunted growth

34. **If a person's pepsin is not adequately splitting peptide bonds, that individual**

- A. is probably having difficulty with digestion.
- B. has no amino acid pool.
- C. has night blindness.
- D. is likely to develop osteomalacia.

30. **Which vitamin is essential to health and vision?**

- A. A
- B. B<sub>12</sub>
- C. C
- D. K

35. **Which of the following side dishes on a menu contains complete proteins?**

- A. Cottage cheese with peaches
- B. Steamed broccoli
- C. Smoked almonds and cashews
- D. Peas with chopped carrots

31. **Which of the following foods is a good source of vitamin E?**

- A. Bacon
- B. Swiss cheese

36. **One danger of a diet that includes excessive amounts of beef and bacon is**

- A. the development of marasmus.
- B. increased risk of xerophthalmia.
- C. increased blood cholesterol levels.
- D. the development of rickets.

37. **Which type of countries have the most problems with protein-energy malnutrition (PEM)?**

- A. Slavic countries

*This examination is valid through August, 2001  
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- B. Mediterranean countries
- C. Industrial countries
- D. Developing countries

38. Which of the following statements about vitamins is false?

- A. Most vitamins are absorbed through food.
- B. Vitamins are generally measured in grams.
- C. The body cannot detect the difference between a natural and a synthetic vitamin.
- D. Vitamins do not contain calories.

39. Which of the following foods contains a large amount of vitamin D?

- A. Liver
- B. Oranges
- C. Soybeans
- D. Lettuce

40. Vitamin K helps the body with

- A. digestion.
- B. blood clotting.
- C. the prevention of xerosis.
- D. the production of all new cells.

41. Why do many chefs cook vegetables for as short a time as possible?

- A. To kill bacteria
- B. To conserve water
- C. To retain nutrients
- D. To decrease the vegetables' versatility

42. LaToya is the manager of a small grocery store and she has just received a shipment of produce. She should refrigerate all of the following *except* the

- A. lettuce.
- B. cherries.
- C. onions.
- D. carrots.

#### IV. WATER AND MINERALS AND AN INTRODUCTION TO HEALTHY COOKING

43. In the human body, waste materials are carried to the kidneys by

- A. vitamin A.
- B. minerals.
- C. protein.
- D. water.

44. Which of the following helps maintain water balance and acid-base balance in the human body?

- A. Calcium
- B. Magnesium
- C. Phosphorus
- D. Sodium

45. When planning a child's meal, which of the following should be added in order to include a selection that is high in calcium content?

- A. Low-fat yogurt
- B. Shrimp
- C. Tofu
- D. Oatmeal

46. Which mineral is associated with normal thyroid gland function?

- A. Iodine
- B. Zinc

- C. Fluoride  
D. Selenium
47. **Sheila is concerned about an iron deficiency, so the best thing for her to avoid is**
- A. coffee.  
B. poultry.  
C. fish.  
D. milk.
48. **Kindergarten student Raymond has extreme restlessness, and his teacher thinks that he has attention-deficit disorder; however, the school nutritionist suspects that Raymond's behavior problems could be corrected with a diet higher in**
- A. calcium.  
B. copper.  
C. iron.  
D. zinc.
49. **Derrick, an experienced and knowledgeable restaurant employee, has just received a shipment of pecan kernels, and he is going to store them**
- A. beside a window in a storage room.  
B. in a freezer.  
C. in a dark cupboard.  
D. in a refrigerator.
50. **A balanced meal will generally have no more than what percentage of its total calories from fat?**
- A. 4 percent  
B. 10 percent  
C. 30 percent  
D. 50 percent
51. **Besides ordinary drinking water, other sources of fluoride are**
- A. soybeans and peanuts.  
B. carrots and beets.  
C. oranges and peppers.  
D. seafood and tea.
52. **In desserts, a chutney differs from a traditional cream sauce in that it**
- A. contains more buttermilk than the sauce.  
B. is higher in alcohol content than the sauce.  
C. has a duller, more common flavor than the sauce.  
D. is lower in fat than the sauce.
53. **Cooking with egg whites instead of whole eggs results in an omelet that**
- A. has no cholesterol.  
B. has a fuller flavor.  
C. is quicker to prepare.  
D. usually costs less in restaurants.
54. **When cooking an entree, the most practical and healthful substitution for mayonnaise is**
- A. an egg.  
B. nonfat plain yogurt.  
C. buttermilk.  
D. creamed cottage cheese.
55. **Which of the following can be used as a low-fat thickener in sauce recipes?**
- A. Roux  
B. Cooked vegetable puree  
C. Egg yolks  
D. Cream
- V. **MARKETING HEALTHY MENUS AND BEVERAGES AND NUTRITION'S RELATIONSHIP TO HEALTH**

56. Benny is designing a survey to gather data about his customers' wants and needs regarding healthy menu options at his family restaurant. Which of the following is the most important question for Benny to include on this survey?

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- A. Do you bring your children to this restaurant?
- B. Are you willing to pay a slightly higher price for a healthy entree item?
- C. Do you enjoy dining at this restaurant?
- D. Would you order light, nutritious foods if they were offered at this restaurant?

57. Which of the following statements best describes what hospitality marketing is?

- A. Determining what customers want and need, developing products and services that meet those wants and needs, and promoting them.
- B. Determining the best places to advertise, developing effective ads, and conducting cost-benefit analyses of ad campaigns.
- C. Communicating to niche markets in order to create a positive product-service position.
- D. Managing product and service development in order to maintain a positive community image.

Use the following scenario to answer questions 58–60.

Joe Romandi owns the popular New Athens Restaurant. Although the New Athens has a reputation for delicious food, many of the regular customers have requested that Joe offer some meals that are more healthful than the usual fare. Joe has decided to add a "Healthy Eating" section to the menu.

58. Which of the following is the least expensive way for Joe to inform the greatest number of potential customers about the "Healthy Eating" section?

- A. Send fliers to patrons on his mailing list

- B. Send a press release to the editor of his local newspaper's Food Section
- C. Run commercials on a local radio station
- D. Run an ad in the Sunday newspaper

59. Joe should make sure that his waitstaff is able to do which of the following?

- A. Prepare the new items
- B. Explain why the changes were made in the menu
- C. Provide the recipes for the healthy entrees
- D. Respond to customer requests regarding ingredients, portions, and substitutions

60. What key question should Joe ask when determining whether the new "Healthy Eating" addition was successful?

- A. How did the new menu items affect the operation's overall profitability?
- B. Do the customers seem healthier?
- C. How long does it take to prepare each of the new items?
- D. Is there more or less food waste at the end of each day?

61. Which of the following graphic elements would be the best to use as a symbol on a new menu to indicate light dishes with low calorie counts?

- A. An overweight diner with a calculator
- B. A small shining sun
- C. The phrase HIGH FAT with a red letter X superimposed on it
- D. A male ballet dancer lifting a female ballet dancer

62. Which of the following correctly arranges the four beverages with regard to alcohol content, going from the lowest percentage to the highest percentage?

- A. Red Table Wine, Light Beer, Shot of Vodka, Bloody Mary

- B. Light Beer, Red Table Wine, Bloody Mary, Shot of Vodka  
 C. Red Table Wine, Light Beer, Bloody Mary, Shot of Vodka  
 D. Light Beer, Bloody Mary, Shot of Vodka, Red Table Wine
63. Which of the following is most important in the marketing of light beverages?
- A. Analyzing the surrounding market and the clientele's needs and wants  
 B. Finding light beverages that can be sold at the same price as "regular" beverages  
 C. Requiring all bartenders and servers to frequently consume the light beverages  
 D. Locating the lowest-priced light beverages available from distributors
64. Much evidence suggests that people at risk for high blood pressure can lower their chances of developing this condition by reducing their intake of
- A. sugar.  
 B. potassium.  
 C. sodium.  
 D. fiber.
65. What is the most common form of artery disease?
- A. Angina  
 B. Heart attack  
 C. Atherosclerosis  
 D. Myocardial ischemia
66. The treatment and healthy diet of a diabetic person is designed to maintain a proper balance between
- A. sugar and glucose.  
 B. ketone bodies and fat.  
 C. glucose and insulin.  
 D. hypoglycemia and monounsaturated fat intake.

67. Which vitamin is found only in animal products and therefore must be added as a supplement to a vegan diet?
- A. A  
 B. B<sub>12</sub>  
 C. K  
 D. D

## VI. WEIGHT MANAGEMENT AND NUTRITION OVER THE LIFE CYCLE

68. Obesity is defined as being what percent above ideal body weight?
- A. 10 percent  
 B. 20 percent  
 C. 30 percent  
 D. 40 percent

Use the following scenario to answer questions 69 and 70.

Christopher is 5' 9" tall and weighs 300 pounds. He wants to lose weight. Christopher is going to begin a carefully planned exercise program, and he wants to change his eating habits.

69. Which of the following behaviors will be most effective in helping Christopher achieve his goal?
- Using rice cakes as a reward for his positive actions
  - Eating only at his dining room table
  - Eating fast to satisfy his appetite more quickly
  - Keeping a knife and fork in his hands throughout the meal
70. Which of the following would be the most healthy and effective daily eating schedule for Christopher?
- 1 big meal for breakfast, 1 snack, and no other meals
  - 1 big meal for lunch, 4 snacks, and no other meals
  - 2 meals and 3 snacks
  - 3 meals and 1 snack
71. When planning a menu for weight loss and maintenance, which of the following should *not* be included as a possible snack?
- Low-fat popcorn sprinkled with garlic powder
  - Rice pudding made with skim milk
  - Peanut butter and jelly sandwich with wholegrain bread
  - Lightly salted pretzels
72. Athletes who “carbo load”—decreasing exercise and increasing the consumption of carbohydrates for three days prior to an important competition—believe that the technique will benefit them because the body will have increased
- sleep apnea.
  - levels of blood lipids.
  - glycogen stores.
  - cholesterol and triglycerides.
73. Which of the following is a sign of anorexia nervosa?
- Binging
  - Obvious weight gain
  - Brittle nails and hair
  - Eating salty snacks between meals
74. Judy recently gave birth to a healthy baby girl, Josephine. Judy is 18 years old, unemployed, and lives with her parents. She drinks one glass of wine about twice a month. Taking into account the health of both mother and daughter, what should Josephine be fed?
- Cow’s milk because of its high amount of protein
  - Powdered formula, which prevents any foodborne illness
  - Milk-based formula to promote jaw and tooth development
  - Breast milk to help build up the infant’s immunity system
75. When a woman becomes pregnant, her nutritional needs change and she requires 50 percent more
- calories.
  - folate.
  - protein.
  - sodium.
76. The most important indicator of a newborn infant’s future health status is its
- gender.
  - lung capacity.
  - mother’s history of drug use.
  - birth weight.
77. Which of the following would be the most healthy breakfast for a lactating mother?

- A. Bacon and buttered biscuits
- B. Sweetened cereal and coffee
- C. Yogurt with a sliced banana
- D. Waffles with maple syrup

- A. dairy products.
- B. meat, poultry, and fish.
- C. vegetables.
- D. water or fluids.

78. A preschooler may develop a food jag, which is a

- A. desire to mostly eat one favorite food.
- B. period of increased appetite.
- C. willingness to help with food preparation.
- D. signal to the parent that the child has eaten enough.

**IMPORTANT! You must hand in this examination to your instructor or proctor along with your answer sheet in order for your examination to be processed.**

79. Which of the following is recommended as part of a sensible weight-loss program?

- A. Considering certain foods as “off-limits”
- B. Eliminating between-meal snacks
- C. Setting reasonable weight-loss goals
- D. Daily weight checks

80. The Modified Food Pyramid for adults over age 70 has a different “base” than the regular Food Pyramid, because it recommends that seniors receive eight daily servings of

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**Appendix D**

**The Art Institute of Atlanta  
Culinary Arts Department  
Class Syllabus – CL 101 Nutrition**

The Art Institute of Atlanta Class Syllabus  
Culinary Arts Department

**Course Description**

**CL 101 NUTRITION**

This course provides an explanation of the basic principles of nutrition and their relationship to health, food preparation, and menu development. The structure, functions, and sources of nutrients, including carbohydrates, fats, vitamins, minerals, proteins, and water, are discussed. Current issues in nutrition are reviewed, including dietary guidelines, energy balance, vitamin supplements, and food fats. 4 credits hours can be earned for completion of this academic quarter.

**Course Competencies:**

Upon completion of this course, students will be able to :

1. Identify the changes in outcomes of food products during storage, preparation, and cooking process.
2. List the 6 groups in the current USDA Food Guide Pyramid and the recommended daily servings from each.
3. List the major nutrients contributed by each of the food groups.
4. Describe the characteristics, functions, and best sources of each major vitamin and mineral.
5. List the primary functions and best sources of each major vitamin and mineral.
6. Describe the process of human digestion.
7. Calculate the energy needs based upon basal metabolic rate and activity expenditure.
8. Discuss contemporary nutritional issues such as vegetarianism, heart-healthy menu menus and religious dietary laws.
9. Identify the correct USDA dietary guidelines and adopt recipes accordingly.
10. Categorize foods into exchange groups and plan menus using the exchange system
11. Identify techniques for healthy ingredient substitutions.
12. Evaluate diets in terms of the USDA recommended dietary allowances/dietary reference intakes.
13. Medical Nutrition Therapy for the most common chronic diseases.
14. Apply principles of nutrition to menu development.

**Textbook**

**Drummond, Karen and Brefere, Lisa, *Nutrition for Foodservice and Culinary Professionals [Fourth Edition]. Wiley. 2001***

**Equipment and Materials**

The Art Institute of Atlanta will provide the following tools and materials for your use during class meetings:

- Audio-visual equipment
- Computer Laboratories
- Library resource Center
- Supplemental Handouts

The students will be responsible for providing the following tools and materials during scheduled class meetings:

- Required textbook
- On Cooking CD-Rom
- Notebook and pen
- Culinary Uniform to include proper shoes and name tag (no hand, apron, or side towel necessary)

**Evaluation:**

Lectures, discussions, in and out of class assignments, projects, quizzes, exams, and guest lectures will achieve the objectives in this course.

**Grading Breakdown:**

Uniform and Participation	10%
Projects	20%
Midterm Exam	20%
Final Exam	30%
Quizzes	20%

There are no make-up grades for uniforms, projects, class participation, in-class assignments, and quizzes. Written Exams make-up will be only with the approval of your instructor because of a serious illness or family emergency.

**Grade Scale:**

94-100 =	A	(No A+)
90-93 =	A-	
86-89 =	B+	
84-85 =	B	
80-83 =	B-	
76-79 =	C+	
74-75 =	C	
70-73 =	C-	
67-69 =	D+	
65-66 =	D	(No D-)
Less than 65 =	F	

**Certification:** The Nutrition examination is externally audited by the Educational Institute of the National Restaurant Association. A passing grade of 75% must be earned in order to receive a certificate from the NRA.

**CLASS POLICIES:****Student Course Attendance Requirement**

Students who do not attend the first class meeting of a course for a quarter may be dropped from the class roster to allow other students to add that class to their schedules.

Students should be prepared to start the quarter the first day of classes and to add/drop courses early in the first week of the quarter to minimize absences. A student who registers for a course but does not attend the course during the first two weeks of the quarter will be administratively withdrawn and charged for the course.

**Course Attendance Policy**

1. Students are required to attend all class meetings, to arrive on time, and to stay for the duration of the class.
2. Students arriving late to class may be marked absent, students arriving 20 minutes, or more after the start of each class will be marked absent. Tardiness will be recorded by your instructor, and will affect your daily class participation grade. Students who leave class before the class is over without the approval of the instructor will be marked absent.
3. Students who accumulate more than three absences may be dropped from the course and a grade of "FS" (failed suspended) will recorded for the course. Students who are suspended receive no refund for the course. FS grades will calculate as an "F" in the GPA and CGPA.
4. There are no excused absences.

**Dress Code and Hygiene:**

The dress code for this class is consistent with other non-laboratory Culinary Arts classes. Clean white unwrinkled chef's coat, white trousers (quarters 1-3) checkered trousers (quarter 4-7), plain white undershirt, neckerchief and black non-skid shoes. Baseball Caps are not allowed in the classroom. Compliance with these professional standards of appearance is mandatory. Students not in complete and clean uniform at the start of class are subject to dismissal in order to rectify the situation. The student will lose uniform points from his/her daily score in addition to points lost due to eventual lateness.

It is assumed that all students will bathe or shower daily, and arrive for class clean, and absent of any bodily odor. Students will in all instances strive to maintain the highest levels of personal hygiene cleanliness.

Grooming policy for a non-laboratory Culinary Arts Class is to include fingernails to be trimmed and clean; no piercing or jewelry worn on or about the face; a plain ring worn on one finger only without a raised surface, but otherwise no other jewelry; clean shaven or facial hair not to exceed ¼ inch in length.

**Use of Cell Phones:**

The use of cell phones or pagers is prohibited in culinary classrooms. This includes kitchen labs, computer labs, and a traditional lecture classroom.

All cell phones and pagers must be set to silent/vibrate mode. Students are not permitted to make or receive calls during class. If a student needs to make a call, he /she may do so only during an approved class break and outside of a culinary classroom.

**Students with Special Needs:**

Any student that needs special considerations due to a disability is asked to identify their need to the instructor in private by the completion of first class. Any resulting class performance that may arise for those who do not identify their needs should not expect any special grading consideration.

It is The Art Institute of Atlanta's policy not to discriminate against qualified students with documented disabilities in its educational programs. If you have a disability-related need for adjustments or other accommodations in this class, contact the special needs coordinator. Please Note: the course outline is a guide for the quarter and may be modified/revised to enhance learning outcomes or by events outside the control of the instructor.

**COURSE CALENDAR**

A schedule of course activities by week:

<b>Week #</b>	<b>Objective</b>
1	Chapters 1 & 2
2	Chapters 3 & 4 Assign Project 1
3	Chapters 5 & 6 Quiz 1
4	Chapter 7 & 8 Quiz 2 Project 1 due Assign Group Project 2
5	Mid-term exam
6	Chapters 9 & 11
7	Preparation & Presentation of project 2
8	Chapter 10 Quiz 3
9	Chapters 12 & 13 Quiz 4
10	Final Exam



**Culinary Arts Program**  
**Required**  
**Knowledge and Competencies**  
**for**  
**The Art Institute of Atlanta--Culinary Arts**  
**CL 101-Nutrition**









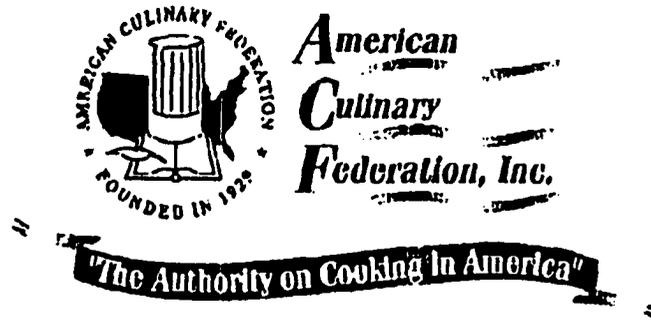








**Culinary Arts Program Required  
Knowledge and Competencies for the  
American Culinary Federation  
Accrediting Commission**



## Culinary Arts Program

# Required Knowledge and Competencies

for the

AMERICAN CULINARY FEDERATION  
ACCREDITING COMMISSION

## REQUIRED KNOWLEDGE AND COMPETENCIES

### *Cooking Programs*

**KNOWLEDGE AREA: Basic Baking**

**Course Numbers (s) and Titles Where Competencies are met (attach Course outlines/Syllabi):**

**PURPOSE:** To apply the fundamentals of baking science to the preparation of a variety of products. To use and care for equipment normally found in the bakeshop or baking area.

<b>COMPETENCIES: Students will be able to:</b>	<b>Course Number</b>	<b>Contact Lecture</b>	<b>Hours Lab</b>
1. Define baking terms.			
2. Identify equipment and utensils used in baking and discuss proper use and care.			
3. Demonstrate proper selection of equipment and utensils for specific application.			
4. Identify ingredients used in baking.			
5. Demonstrate proper scaling and measurement techniques.			
6. Apply basic math skill to recipe conversions.			
7. Describe properties and list function of various ingredients.			
8. Prepare crusty, soft and specialty yeast products.			
9. Prepare quickbreads.			

# REQUIRED KNOWLEDGE AND COMPETENCIES

## *Cooking Programs*

### **KNOWLEDGE AREA: Basic Baking**

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10. Produce a variety of types of pies and tarts.
11. Produce a variety of types of cookies.
12. Prepare a variety of types of cakes and describe techniques used in mixing, panning, baking and basic decorating.
13. Demonstrate basic icing and decorating techniques.
14. Prepare laminated doughs.
15. Prepare Choux pastries.
16. Prepare the three basic meringue types.
17. Prepare creams, custards, puddings and related sauces.
18. Prepare a variety of dessert sauces.
19. Discuss the application of mixes and other value added products.
20. Discuss nutritional concerns as they apply to baking, including recipe modifications.
21. Prepare a variety of basic hot soufflés.

**REQUIRED KNOWLEDGE AND COMPETENCIES**  
*Cooking Programs*

**KNOWLEDGE AREA: Basic Baking**

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22. Prepare fritters, crepes, cobblers and crisps.

23. Prepare a variety of fillings and toppings for pastries and baked goods.

24. Demonstrate the presentations of baked goods and desserts.

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## REQUIRED KNOWLEDGE AND COMPETENCIES

### *Cooking Programs*

#### **KNOWLEDGE AREA: Beverage Management**

**Course Numbers (s) and Titles Where Competencies are met (attach Course outlines/Syllabi):**

**PURPOSE:** To become familiar with and varieties of alcoholic and non-alcoholic beverages. To develop an appreciation for wine and food affinity. To explain laws and procedures related to responsible alcohol service.

<b>COMPETENCIES: Students will be able to:</b>	<b>Course Number</b>	<b>Contact Lecture</b>	<b>Hours Lab</b>
1. Identify local, state and federal laws pertaining to the purchase and service of alcoholic beverages.			
2. Discuss the basic production process for distillation and fermentation.			
3. Distinguish wines by grape and/or other fruit variety, country, growing region and production process.			
4. Evaluate the relationship of beverages to food.			
5. Identify and preparation, presentation and service of alcoholic, non-alcoholic and de-alcoholized beverages.			
6. Identify equipment and glassware used for beverage preparation and service.			
7. Discuss opening and closing procedures of a beverage operation.			
8. Identify levels of intoxication and methods to control excessive consumption by guests. Discuss Dram Shop Act and liquor law liability.			

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**REQUIRED KNOWLEDGE AND COMPETENCIES**

*Cooking Programs*

**KNOWLEDGE AREA: Beverage Management**

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9. Explain procedures for implementing internal beverage controls.

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**REQUIRED KNOWLEDGE AND COMPETENCIES**  
*Cooking Programs*

**KNOWLEDGE AREA: Business and Math Skills**

**Course Numbers (s) and Titles Where Competencies are met (attach Course outlines/Syllabi):**

**PURPOSE:** To perform mathematical functions related to foodservice operations

<b>COMPETENCIES: Students will be able to:</b>	<b>Course Number</b>	<b>Contact Lecture</b>	<b>Hours Lab</b>
1. Perform basic math functions			
2. Calculate food, beverage and cost percentages			
3. Calculate labor costs and percentages			
4. Demonstrate process of recipe yield adjustment.			
5. Demonstrate the process of recipe costing			
6. Determine selling price of menu items.			
7. Calculate payroll tax, tip credit, and other employee-related tax computations.			
8. Discuss a financial statement for a foodservice operation			
9. Perform calculations using current technology (i.e. computers, calculators, POS).			

**REQUIRED KNOWLEDGE AND COMPETENCIES**

*Cooking Programs*

**KNOWLEDGE AREA: Business and Math Skills**

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**REQUIRED KNOWLEDGE AND COMPETENCIES**

*Cooking Programs*

**KNOWLEDGE AREA: Dining Room Service**

**Course Numbers (s) and Titles Where Competencies are met (attach Course outlines/Syllabi):**

**PURPOSE: To perform dining room service functions using a variety of types of service. To demonstrate an understanding of quality customer service.**

<b>COMPETENCIES: Students will be able to:</b>	<b>Course Number</b>	<b>Contact Lecture</b>	<b>Hours Lab</b>
<ol style="list-style-type: none"> <li>1. Demonstrate the general rules of table settings and service.</li> <li>2. Describe specific American, English, French and Russian Service.</li> <li>3. Discuss service methods such as banquets, buffets and catering and a la carte.</li> <li>4. Describe the functions of dining service.</li> <li>5. Discuss training procedures for dining room staff.</li> <li>6. Discuss procedures for processing guest checks using current technology.</li> <li>7. Demonstrate an understanding of guest service and customer relations, including handling of difficult situations and accommodations for the disabled.</li> <li>8. Explain inter-relationships and work flow between dining room and kitchen operations.</li> <li>9. Discuss sales techniques for service personnel including menu knowledge and suggestive selling.</li> <li>10. Discuss industry efforts to combat excessive consumption</li> </ol>			

**REQUIRED KNOWLEDGE AND COMPETENCIES**

*Cooking Programs*

**KNOWLEDGE AREA: Dining Room Service**

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**REQUIRED KNOWLEDGE AND COMPETENCIES**

*Cooking Programs*

**KNOWLEDGE AREA: Food Preparation**

**Course Numbers (s) and Titles Where Competencies are met (attach Course outlines/Syllabi):**

**PURPOSE:** To develop skills in knife, tool and equipment handling and apply principles of food preparation to produce a variety of food products. To operate equipment safely and correctly. To apply knowledge of laws and regulations relating to safety and sanitation in the kitchen.

<b>COMPETENCIES: Students will be able to:</b>	<b>Course Number</b>	<b>Contact Lecture</b>	<b>Hours Lab</b>
<ol style="list-style-type: none"> <li>1. Demonstrate knife skills, hand tool and equipment operation, emphasizing proper safety techniques.</li> <li>2. Demonstrate how to read and follow a standard recipe.</li> <li>3. Identify and use utensils, pots and pans and demonstrate safe practices using stoves, mixers, ovens, etc..</li> <li>4. Demonstrate moist heat methods of cooking including roasting and baking, broiling and grilling, griddling, sautéing, frying, and deep frying.</li> <li>5. Demonstrate combined methods of cooking including braising and stewing.</li> <li>6. Utilize standard weights and measures to demonstrate proper scaling and measurement techniques.</li> <li>7. Identify and use herbs, spices, oils and vinegar, condiments, marinades and rubs.</li> <li>8. Identify and prepare meats, seafood, poultry and variety meats.</li> <li>9. Identify and prepare stocks, soups and sauces.</li> </ol>			

## REQUIRED KNOWLEDGE AND COMPETENCIES

### *Cooking Programs*

#### **KNOWLEDGE AREA: Food Preparation**

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|--|--|--|--|
| 10. Identify and prepare fruits, vegetables, starches, legumes and grain products. |  |  |  |
| 11. Identify and prepare salads and salad dressings.                               |  |  |  |
| 12. Identify and prepare hot and cold sandwiches.                                  |  |  |  |
| 13. Identify and prepare canapés and cold and hot hors d'oeuvre.                   |  |  |  |
| 14. Identify and prepare a variety of beverages, including coffees and teas.       |  |  |  |
| 15. Identify and prepare breakfast meats, eggs, cereals, and battered products.    |  |  |  |
| 16. Outline the procedure for writing a standardized recipe.                       |  |  |  |
| 17. Prepare written requisitions for recipe.                                       |  |  |  |

## REQUIRED KNOWLEDGE AND COMPETENCIES

### *Cooking Programs*

**KNOWLEDGE AREA:   Garde Manger**

**Course Numbers (s) and Titles Where Competencies are met (attach Course outlines/Syllabi):**

**PURPOSE:** To develop skills in producing a variety of cold food products. To prepare items appropriate for buffet presentation, including decorative pieces.

<b>COMPETENCIES: Students will be able to:</b>	<b>Course Number</b>	<b>Contact Lecture</b>	<b>Hours Lab</b>
1. Identify tools and equipment used in garde manger, emphasizing safety and sanitation procedures.			
2. Demonstrate basic garnishes.			
3. Preparation of cold items to include soups, salads, sauces, dressings, marinades, relishes, sandwiches, canapés and hors d'oeuvre.			
4. Demonstrate fundamental skills in the preparation and uses of aspic.			
5. Develop fundamental skills in the preparation of forcemeats (pates, galantines, ballatines, terrines and sausages).			
6. Prepare mousses and gelatins.			
7. Demonstrate food presentation techniques, i.e., platters, bowls and plates.			
8. Produce decorative centerpieces (ie. fruit, vegetable carvings, salt dough, tallow and ice carvings).			
9. Identify and discuss ingredients used in the cold kitchen.			

**REQUIRED KNOWLEDGE AND COMPETENCIES**

*Cooking Programs*

**KNOWLEDGE AREA: Garde Manger**

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10. Identify and discuss cheese and dairy product.

**REQUIRED KNOWLEDGE AND COMPETENCIES**

*Cooking Programs*

**KNOWLEDGE AREA: Human Relations Management**

**Course Numbers (s) and Titles Where Competencies are met (attach Course outlines/Syllabi):**

**PURPOSE:** To prepare for the transition from employee to supervisor. To evaluate styles of leadership and develop skills in human relations and personnel management.

<b>COMPETENCIES: Students will be able to:</b>	<b>Course Number</b>	<b>Contact Lecture</b>	<b>Hours Lab</b>
<ol style="list-style-type: none"> <li>1. Describe process of management through effective communication skills.</li> <li>2. Summarize leadership styles and analyze when each is most appropriate.</li> <li>3. Outline the supervisor's role in decision-making, problem solving and delegation of duties.</li> <li>4. Explain the role of job descriptions and specifications and develop written examples.</li> <li>5. Perform mock interviews, prepare resumes, job applications and cover letters.</li> <li>6. Describe procedures of new employee orientation.</li> <li>7. Compare training methods; construct an effective employee training program to include follow-up training and cross-training.</li> <li>8. Analyze types and methods of employee evaluation.</li> <li>9. Describe necessity of change and ways of implementing change with the least employee resistance.</li> </ol>			

**REQUIRED KNOWLEDGE AND COMPETENCIES**

*Cooking Programs*

**KNOWLEDGE AREA: Human Relations Management**

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10. Evaluate methods of conflict resolution and grievance procedures (union/non-union).

11. Identify reasons for disciplinary problems and discuss the supervisor's role in handling them.

12. Describe the procedure for terminating employees.

13. Analyze motivational techniques/problems; discuss procedures for attitudinal changes.

14. Analyze ways of dealing with stress in the workplace.

15. Discuss time management and other organizational management techniques.

16. Discuss legal issues related to managerial decisions ( sexual harassment, discrimination, violence/anger and unemployment compensation)

**REQUIRED KNOWLEDGE AND COMPETENCIES**  
*Cooking Programs*

**KNOWLEDGE AREA: Introduction to the Hospitality Industry**

**Course Numbers (s) and Titles Where Competencies are met (attach Course outlines/Syllabi):**

**PURPOSE:** To develop an understanding of the hospitality industry and career opportunities in the field. To investigate trade publications and professional organizations appropriate for continuing education. To become familiar with the organizational structure and basic functions of departments within hospitality and foodservice establishments.

**COMPETENCIES: Students will be able to:**

	Course Number	Contact Lecture	Hours Lab
1. Define hospitality and the philosophy of the hospitality industry.			
2. Trace the growth and development of the hospitality and tourism industry.			
3. Describe the various cuisines and contributions of leading culinarians.			
4. Identify professional organizations within the field; explain purposes and benefits.			
5. Outline the organization, structure and functional areas in various hospitality organizations as a perspective for later courses in menu planning, purchasing, food production and service, food and beverage controls, management, etc.			
6. Evaluate career opportunities through participation in field trips and guest speakers in class.			
7. Discuss/evaluate industry trends as they relate to career opportunities and the future of the industry.			
8. Discuss and evaluate industry trade periodicals.			
9. Discuss professional ethics practiced in the Industry.			

## REQUIRED KNOWLEDGE AND COMPETENCIES

### *Cooking Programs*

#### **KNOWLEDGE AREA: Menu Planning**

**Course Numbers (s) and Titles Where Competencies are met (attach Course outlines/Syllabi):**

**PURPOSE:** To apply the principles of menu planning and layout to the development of menus for a variety of types of facilities and service.

<b>COMPETENCIES: Students will be able to:</b>	<b>Course Number</b>	<b>Contact Lecture</b>	<b>Hours Lab</b>
1. List basic menu planning principles.			
2. Identify principles of menu layout and design.			
3. Create menu item descriptions following established truth-in-menu guidelines.			
4. Apply principles of nutrition to menu development.			
5. Determine menu prices utilizing proper cost controls.			
6. Plan a la carte, cycle, ethnic, banquet and buffet menu.			
7. Discuss importance of product mix, check average and their impact on profit contribution.			
8. Develop a menu layout for a foodservice operation.			
9. Discuss the availability of Food and Seasonal Menus.			

**REQUIRED KNOWLEDGE AND COMPETENCIES**

***Cooking Programs***

**KNOWLEDGE AREA: Menu Planning**

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10. Discuss Menu Planning resources (Internet, professional and vendors)

**REQUIRED KNOWLEDGE AND COMPETENCIES**  
*Cooking Programs*

**KNOWLEDGE AREA: Nutrition**

**Course Numbers (s) and Titles Where Competencies are met (attach Course outlines/Syllabi):**

**PURPOSE:** To describe the characteristics, functions, and food sources of the major nutrients and how to maximize nutrient retention in food preparation and storage. To apply the principles of nutrient needs throughout the life cycle to menu planning and food preparation.

<b>COMPETENCIES: Students will be able to:</b>	<b>Course Number</b>	<b>Contact Lecture</b>	<b>Hours Lab</b>
1. List the six food groups in the current USDA Food Guide Pyramid and the recommended daily servings from each. List the major nutrients contributed by each of the food groups			
2. Discuss the current dietary guidelines and adapt recipes accordingly.			
3. Evaluate diets in terms of the recommended dietary allowances.			
4. Describe the characteristics, functions and best sources of each of the major nutrients.			
5. List the primary functions and best sources of each of the major vitamins and minerals.			
6. Describe the process of human digestion.			
7. Calculate energy needs based upon basal metabolic rate and exercise expenditure.			
8. Discuss and demonstrate cooking techniques and storage principles for maximum retention of nutrients.			

**REQUIRED KNOWLEDGE AND COMPETENCIES**

*Cooking Programs*

**KNOWLEDGE AREA: Nutrition**

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9. Categorize foods into exchange groups and plan menus applying the exchange system.

10. Identify common food allergies and determine appropriate substitutions.

11. Discuss contemporary nutritional issues such as vegetarianism, heart healthy menus and religious dietary laws.

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## REQUIRED KNOWLEDGE AND COMPETENCIES

### *Cooking Programs*

#### **KNOWLEDGE AREA: Purchasing and Receiving**

**Course Numbers (s) and Titles Where Competencies are met (attach Course outlines/Syllabi):**

**PURPOSE:** To understand the overall concept of purchasing and receiving practices in quality foodservice operations. To apply knowledge of quality standards and regulations governing food products to the purchasing function. To receive and store food and non-food items properly.

**COMPETENCIES:** Students will be able to:

	Course Number	Contact Lecture	Hours Lab
1. Discuss the flow of goods in a foodservice operation.			
2. Describe the various formal and informal purchasing methods.			
3. Analyze market fluctuations and product cost.			
4. Discuss legal and ethical considerations of purchasing.			
5. Explain regulations for inspecting and grading of meats, poultry, seafood, eggs, dairy products, fruits and vegetables.			
6. Outline yield grades and National Association of Meat Purveyors (NAMP) specifications for meats.			
7. Write a bid specification.			
8. Evaluate received goods to determine conformity with user specifications.			
9. Receive and store fresh, frozen, refrigerated and staple goods.			

**REQUIRED KNOWLEDGE AND COMPETENCIES**

*Cooking Programs*

**KNOWLEDGE AREA: Purchasing and Receiving**

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- 10. Explain proper receiving and storing of cleaning supplies and chemicals.
- 11. Conduct yield and quality tests on canned, fresh, frozen and prepared food products.
- 12. Conduct a yield and cost comparison test of pre-fabricated products and on-premises butchered products.
- 13. Inventory food and non-food items on hand.
- 14. Explain the procedures for rotation of stock and for costing and evaluating, including FIFO and LIFO.
- 15. Describe proper procedures of issuing product according to requisition.
- 16. Describe current computerized systems for purchasing and inventory control.

**REQUIRED KNOWLEDGE AND COMPETENCIES**  
*Cooking Programs*

**KNOWLEDGE AREA: Sanitation and Safety**

**Course Numbers (s) and Titles Where Competencies are met (attach Course outlines/Syllabi):**

**PURPOSE:** To develop an understanding of the basic principles of sanitation and safety and to be able to apply them in the foodservice operations. To reinforce personal hygiene habits and food handling practices that protect the health of the consumer.

<b>COMPETENCIES: Students will be able to:</b>	<b>Course Number</b>	<b>Contact Lecture</b>	<b>Hours Lab</b>
<p>1. Identify the critical control points during all foodhandling processes as a method for minimizing the risk of foodborne illness (HACCP system).</p> <p>2. Identify microorganisms which are related to food spoilage and foodborne illnesses; describe their requirements and methods for growth.</p> <p>3. Describe symptoms common to foodborne illnesses and how these illnesses can be prevented.</p> <p>4. Demonstrate good personal hygiene and health habits.</p> <p>5. Use acceptable procedures when preparing potentially hazardous foods to include time/temperature principles.</p> <p>6. List the major reasons for and recognize signs of food spoilage.</p> <p>7. Outline the requirements for proper receiving and storage of both raw and prepared foods.</p> <p>8. Recognize sanitary and safety design and construction features of food production equipment and facilities. (i.e., NSF, UL, OSHA ADA, etc.)</p>			

**REQUIRED KNOWLEDGE AND COMPETENCIES**

*Cooking Programs*

**KNOWLEDGE AREA: Sanitation and Safety**

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- 9. Describe types of cleaners and sanitizers and their proper use.
  
- 10. Review Material Safety Data Sheets (MSDS) and explain their requirements in handling hazardous materials. Discuss right-to-know laws.
  
- 11. Develop cleaning and sanitizing schedule and procedures for equipment and facilities.
  
- 12. Identify proper methods of waste disposal and recycling.
  
- 13. Describe appropriate measures for insects, rodents and pest control eradication.
  
- 14. Conduct a sanitation self-inspection and identify modifications necessary for compliance with standards.
  
- 15. List common causes of typical accidents and injuries in the foodservice industry and outline a safety management program.
  
- 16. Demonstrate appropriate emergency policies for kitchen and dining room injuries.
  
- 17. Describe appropriate types and use of fire extinguishers used in the foodservice area.
  
- 18. Review laws and rules of the regulatory agencies governing sanitation and safety in foodservice operation.



**Culinary Arts Program**

**Required**

**Knowledge and Competencies**

for the

**AMERICAN CULINARY FEDERATION**  
**ACCREDITING COMMISSION**

**Appendix F**

**Study Outline for Culinary Student Nutrition Course**

### Study Outline for the NRA nutrition course examination

The course relies on the text book entitled *Nutrition for Foodservice and Culinary Professional, Fourth Edition*, by Karen Eich Drummond and Lisa M. Brefere, as the study outline to prepare for the nutrition course examination. The study outline with objectives for each chapter are listed below:

#### Chapter One

##### Objectives:

Consider factors that influence food selection. (Baskette, 1992)

Define nutrition, calorie, nutrient, and nutrient density.

Identify the classes of nutrients and their characteristics.

Describe four characteristics of a nutritious diet.

Define Dietary Reference Intakes.

Compare and Contrast the EAR, RDA, AI, and UL.

Explain the importance and function of the Dietary Reference Intakes.

Describe the processes of digestion, absorption, and metabolism, and how the digestive system works.

##### Topics Included:

1. Factors that influence food selection include culture and family; social and emotional factors; a desire to improve health and appearance; food cost, convenience and availability; flavor; and the environment.
2. Nutrients are the nourishing substances in food. 3. There are about fifty nutrients, which can be arranged into six groups: carbohydrates, lipids, proteins, vitamins, minerals, and water.

3. Food energy and its use in the body are measured in calories.
4. A nutritious diet has four important characteristics. It should be:
  - a. adequate, providing enough essential nutrients and calories.
  - b. balanced, not overemphasizing certain foods at the expense of others.
  - c. moderate, avoiding excessive amounts of calories and particular foods and nutrients.
  - d. varied, including many different foods.
5. The Food and Nutrition Board of the National Academy of Sciences sets the Dietary Reference Intakes, which provide nutrient recommendations for seven nutrient groups.
6. The gastrointestinal tract is a hollow tube running down the middle of the body, starting in the mouth and ending in the anus, where solid waste leaves the body.
7. Digestion and absorption are the processes by which food is broken down into its components and put to use in the body's tissues.

## Chapter Two

### Objectives:

List and discuss the Dietary Guidelines for Americans.

List the goals of the Food Guide Pyramid.

Describe how the Food Guide Pyramid encourages variety, proportionality, and moderation.

Use the Food Guide Pyramid and food labels to plan menus.

Discuss how the Exchange System is used, and how its advantages and disadvantages compare with the Food Guide Pyramid.

**Read with understanding the food label, including the Nutrition Facts panel, nutrient claims, and health claims.**

**Topics Included:**

- 1. The Dietary Guidelines for Americans outline recommendations for a healthy and nutritious diet.**
- 2. The recommendations are to aim for fitness, build a healthy base, and choose sensibly.**
- 3. The Basic Four approach has been replaced by the Food Guide Pyramid.**
- 4. The Pyramid shows how to get enough nutrients and how to avoid excesses of certain food components.**
- 5. The five nutrient-dense food groups in the Pyramid are bread, cereal, rice, and pasta; vegetables; fruit; milk, yogurt, and cheese; and meat, poultry, fish, dry beans, eggs, and nuts.**
- 6. The Exchange System groups foods by their calorie, carbohydrate, fat, and protein content.**
- 7. The Exchange Lists for Meal Planning have been developed for use by diabetics and for weight control.**
- 8. Most food labels now include information regarding nutritional content and ingredients.**
- 9. Daily Values are nutrient standards used on food labels to allow for nutrient comparisons among foods.**
- 10. Nutrient and health content claims can appear on food packages only if they follow legal definitions.**

### Chapter 3

#### Objectives:

**Distinguish between simple and complex carbohydrates.**

**Identify foods high in added sugars, natural sugars, starch, and fiber.**

**Discuss the health benefits of increased consumption of complex carbohydrates and decreased consumption of added sugar.**

**Describe how carbohydrates are digested, absorbed, and metabolized by the body.**

**Identify foods as being whole grains or refined grains.**

**State the dietary recommendation for carbohydrates.**

**Discuss the purchasing, storing, cooking and menu planning using grains, legumes, and pasta.**

#### Topics Included:

1. There are two categories of carbohydrates: simple carbohydrates (or sugars) and complex carbohydrates (including starch and fiber).
2. Simple carbohydrates include monosaccharides (single sugars), such as glucose, fructose, and galactose, and disaccharides (double sugars), such as sucrose, maltose, and lactose.
3. Sugar occurs naturally in some foods, such as fruit and milk.
4. Sugar alcohols are sugar-like compounds that occur naturally in fruits and vegetables.
5. Refined sugars, such as table sugar and corn syrup, are added to foods as sweeteners.

6. Health problems that can be linked to sugar consumption include obesity, diabetes, heart disease, hypoglycemia, and tooth decay.
7. Plants store glucose in the form of starch, which we eat in the form of cereal grains and some vegetables.
8. Fiber, which is found only in plant foods, has been found to provide many health benefits.
9. Whole grains are far more nutritious than refined grain.
10. Cooking carbohydrates makes them easier to digest.
11. The Food Guide Pyramid recommends that adults eat at least six servings of grain products, at least three servings of vegetables, and two servings of fruit daily.

#### **Chapter 4**

##### **Objectives:**

**Compare and contrast fats and oils.**

**List the functions of lipids in foods and in the body.**

**Identify the predominant form of lipid.**

**Define saturated, monosaturated, and polyunsaturated fats and list foods in which each is found.**

**Define trans fatty acids and give examples of foods they are found in.**

**Define cholesterol and lecithin, explain their functions, and tell where they are found in the body and in foods.**

**Discuss how fats are digested, absorbed, and metabolized.**

**Discuss the relationship between lipids and conditions such as heart disease and cancer.**

Articulate recommendations for dietary intake of fat, saturated fat, trans fat, monounsaturated fat, polyunsaturated fat, and cholesterol.

Discuss the purchasing, storage, cooking and menu planning for meat, poultry, fish and shellfish.

Describe rancidity

Distinguish between the percentage of fat by weight and the percentage of calories from fat.

Topics Included:

1. Fats, oils, cholesterol, and lecithin make up the group of compounds called **lipids**.
2. Most lipids in food and in the human body are in the form of **triglycerides**, which are made of three fatty acids attached to glycerol.
3. Fatty acids can be either saturated or unsaturated. Unsaturated fatty acids are either monounsaturated or polyunsaturated.
4. The biggest sources of saturated fat in the American diet are cheese, beef, milk, the fat baked in goods, margarine, and butter.
5. Monounsaturated fats include olive oil, canola oil, and peanut oil.
6. Polyunsaturated fats are found in safflower, corn, soybean, sesame, and sunflower oils, as well as in nuts and seeds.
7. Trans fats are made as a result of the hydrogenation process.
8. Two essential fatty acids that the body can't make are linoleic acid and linolenic acid.
9. Cholesterol, while necessary for normal body function, is linked to heart disease when its level in the blood is too high.

10. Fats are difficult for the body to digest, absorb, and metabolize.
11. To assist in metabolizing fats, the body creates lipoproteins, which include HDLs (high-density lipoproteins), LDLs (low-density lipoproteins), and VLDLs (very low-density lipoproteins).
12. Excessive fats in the diet and in the body have been associated with both heart disease and cancer. Therefore, the Dietary Guidelines for Americans recommends a diet low in fat, saturated fat, and cholesterol.
13. When purchasing and preparing meats, poultry, and fish, select a lean cut, order a quality product, trim all fat, use flavorful rubs and marinades, select an appropriate cooking method, think about how to flavor the dish, and make the portion look large and attractive on the plate.

## Chapter 5

### Objectives:

Identify the building blocks of protein.

List the functions of protein in the body.

Explain how protein is digested, absorbed, and metabolized.

Distinguish between complete and incomplete protein.

Explain the consequences of eating too much or too little protein.

Discuss the purchasing, storage, cooking, and menu planning for milk, dairy products, and eggs.

### Topics Included:

1. Although protein foods remain a central component of the diet, more emphasis is being placed on non-meat protein sources.

2. **Proteins are made of long chains of amino acids. There are twenty different amino acids in all.**
3. **Proteins have many important functions in the body. They are part of the body's structure; they help to build and maintain body tissues; they are found in many enzymes, hormones, and antibodies; they transport many substances through the bloodstream; and they help maintain the acid-base balance of the blood.**
4. **Protein is found in both animal and plant foods.**
  - a. **It is highest in meat, poultry, and fish.**
  - b. **Among plant foods, grains and legumes are usually richest in protein.**
  - c. **Animal proteins are complete proteins.**
  - d. **Most plant proteins are incomplete, but they can be combined with other foods to create complementary proteins.**
5. **Eating either too much or too little protein can cause health problems.**
6. **Most Americans eat more than the RDA for protein.**
7. **More protein is needed during pregnancy and infancy.**
8. **Negative nitrogen balance results during a starvation and some illnesses.**
9. **Milk is homogenized to create a permanent bond between the milk and cream.**
10. **Cheeses and yogurt are excellent sources of protein and calcium.**

## **Chapter 6**

### **Objectives:**

**State the general characteristics of vitamins**

**Identify the functions and food sources of each of the 13 vitamins.**

**Identify which vitamins are more likely to be deficient in the American diet, and the possible side effects of vitamin toxicity.**

**Describe ways to conserve vitamins when handling and cooking foods.**

**Discuss the purchasing, storage, cooking, and menu planning for fruits and vegetables.**

**Define functional foods and give examples of phytochemicals and the foods in which they are found.**

**Topics Included:**

- 1. Vitamins are needed in very small quantities but play enormous roles in the way the body functions.**
- 2. Most vitamins are obtained through food.**
- 3. Vitamins are classified as either fat-soluble or water-soluble.**
  - a. Fat-soluble vitamins include vitamins A, D, E, and K.**
  - b. Water-soluble vitamins include vitamin C and the B-complex vitamins.**
- 4. Vitamin A is important for eyesight, cell growth, skin and hair, and immune system function.**
- 5. Vitamin D is produced by the body when the skin is exposed to ultraviolet rays. It helps in maintaining blood calcium levels.**
- 6. Vitamin E functions as an antioxidant and plays a role in the development of nervous tissues.**
- 7. Vitamin K is essential to the production of blood-clotting chemicals.**
- 8. Vitamin C is an important antioxidant that prevents scurvy and helps form collagen.**
- 9. Thiamin, riboflavin, and niacin play key roles in energy metabolism.**

10. Vitamin B6 facilitates the breaking down of glucose and metabolizing protein.
11. Folate and vitamin B12 are both involved in the production of DNA.
12. Pantothenic acid and biotin are needed for energy metabolism.

## Chapter 7

### Objectives:

List the functions of water.

Identify the percent of body weight made up of water.

Recognize the importance of minerals and water to a healthy diet.

Identify the functions and foods sources of the major minerals: calcium, phosphorous, sodium, potassium, chloride, magnesium, and sulfur; and the trace minerals: chromium, copper, fluoride, iodine, iron, selenium, and zinc.

Discuss how high levels of minerals, such as lead, can be toxic, and how deficiencies can cause diseases such as osteoporosis and iron-deficiency anemia.

Discuss the purchasing, storage, and use of nuts and seeds in cooking.

Identify when supplements may be necessary.

### Topics Included:

1. Major minerals, such as calcium, chloride, magnesium, phosphorous, potassium, sodium, and sulfur, are needed in large amounts in the diet.
2. Trace minerals, such as iron, fluoride, and zinc, are needed in smaller amounts in the diet.
3. Water accounts for 50 to 60 percent of the average adult's body weight and plays a role in virtually every body process.
4. Calcium and phosphorous are important for healthy bones and teeth.

- a. Milk and milk products are the major sources of calcium in the diet.
  - b. Phosphorous is found in a wide variety of foods, including dairy products, meat, eggs, and legumes.
5. Magnesium is found in all body tissues. Good sources include green leafy vegetables, potatoes, nuts, legumes, and whole-grain cereals.
  6. Sodium, potassium, and chloride are electrolytes, which help the body maintain its water balance and acid base balance.
  7. Iron contributes to a variety of functions in the body, including oxygen transportation and storage, energy metabolism, and cell production. Iron deficiency is the most common nutritional deficiency.
  8. Zinc, present in all protein-containing foods, aids in wound healing, bone formation, DNA and protein synthesis, development of sex organs, and general tissue growth.
  9. Iodine is required for normal thyroid function
  10. Fluoride is obtained from drinking water, as well as tea and seafood. It contributes to the development of strong teeth in children.
  11. Chromium plays an important role in the body's metabolism of lipids.
  12. Copper aids in the formation of collagen and is a part of many important enzymes.
  13. Osteoporosis, characterized by the loss of bone density and strength, can be prevented by sufficient calcium intake and exercise.

**Chapter 8****Objectives:**

**Develop and evaluate healthy menu selections.**

**Define seasoning, flavoring, herbs, and spices.**

**Suggest ingredients and methods to develop flavor.**

**Identify techniques and cooking methods that are healthy.**

**Discuss different ways to present foods for maximum eye appeal.**

**Give examples of healthy dishes for each section of the menu.**

**Identify substitutions for ingredients to make a healthier dish.**

**Topic Included:**

1. **A healthy menu item is moderate in amount of calories, fat, cholesterol, and sodium.**
2. **Herbs are the leafy parts of certain plants that grow in temperate climates. Spices are the roots, bark, seeds, flowers, buds, and fruits of certain tropical plants.**
3. **Vinegars have a light, tangy taste and add flavor without fat; oils can be infused with fresh herbs, ground spices, fresh roots, and other ingredients.**
4. **Stock functions as the body of many soups, sauces, and other foods, as well as a flavor builder.**
5. **Glazes are stocks reduced to a thick, gelatinous consistency.**
6. **Rubs combine dry ground spices and finely cut herbs. Marinades are seasoned liquids used for soaking a food before cooking.**

7. Techniques used to develop flavor in healthy recipes include reduction, searing, deglazing, sweating, and pureeing.
8. Dry-heat cooking methods include roasting, broiling, grilling, sautéing, and stir-frying.
9. Among the moist-heat cooking methods are steaming, poaching, braising, stewing, and micro waving.
10. When presenting food items, attention should be given to height, color, shape, layout, and garnishes.
11. Recipes for appetizers, soups, salads and dressings, entrees, side dishes, desserts, and breakfast items can all be modified to reduce the number of calories and the amount of fat, cholesterol, sodium, and/or sugar.

## Chapter 9

### Objectives:

Describe two methods a foodservice operator can use to gauge customers' needs and wants.

Give three examples of how to draw attention to healthy menu options.

Discuss effective ways to communicate and promote a nutrition program to customers.

Explain the importance and extent of staff training needed to successfully implement healthy menu options.

Describe two methods used to evaluate healthy menu options.

Discuss how nutrition labeling laws affect restaurant menus.

**Topics Included:**

1. **Marketing means finding out what customers need and want and then developing, promoting, and selling the products and services they desire.**
2. **To determine customers' needs and wants, foodservice operators can interview servers about customer requests and /or conduct surveys among customers.**
3. **To inform customers of healthy menu options, foodservice operators can highlight menu selections, include a separate section on the regular menu, add a clip-on to the menu, and/or have servers describe nutritious items.**
4. **Three methods for promoting a nutrition program are advertising, sales promotion, and publicity.**
  - a. **Sales promotion can include coupons, point-of-purpose displays, or contests.**
  - b. **Publicity involves obtaining free editorial space or time in various media.**
5. **During staff training, servers needs to understand the rationale for the nutrition program; grand opening details; the ingredients, preparation, and service for each menu item; basic nutrition concepts; how to handle customers' special requests; and merchandising details.**
6. **The healthy menu program should be evaluated after it is launched.**
7. **Restaurants must comply with FDA rules concerning nutrient and health claims.**

**Chapter 10****Objectives:**

**List lower-calorie and lower-alcohol drink options.**

**State the number of calories in one gram of alcohol.**

**Define various types of bottled water.**

**Identify healthy snacks/appetizers.**

**Describe the steps a foodservice operator takes in order to market light beverages and foods.**

**Topics Included:**

- 1. Demand for lighter and lower-alcohol drinks has been on the rise for years.**
- 2. Customers who want lighter beverages can choose from among fruit juices, creamy drinks, alcohol-free wines, light beers, nonalcoholic malt beverages, wine coolers, wine spritzers, cocktails, and specialty coffees.**
- 3. Bottled water doesn't contain calories, sugar, caffeine, additives, preservatives, or, in most cases, a lot of sodium.**
  - a. Spring water is collected as it flows naturally to the surface**
  - b. Mineral water comes from a protected underground source.**
  - c. Sparkling water is any carbonated water.**
  - d. Other beverages considered bottled water include seltzer, club soda, and tonic water.**
- 4. Nutritious foods appropriate for beverage operations include fresh fruit, a variety of dips served with crudités, and baked tortilla chips.**
- 5. Marketing of light beverages and foods must be tailored for the specific clientele at which they are aimed.**
- 6. Bartenders and servers need to be trained about new offerings so that they can suggest options appropriately.**

**Chapter 11****Objectives:**

**List three risk factors for cardiovascular disease.**

**List three common forms of cardiovascular disease.**

**Explain how diet can play a role in the prevention and treatment of cardiovascular disease and cancer.**

**Distinguish between the Step I and Step II diets and explain when they are used.**

**List five menu-planning guidelines to lower cardiovascular risk.**

**List five lifestyles modifications for hypertension control.**

**Define cancer.**

**List five-menu-planning guidelines to lower cancer risk.**

**Distinguish between Type 1 and Type 2 diabetes mellitus.**

**Discuss three principles of planning meals for people with diabetes.**

**Name the major types of vegetarian eating styles.**

**State the health benefits of the vegetarian diet.**

**List five menu-planning guidelines for vegetarians.**

**Topics Included:**

1. **Cardiovascular disease and cancer are the two leading causes of death in the United States. The prevention and treatment of both diseases have a dietary component.**
  - a. **Arteriosclerosis, characterized by the buildup of plaque along artery walls, is the most common form of artery disease.**



- c. Vegans don't eat eggs or dairy at all.
  - d. Pescovegetarians eat seafood.
8. People choose to become vegetarians for health, ecological, ethical, and religious reasons.
  9. Vegetarian diets can provide adequate nutrition, but special attention must be paid to certain nutrients that are usually obtained through animal foods.
  10. Legumes and grains are often the staples in a healthy vegetarian diet.

## Chapter 12

### Objectives:

**Define obesity and overweight**

**Advantages of the three methods of measuring obesity**

**List the health implications of obesity**

**Possible causes of obesity**

**List the six components of a comprehensive weight-reduction program**

**Describe seven basic concepts of nutrition education when planning diets**

**Explain the relationship between exercise and weight loss**

**Define behavior and attitude modification theory**

**Discuss five strategies that appear to support weight maintenance**

### Topics Included:

1. Obesity is considered a disease in which genetic, environmental, and psychological factors, among others are involved.
2. Obesity can be measured using height-weight tables.

3. Another frequently used method of measuring degree of obesity uses a formula called body mass index (BMI).
4. Obese people are at increased risk for hypertension, high cholesterol, Type 2 diabetes, and coronary heart disease.
5. Three theories that focus on the physiological aspect of diabetes are the fat cell theory, the set point theory, and the dietary obesity theory.
6. Current approaches to treating obesity tend to focus on exercise, reducing the amount of fat in the diet, and behavior and attitude modification.
7. A person is considered underweight if he or she weighs 10 percent below the listing in the height-weight tables.
8. Athletes have special dietary requirements, including an increased need for water and complex carbohydrates.

## **Chapter 13**

### **Objectives:**

**Explain why good nutrition during pregnancy is so vital**

**Identify nutrients that must be supplemented during pregnancy**

**Plan menus for women during pregnancy and lactation**

**Describe infant feeding during the first year, including the progression of solid foods**

**Plan menus for preschool and school-age children**

**Describe influences on children's and adolescents' eating habits**

**Plan menus for preschool and school-age children**

**Distinguish between anorexia nervosa, bulimia nervosa, and binge eating disorder**

**List factors that influence the nutrition status of adults and older adults**

**Plan menus for healthy older adults****Topics Included:**

1. **Good nutrition during pregnancy is critical to the health of both mother and baby.**
  - a. **The need for certain nutrients, such as folate and vitamin B12, increases dramatically during pregnancy.**
  - b. **Alcohol and foods known to contain harmful substances (even in small amounts) should be avoided.**
2. **Lactating mothers need extra calories, protein, and fluids.**
3. **Breastfeeding has been shown to be the healthiest way to feed infants, and is on the rise in the United States.**
4. **Small children's appetites fluctuate with rate of growth.**
5. **Parents should be patients with the picky eating habits of preschoolers.**
6. **School-age children are better eaters and will try a wider variety of foods.**
7. **Adolescents begin to take more control over their teenage children.**
8. **Eating disorders, such as anorexia nervosa, and binge eating disorder, are most common among adolescent girls and young women and can be deadly.**
9. **The nutritional needs and concerns of the elderly are influenced by both physical changes and social factors.**

The current final examination is based on a nutrition course which consists of the text entitled *Nutrition for Foodservice and Culinary Professionals, Fourth Edition*, by Karen Eich Drummond and Lisa M. Brefere, and the NRA student workbook.

**Appendix G**

**Letter of Approval from Arts Institute of Atlanta**

**Letter of Approval from the National Restaurant Association**



July 24, 2001

Ms. Marilyn Hughes, M.S., R.D.  
120 Treebrook Way  
Fairburn, GA 30213

Dear Ms. Hughes:

After reviewing your graduate proposal with our President and Dean of Education, we at The Art Institute of Atlanta have approved your request to survey Culinary Students for your dissertation based on the following stipulations:

1. The Art Institute of Atlanta receives a copy of your dissertation once completed.
2. You present the findings of your study to the Culinary Faculty at a Faculty Workshop here at AIA.
3. The Art Institute of Atlanta is acknowledged in your final paper.

Upon your agreement to these terms we can meet to discuss the details and administration of your survey.

Any questions, please feel free to call me, and I look forward to working with you and participating in your study at Auburn University.

Sincerely,

CULINARY ARTS

A handwritten signature in cursive script that reads 'Sarah Gorham, CEC'.

Sarah Gorham, CEC  
Director

November 26, 2002

Marilyn Hughes  
Auburn University  
328 Spidle Hall  
Auburn, AL 36849  
Fax 770.719.1201

Dear Ms. Hughes:

On behalf of the National Restaurant Association Educational Foundation, I am pleased to grant you permission to reproduce the examination for *Nutrition for the Foodservice Professional*, #8504. The permission is extended for use in your dissertation and for fifteen copies total.

Please include the following credit line: "Reproduced with permission from the National Restaurant Association Educational Foundation, copyright 2001."

If you would like to change or extend the parameters of this permission in the future, please contact me to discuss the proposed change. Thank you for your interest in the NRAEF.

Regards,



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