NUTRITION AND HEALTH SCIENCES (NUTR)

NUTR 100 Healthy Living
Description: Various risk factors and personal behaviors that affect health. Practical methods for self-assessments and improving and maintaining physically active and healthy eating habits designed to enhance awareness of short- and long-term risks and to achieve a higher level of wellness.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: FITN 112B; NUTR 252; NUTR 256; NUTR 356; NUTR 454
Course and Laboratory Fee: $35

NUTR 131 The Science of Food
Crosslisted with: CHEM 131, FDST 131
Description: Covers general and food chemistry, nutrition, food microbiology, food safety and quality, standards that are enforced by regulatory agencies, and food processes applied to improve food quality, shelf life and safety.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: FDST 205
ACE: ACE 4 Science

NUTR 131H The Science of Food
Crosslisted with: FDST 131H, CHEM 131H
Description: Covers general and food chemistry, nutrition, food microbiology, food safety and quality, standards that are enforced by regulatory agencies, and food processes applied to improve food quality, shelf life and safety.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 4 Science

NUTR 150 Career Preparation in Nutrition and Health Sciences
Description: Process of career preparation and planning. Philosophy and goals of academic programs, curricula, certifications, career opportunities and graduate programs in the Department of Nutrition and Health Sciences.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Pass No Pass

NUTR 213 Meat Specifications and Procurement
Crosslisted with: ASCI 213
Notes: For those students who have an interest in a career in Culinary Science, Meat Science, and/or Dietetics.
Description: Selecting and purchasing meat for the hotel, restaurant, institutional industry, and the retail markets.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NUTR 230 Peer Health Education
Prerequisites: Permission
Notes: Requires serving as a Wellness Advocate in the University living units to gain experience in utilizing the information learned.
Description: The role of Wellness Advocate in the promotion of the health and wellness needs of college students. Techniques for promoting the adoption of lifestyle choices for lifelong health and well being.
Credit Hours: 1-2
Min credits per semester: 1
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option

NUTR 244 Scientific Principles of Food Preparation
Prerequisites: Sophomore standing; FACS or HRTM or NUTR major
Description: Chemical, physical, sensory, and nutritional principles of food preparation.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: NUTR 371

NUTR 245 Scientific Principles of Food Preparation Laboratory
Prerequisites: Must enroll in both NUTR 244 (lecture) and NUTR 245 (lab)
Description: Application of chemical, physical, sensory, and nutritional principles of food preparation.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option
Prerequisite for: NUTR 371
Course and Laboratory Fee: $45

NUTR 246 Anatomical Foundations of Human Movement
Prerequisites: BIOS 214 - Human Anatomy with a grade of C or higher
Description: Will provide knowledge of structure, function, and position of fibrous, skeletal, muscular, and nervous tissue of the human body for the application of analyzing human movement in exercise and sport.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

NUTR 250 Human Nutrition and Metabolism
Prerequisites: 4 hours chemistry or biological sciences
Description: Introduction to nutrient function in the body, nutrient chemistry and energy metabolism. Role of nutrients in health and disease.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NUTR 251 Nutrition Through the Life Cycle
Prerequisites: NUTR 250.
Description: Influence of normal physiological stress on nutritional requirements throughout the life cycle: pregnancy, lactation, growth, and aging.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
NUTR 252 Nutrient and Fitness Assessment
Prerequisites: NUTR 100, NUTR majors only
Description: Introduction to and practical application of tools frequently used to estimate fitness levels and dietary intake; association among physical activity, nutrition, and health; health screening and risk classification; principles of assessment and various assessment strategies.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

NUTR 253 Cultural Aspects of Food and Nutrition
Description: The influences of culture on food and nutrition practices.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
ACE: ACE 9 Global/Diversity

NUTR 255 Special Topics in Health
Prerequisites: NUTR 201.
Description: Series of minicourses devoted to specific content areas of health.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option

NUTR 256 Addressing Health Disparities through Health Literacy
Prerequisites: NUTR 201
Description: Understanding of health disparities existing at national and local levels through a social justice lens and the role of health literate communication in reducing health disparities, as well as its limitations.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: NUTR 408

NUTR 298 Special Topics in Nutritional Science and Dietetics
Prerequisites: As announced by department.
Description: Topics vary.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded with Option

NUTR 299 Independent Study
Prerequisites: 6 hrs in major department or closely related areas and permission.
Notes: Work supervised and evaluated by departmental faculty members.
Description: Individual projects in research, literature review, or creative production.
Credit Hours: 1-5
Min credits per semester: 1
Max credits per semester: 5
Max credits per degree: 5
Grading Option: Graded with Option

NUTR 302 Health Information: Science, Media, and the Consumer
Prerequisites: NUTR 250 and NUTR major
Description: Critical evaluation, interpretation and communication of consumer health messages.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL/SPR
ACE: ACE 2 Communication Competence

NUTR 330 Environmental Health
Crosslisted with: NRES 330
Prerequisites: Class standing of sophomore or above with at least one semester of chemistry and biology.
Description: Provides a comprehensive understanding of how environmental exposures to physical, chemical and biological hazards influence human health. Offers basic knowledge in the core concepts of toxicology, exposure and risk, vulnerable populations and the interrelationship between human, animal and environmental health.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL/SPR
ACE: ACE 8 Civic/Ethics/Stewardship

NUTR 344 Nutrition and Food for Optimal Health
Prerequisites: NUTR 250; NUTR majors only; or permission
Description: Implementation of dietary guidelines and recommendations, nutrient assessment methodologies, concepts of healthy menu planning, and scientific principles of food preparation in promotion of optimal health.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL/SPR
Course and Laboratory Fee: $140

NUTR 351 School Health Issues
Description: Prevalence and etiology of health behaviors among children and teens. Organization, development, and legal aspects of school health programming.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NUTR 352 Social Marketing in Health Communication
Prerequisites: Junior standing. NUTR majors only.
Description: Application of the social marketing framework to analyze public health problems and design program solutions.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
NUTR 355 Introduction to Sports Nutrition
Prerequisites: BIOS 213; NUTR 250
Description: Understanding of fundamental principles of sports nutrition. Tools and knowledge to evaluate scientific literature and to develop evidence-based diet and supplementation strategies aimed at maximizing athletic performance.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

NUTR 356 Nutrition Education in the Community
Prerequisites: NUTR 100 and 250.
Description: Overview of community nutrition. Assessment of community needs and services; policy formation; techniques for developing and delivering theory-based nutrition education.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

NUTR 370 Food Production Management
Prerequisites: NUTR 244 and 245.
Description: Application of food production and purchasing principles in foodservice management.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NUTR 371 Applied Food Production Laboratory
Prerequisites: NUTR 244 and 245.
Description: Application of theoretical knowledge and quality assessment is provided in university or community laboratory setting.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option
Course and Laboratory Fee: $20

NUTR 372 Food Safety and Sanitation
Prerequisites: One course in chemistry and one course in biological sciences.
Description: Various factors that result in food illness: food allergy, natural toxins, parasites, microbial and viral food borne infections and food borne intoxications. Students will assess hazards, identify critical control points and establish monitoring and system verification procedures.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL

NUTR 384 Biomechanics of Human Movement
Prerequisites: Junior standing; BIOS 214
Description: Anatomical and mechanical principles as related to human movement.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Course and Laboratory Fee: $20

NUTR 399 Independent Study
Prerequisites: Permission.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Pass No Pass

NUTR 400 Planning and Implementation of Health Promotion Programs
Prerequisites: NUTR 250 and junior standing
Description: Theory-based process of developing health promotion/education programs. Principles of planning, implementing and evaluating health education interventions will be taught using evidence-based research.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL/SPR
Prerequisite for: NUTR 404; NUTR 487
Experiential Learning: Case/Project-Based Learning

NUTR 401 Health Behavior
Prerequisites: Junior standing.
Description: Social, psychological, and cultural factors that influence the adoption, maintenance, and modification of health behaviors in communities.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NUTR 404 Evaluation and Research Related to Health Promotion
Prerequisites: NUTR 400
Description: Introduction to research, study designs, and data collection methods in health and behavior-change related studies, including exercise, nutrition, and health education. Emphasis on understanding research literature and development of research/grant proposals.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: NUTR 406

NUTR 406 Management and Administration of Health Promotion Programs
Prerequisites: NUTR 404
Description: Overview of systems approach to the management of resources needed to plan, implement, and evaluate a health education/promotion program including financial, human, curricula, and physical resources. Qualities of effective leadership will be explored and evaluated.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

ACE: ACE 10 Integrated Product
Experiential Learning: Research
NUTR 407 Principles of Epidemiology for Nutrition and Public Health
Crosslisted with: NUTR 807
Prerequisites: NUTR 250 and 3 cr hrs Statistics
Description: Application of basic concepts of epidemiology to nutrition and public health to include epidemiological research design, estimating outcome measures and determining cause and effect and effectiveness of interventions to prevent and treat disease.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

NUTR 408 Community Health Advocacy
Prerequisites: NUTR 256
Description: Will provide knowledge of health policy development in the United States and with opportunities to apply health advocacy skills through learning, reflection, and engagement with local organizations.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

NUTR 420 Molecular Nutrition
Crosslisted with: NUTR 820
Prerequisites: For NUTR 420: BIOS 206 and BIOC 431, or parallel. For NUTR 820: None
Notes: A neuroscience course is a plus, although not required.
Description: The mechanisms of nutrient sensing and transport, and how nutrients regulate physiological processes at the molecular level.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Experiential Learning: Case/Project-Based Learning

NUTR 429A Food Security: A Global Perspective
Crosslisted with: PLAS 429A, AGRO 829A, HORT 829A, NRES 429A, NRES 829A, NUTR 829A
Prerequisites: Junior standing
Description: Overview of the technical and sociocultural dimensions of global food insecurity.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Experiential Learning: Case/Project-Based Learning

NUTR 430 Nutritional Anthropology
Crosslisted with: ANTH 430, ANTH 830, NUTR 830
Prerequisites: ANTH 242 or equivalent.
Description: Anthropological approaches to the study of nutrition. Background to nutrition science; bio-cultural aspects of obesity, fertility, lactose intolerance, and infant feeding practices; biological differences in nutritional requirements, fertility, and mortality; interpretation of nutritional deficiencies in skeletal remains; reconstructing prehistoric diets from archaeological evidence; and evaluation of relationships between dietary patterns and dental remains in fossil record.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NUTR 440 Research Critiques in Extracellular Vesicles
Crosslisted with: NUTR 840
Prerequisites: NUTR 440: BIOS 213 & BIOS 213L, and BIOC 431 or parallel with prior knowledge of biochemistry, physiology, or its equivalent. For NUTR 840: None
Description: Physiological and pathological adaptations of Extracellular vesicles (EV). By reading, discussing, and presenting reviewed scientific manuscripts, learning about the current limitations in the EV biology field, how to critically review a scientific manuscript, and how to provide scientific presentations are emphasized in a journal-club format.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Experiential Learning: Case/Project-Based Learning

NUTR 445 Obesity Diseases and Human Health
Crosslisted with: NUTR 845
Prerequisites: NUTR250, BIOS 213 & BIOS 213L or parallel
Notes: Prior knowledge of biochemistry, physiology or advanced nutrition and metabolism or its equivalent needed
Description: Introduction to the prevalence of over nutrition, which results in the development of obesity, maternal obesity and metabolic syndrome. Current research topics will include complications of obesity and obesity-during pregnancy.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Experiential Learning: Case/Project-Based Learning

NUTR 449 Culinology Research Experience
Prerequisites: Senior standing; FDST 448
Description: Supervised individual professional Culinology research experience in product development.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Pass No Pass

NUTR 450 Medical Nutrition Therapy I
Prerequisites: BIOC 401 and 401L, or BIOC/BIOS/CHEM 431; BIOS 213 or ASCI 240.
Description: Nutrition assessment, nutrition support, documentation of nutrition services and medical terminology.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: NUTR 452

NUTR 452 Medical Nutrition Therapy II
Prerequisites: NUTR 450
Description: Nutrition in the disease state. Physiological and biochemical basis of medical nutrition therapy.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
NUTR 453 Nutrition and Fitness Communication Strategies
Prerequisites: NUTR 250 with NHS Major only
Description: Application of behavior change and counseling theories to individual clients. Data assessment and interpretation, and developing goals and/or outcomes to facilitate health behavior changes.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NUTR 454 Peer Nutrition Education
Prerequisites: Junior standing; NUTR 100.
Description: Practical experience in developing skills in nutrition for health promotion and nutrition education.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option
Course and Laboratory Fee: $60

NUTR 455 Advanced Nutrition
Prerequisites: BIOC 401 and 401L, or BIOC/BIOS/CHM 431; BIOS 213 or ASCI 240, or parallel.
Description: Biochemical and physiological aspects of human nutrition. Nutrient transport, storage and utilization under various metabolic states and relationships to the development of chronic diseases.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: NUTR 492
ACE: ACE 10 Integrated Product

NUTR 456 Clinical Exercise Physiology
Crosslisted with: NUTR 856
Prerequisites: NUTR 486/886 or equivalent.
Description: Cardiovascular, pulmonary, metabolic, pharmacologic, endocrinologic, renal, neurologic, inflammatory, and orthopedic aspects of clinical exercise physiology as they relate to exercise testing and programming.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL/SPR

NUTR 457 Classroom and Outreach Experiences in Food and Nutrition
Description: Supervised classroom or outreach experiences in educational or community settings.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NUTR 470 Cost Control for Foodservice
Crosslisted with: NUTR 870
Prerequisites: NUTR 370.
Description: Principles of cost control for foodservice. Integration of cost control and foodservice/restaurant management principles which influence financial integrity. Utilization of the computer as a tool to enhance decision making capabilities.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option

NUTR 471 Vines, Wines and You
Crosslisted with: PLAS 471, HORT 871, NUTR 871, HRTM 471, HRTM 871
Prerequisites: 6 hrs science or equivalent experience; 21 years of age or older
Notes: Proof of age is required.
Description: Origin, botany, historical and cultural significance of the grapevine and related species. Principles and practices of vineyard establishment, management and processing of grape products, importance and/or scope of grape and wine industry; global and local significance. Culinary applications, health, environmental and safety-related issues, business and industry relations and experience.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Course and Laboratory Fee: $95

NUTR 473 Organization and Administration of Foodservice
Crosslisted with: NUTR 873
Prerequisites: NUTR 370.
Description: Organizational, administrative, and human relations concepts to foodservice. Utilization of computer applications in administration of a foodservice facility.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: NUTR 973

NUTR 480 Introduction to Functional Electrocardiography
Crosslisted with: NUTR 880
Prerequisites: NUTR 486; NUTR 484
Description: Theory and application of electrocardiography in graded exercise testing.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NUTR 484 Physiology of Exercise
Crosslisted with: NUTR 884
Prerequisites: BIOS 213 or equivalent.
Description: Effects of physical activity on the circulatory, respiratory, and other physiological processes.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: NUTR 486, NUTR 886; NUTR 488; NUTR 858
Course and Laboratory Fee: Total Seats Needed: 110
NUTR 486 Exercise Testing and Exercise Programming in Adult Fitness and Cardiac Rehabilitation
Crosslisted with: NUTR 886
Prerequisites: NUTR 484; EDPS 459 or STAT 218
Description: In-depth analysis and development of the techniques and knowledge prerequisite for certification in adult fitness and cardiac rehabilitation as prescribed by the American College of Sports Medicine.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded
Prerequisite for: NUTR 456, NUTR 856
Course and Laboratory Fee: Total Seats Needed: 110
Experiential Learning: Case/Project-Based Learning

NUTR 487 Community Health and Wellness Practicum
Prerequisites: NUTR 400. Community Health and Wellness majors only.
Notes: Background check will be required.
Description: Application of health education concepts and skills in a practical setting while serving as a health education resource person.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded

NUTR 488 Practicum in Exercise and Health Behavior Planning
Prerequisites: NUTR 484
Description: Practical experience in exercise testing and analysis and planning of health and fitness programs for individuals.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NUTR 492 Nutrition Problems
Prerequisites: NUTR 455 or equivalent, and permission.
Description: Individual problems may be selected from diet therapy, animal feeding, metabolism studies, or surveys.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded with Option

NUTR 493 Workshop Seminar
Credit Hours: 1-12
Min credits per semester: 1
Max credits per semester: 12
Max credits per degree: 12
Grading Option: Graded with Option

NUTR 494 Essentials of Strength Training & Conditioning
Crosslisted with: NUTR 894
Prerequisites: Junior Standing
Description: Overview of the scientific principles and practical applications of strength and conditioning that integrate physiological responses, adaptations, testing, exercise techniques, program design, and periodization for athletic performance.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

NUTR 496 Independent Study
Crosslisted with: NUTR 896
Prerequisites: 12 hrs in major related areas; permission.
Notes: Supervised and evaluated by departmental faculty members.
Description: Individual projects in research, literature review, or creative production.
Credit Hours: 1-5
Min credits per semester: 1
Max credits per semester: 5
Max credits per degree: 5
Grading Option: Graded with Option

NUTR 497Z Student Teaching Multicultural
Crosslisted with: TEAC 497Z, SPED 497Z
Description: Supervised teaching experiences in schools. Accompanying seminar focuses on: teacher certification, teacher and student rights and responsibilities, proper conduct of teachers, selected legal aspects of education, methods of communicating with parents and community members, and current issues which impact education.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Pass No Pass
Course and Laboratory Fee: $25
Experiential Learning: Student Teaching/Education Practicum

NUTR 498 Research Experiences
Prerequisites: Senior standing and permission.
Description: Participation in an ongoing research project. Select from foods, human nutrition education, small animal, or survey research areas.
Credit Hours: 1-5
Min credits per semester: 1
Max credits per semester: 5
Max credits per degree: 5
Grading Option: Graded with Option
Experiential Learning: Research

NUTR 498A Global Research Experiences in Nutrition and Health
Crosslisted with: GLST 498B
Notes: Self-paced course. Can result in publication. Suitable for domestic and international research experiences.
Description: Structuring a global research experience while strengthening research and science communication skills and enhancing global competency and awareness.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded
Experiential Learning: Research

NUTR 499H Honors Thesis
Prerequisites: Good standing in the University Honors Program or by invitation.
Description: Conduct a scholarly research project and write a University Honors Program or undergraduate thesis.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Experiential Learning: Research