Master of Science Program in International Sports Science and Smart Health Technology
Department of Exercise and Health Science, NTUNHS

Required Courses

Research Methodology

This course trains students in the conduct of scientific research and provides methodologies for such research. It includes rigorously identifying research questions, proposing solutions, collecting and analyzing data. The course culminates with an introduction to writing research reports and dissertations.

Data Management & Statistical Analysis:

This course aims to enhance students' abilities to interpret and apply statistical methods related to exercise and health sciences. It assists students in understanding the appropriate timing for various statistical tests, supplemented by discussions on literature related to health issues and the use of advanced statistical software for practical data handling. The course presents information through easily understandable charts and explanations. In addition to reviewing descriptive statistics, the curriculum emphasizes inferential statistics, including t-tests, analysis of variance, regression, correlation analysis, and other practical statistical analyses.

Individual Studies in Smart Exercise Health Technology:

This course delves into advanced research and practices in the fields of exercise and health science as well as health technology, encompassing core knowledge and applications in exercise physiology, sports nutrition, sports psychology, and training. By integrating theoretical learning with practical applications, students will master the use of scientific methods to assess, design, and implement exercise programs that enhance health and athletic performance. The curriculum emphasizes interdisciplinary learning, aiming to cultivate critical thinking, problem-solving skills, and a global perspective, thereby preparing students for careers in the global exercise and health science industry. Additionally, the course provides an overview of health technology, covering a wide range of topics such as digital health, mobile applications, wearable technology, health information systems, telemedicine, machine learning, artificial intelligence, and big data. Students will learn to evaluate the opportunities and challenges associated with these technologies and explore their effectiveness in improving public health and healthcare

worldwide, with particular focus on the application of digital health in exercise prescription. Featuring case studies on the use of immersive interactive training devices, the course illustrates how digital health technologies can be effectively to devise exercise plans, offering optimal solutions for exercise program design.

Individual Study:

This course is designed to guide students through in-depth studies on specific topics or issues, utilizing interdisciplinary knowledge and develop research questions and methodologies. Students will learn how to formulate research plans, collect and analyze data, and acquire skills in writing research reports. In addition, through the reading of academic literature, students will gain a comprehensive understanding of the existing knowledge on the topic and identify research gaps.

Master Thesis:

This course is designed to enhance students' writing skills and cultivate their ability to compose academic articles for successful publication in peer-reviewed journals. Upon completing this course, students should be able to execute a preliminary research project and achieve the following objectives: 1. Become proficient in the methods, techniques, and proper formatting of academic writing, such as APA style. 2. Improve writing skills through the critique of academic papers. 3. Understand the submission processes, review procedures, and basic requirements of academic journals. 4. Learn the skills for oral presentations and the creation of posters.

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Elective Subjects

Area of Sport and Health Science

Individual Study in Exercise Psychology:

This course explores the theories and applications of psychology in fitness and exercise, aiming to cultivate an in-depth understanding of exercise psychology among students. Topics include motivation, stress management, self-efficacy, and team dynamics, with a focus on discussing empirical research. Students will learn how to apply psychological theories to enhance athletic performance and improve fitness motivation. The course also involves group research projects and case studies, fostering Individual research skills and critical thinking. This course is ideal for students interested in pursuing research in exercise psychology or related fields.

Individual Study in Applied Exercise Physiology:

This course is designed to enable students to understand the physiological adaptions and mechanisms that occur during various intensities and duration of exercise. The curriculum includes the selection and presentation of literature to enhance students' expertise in exercise guidance. Additionally, the course covers concepts and training methods related to physical fitness and athletic performance.

Special Study in Skeletal Muscle and Exercise:

This course is designed to develop and enhance the student's understanding of the field of muscle physiology and the body's responses to exercise. The curriculum focuses on the relationship between cellular structure/function, muscle histology/organization and the functional characteristics of skeletal muscle, as well as the impact of exercise on muscle performance under normal and pathological situations. In addition, the training effects of long-term exercise on muscle physiological and biochemical changes will be discuss as well.

Individual Study in Exercise Respiratory and Circulation:

This course is a lecture series on systemic circulation and respiratory control during exercise. Students will learn about cardiovascular and respiratory regulation within the field of exercise

science. Additionally, they will learn how to introduce and critically review academic research articles.

Fitness Exercise Training Program Design:

The course aims to train students in developing the health promotion programs by exploring and applying health promotion theories. It involves designing and developing health promotion plans tailored to the diverse health needs of various populations, and planning, testing, and evaluating these plans through research methodologies. The course content includes the history and development of health promotion, the process of developing health promotion programs, methods for evaluating health promotion programs, theories and models related to individual and community health promotion, commonly used health promotion techniques and methods, and the practical application of these theories and techniques in promoting individual, family, and community health. Additionally, the course examines the factors influencing the promotion of health promotion programs from various perspectives such as marketing, mass media, gender, and cultural diversity.

Special Topics in Functional Training:

This course comprises seven main sections: foundational theory, stretching and warm-up, lower body training, core training, upper body training, enhanced training, and Olympic weightlifting. The foundational theory section aims to introduce the concepts and principles of functional training, helping students understand principles of movement, objectives, and practical skills. Students will also learn how to tailor professional training programs to meet the client needs. Upon completing this course, students will be able to integrate theory and practice, applying what they have learned in daily training and professional settings.

Individual Study in Special Populations and Adapted Physical Education :

This course focuses on the components of exercise prescription, teaching students how to design exercise programs for special populations, including the considerations of individuals health conditions, diseases, or disabilities. The curriculum covers background knowledge,

assessment/evaluation, exercise selection, and development of specific exercise plans for special populations. Student will be able to devise, implement, and follow up on exercise program, using physical activity instruction and training to provide opportunities for special populations to enhance physical fitness, promote health, thereby improve quality of life.

Area of Smart Health Technology

Special Topics in Smart Enablement and Sports Technology:

This course aims to train students in using smart technology devices to assess physical activity functions and design personalized exercise prescriptions and training guidance. The goal is to assist individuals facing mobility challenges, frailty, those at high risk of muscular insufficiency, sub-healthy populations, and older adults at high risk of cognitive function impairment in improving their quality of life.

Individual Study in Multimedia Exercise and Sports Training Technology:

This course aims to help students understand the concepts and strategies of multimedia production and develop smart health technology capabilities. Upon complete this course, students are able to understand the concept of planning and design, creative analysis, creative project planning, and teamwork. Furthermore, students can extend and combine their specialties in health technology, and their creativity can be applied to the field of professional skills learning as a basis for future career in practice and research.

Individual Study in Exercise Equipment and Ergonomic Design Development:

This course seeks to provide a comprehensive overview of exercise equipment design and ergonomics, equipping students with the knowledge and tools necessary for developing user-centered exercise equipment. Lectures and practical sessions within the course cover topics such as material selection, manufacturing techniques, and the latest technology trends in exercise equipment design. Students will also learn about the regulatory and ethical issues involved in the developing exercise equipment. Through participation in the case studies and hands-on projects, students will acquire the skills to assess and improve existing designs and

propose innovative solutions that enhance exercise technology and athletic performance.

Signal Capture and Data Processing Analysis:

This course introduces signal capture and data processing analysis, focusing on methods commonly used in sports medicine research. It aims to equip students with the skills needed for data collection, processing, and analysis to enhance research productivity. Students will learn to transform experimental data into academic outcomes through statistical analysis, chart creation, and poster presentation techniques. Additionally, the course includes advanced data processing techniques emphasized in the context of human-computer interaction using LabVIEW. Students will enhance their data visualization skills by creating and fine-tuning charts. Visits to renowned laboratories and the reading of academic literature will also help expand students' understanding of the latest developments in sports medicine.

Individual Study in Assistive Technology and Rehabilitation in Sports Medicine:

This course explores the role of assistive technology and rehabilitation in sports medicine, with an emphasis on engineering, technology, and rehabilitation principles. It aims to educate students on how assistive devices and rehabilitation methods can aid athletes and individuals with disabilities. The course introduces the design, implementation, and potential effects of assistive technologies within the context of sports medicine. Through theoretical learning and case studies, students will learn to assess current applications of assistive technologies and explore the future development of assistive and rehabilitation technologies. The course is designed to stimulate students' thinking about the challenges and possibilities of using technology to improve athletic performance and quality of life.

Software Development for Mobile Device Application:

This course is designed to familiarize students with the design, development, evaluation, and use of digital health applications, particularly in the context of exercise and health management. The course will guide students through a comprehensive exploration of key issues related to digital health applications, including design principles, user experience, mobile app development,

exercise data collection and analysis, health promotion, and health status monitoring. Students will learn how digital health applications can help users change their physical activities, promote health, and enhance the effectiveness of exercise and health management. Throughout the course, students will have the opportunity to design and develop their own exercise health application and assess and optimize its effectiveness through methods such as user feedback and data analysis.