



**SPORT SCIENCE & MANAGEMENT
SS9002 PRINCIPLES OF STRENGTH TRAINING**

Pre-requisites	None required
No of AUs	3
Contact Hours	Total hours: 39 Lectures: 13

Course Aims

More than 600 muscles are used by humans to work, exercise, play and accomplish daily tasks. The skeletal muscle is our body's most abundant tissue making about 22-26% of a female's body mass and about 40-44 % of a male's body mass. Adequate muscle strength is important at every stage of our life to move with ease, improve bone health, efficient glucose tolerance and better metabolism, better posture, avoid injuries, enhance self-esteem and have an improved quality of life This module is structured to provide a concept and practice-based knowledge on muscular fitness and conditioning.

Intended Learning Outcomes (ILO)

At the end of this course, you (as a student) should be able to:

1. Explain the different components of muscular fitness
2. Describe the terminology, safety concerns, and proper techniques using both free weights and machines.
3. Perform weight training exercises for major muscle groups using correct posture and technique
4. Manage a personal and sustainable muscular fitness plan
5. Monitor strength training and assess strength gains
6. Develop safe practices in strength training

Course Content

The following key topics are going to be covered:

1. Introduction to health, exercise and fitness
2. General principles of exercise and physical fitness
3. Factors affecting muscular fitness
4. Types of strength training
5. Designing a personal exercise programme
6. Core strength training
7. Upper body strength training
8. Lower body strength training strength
9. Body mechanics, posture, neck and back health

Assessment (includes both continuous and summative assessment)

Component	Course ILO Tested	Related Programme LO or Graduate Attributes	Weighting	Team/ Individual	Assessment rubrics
1. Practical assessment	ILO #1-6	A1, A2, A3, B1, B3, B4, B5, C1, D1, D2, E1, E2	60%	Individual	Appendix 1
2. Theoretical assessment	ILO #1-6	A1, A2, B1, B2, C1	30%	Individual	Appendix 1
3. Professional Qualities	ILO #1-6	D1, E1, E2	10%	Individual	Appendix 2
Total			100%		

Graduates of the SSM programme should show:

Competence	
A1: {Understanding}	process and interpret information, evidence and methodologies related to sport science or sport management
A2: {Self-discipline}	independently apply themselves to solve relevant problems
A3: {Modern Tool Usage}	use technology to communicate and provide feedback on sports activities, improve sports performance, monitor and increase physical activity, provide exercise prescription, solve problems for disadvantaged athletes/sportspeople, and commercialize and innovate sports products, events and services
Creativity	
B1: {Critical Thinking}	critically assess the applicability of sport science and sport management tools toward problems and in the workplace
B2: {Analytical Thinking}	critically analyse data from a multitude of sources
B3: {Interdisciplinary Thinking}	connect the subfields of sport science and sport management to tackle problems

B4: {Innovation}	be able to develop new applications or improve existing techniques
B5: {Entrepreneurship}	develop new ideas and plans for sport science, businesses and events
Communication	
C1: {Effective Communication}	present findings or ideas from sport science and sport management research logically and coherently at the appropriate level for the intended audience and in all forms of communication
C2: {Teamwork}	work in teams on projects that require sport science or sport management application, and communicate results via demonstration, verbally and in written form
Civic-Mindedness	
D1: {Professionalism}	act in a manner that respects the profession and meets the expectations of the sport science and sport management industry
D2: {Inclusiveness}	promote sport and physical activity in all individuals to bring people together and improve physical, social and psychological outcomes
Character	
E1: {Ethical behaviour}	act with integrity and in a socially responsible and ethical manner in line with societal and legal expectations in relation to collecting and analysing data of people and protecting personal data with appropriate computer security
E2: {Sportsmanship}	demonstrate appropriate safety, concern and good conduct in sport situations towards other individuals involved in the activity
Formative feedback	
Generic feedback will be provided to Quiz. Upon the completion of the presentation, as a group, you will be provided with verbal feedback pertaining to your assessed performance.	
Learning and Teaching approach	

Approach	How does this approach support you in achieving the learning outcomes?
Theoretical session or segment of the class	Lectures will provide background information about key topics in strength training
Practical sessions or segment of the class	Sessions encompassed by a variety of teaching styles (Direct Teaching, Guided Discovery etc). Instructor must be able to provide the accurate model during demonstration for you to observe the movement. Actions and teaching cues related to the accurate movement will be taught to allow you to learn the “what”, “why” and “how”. Instructor will also provide feedback to you during sessions.

Reading and References

1. Corbin, C.B., Welk, G., Corbin, W.R., & Welk, K.A. (2009). Concepts of fitness and wellness (Eighth edition). McGraw-Hill.
2. Fahey, T.D., Insel, P.M., & Roth, W.T. (2009). Fit and Well (Eighth edition). McGraw-Hill.
3. Nieman, D.C. (2007). Exercise Testing and Prescription (Sixth edition). McGraw-Hill.
4. Sharkey, B.J., & Gaskill, S.E. (2007). Fitness and Health (Sixth edition). Human Kinetics.
5. Hoffman, J. (2006). Norms for fitness, performance and health. Human Kinetics.
6. ACSM's guidelines for exercise testing and prescription (Eight edition). Lippincott Williams & Wilkins.

Course Policies and Student Responsibilities

(1) General

You are expected to complete all assigned pre-class readings and activities, attend all classes – lecture and laboratory - punctually and submit all scheduled assignments and take tests by due dates. You are not allowed to swap laboratory groups without express permission from the course coordinator. You are expected to take responsibility to follow up with course notes, assignments and course related announcements for sessions they have missed. You are expected to participate in all discussions and class activities unless there is a valid medical reason not to do so.

(2) Absenteeism

Absence from class without a valid reason will affect your overall course grade. Valid reasons include falling sick supported by a medical certificate and participation in NTU's approved activities supported by an excuse letter from the relevant bodies.

If you miss a lecture, you must inform the course instructor via email prior to the start of the class.

(3) Absence Due to Medical or Other Reasons

If you are sick and not able to complete a test or submit an assignment, you have to submit the original Medical Certificate (or another relevant document) to the Sport Science & Management (or Home School) administration to obtain official leave. Without this, the missed assessment component will not be counted towards the final grade. There are no make-ups allowed.

(4) Attire and safety

You are expected to participate in practical laboratory activities. Some of these activities involve physical exercise. You are expected to wear appropriate attire for participation, obey laboratory safety rules, and take appropriate care of and return all equipment after use.

Academic Integrity

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the [academic integrity website](#) for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Collaboration is encouraged for your work in the class and laboratories because peer-to-peer learning helps you understand the subject better and working in a team trains you to better communicate with others. Working together and exchanging ideas and experiences will help improve the quality of your assessed presentation. It is important to credit others for their contribution to your work which promotes ethical practices and academic integrity.

Course Instructors

Instructor	Office Location	Phone	Email

Planned Weekly Schedule

Week	Topic	Course LO	Readings/Activities
1	<ul style="list-style-type: none"> • Introduction to health, exercise and fitness • General principles of exercise and physical fitness • Basic muscle structure and functions • Understanding muscular fitness and adaptations to training • Health and performance benefits of muscular fitness 	1-6	All students/participants will be required to do moderate-intensity exercise on different equipment

	<ul style="list-style-type: none"> Familiarisation to strength training equipment 		
2	<ul style="list-style-type: none"> Preparing for strength training Factors affecting muscular fitness Types of strength training Guidelines for strength training in healthy adults Evaluation of readiness for strength training Concepts of warm-up and warm-down Safe practices in strength training Familiarisation to strength training equipment 	1-6	All students/participants will be required to do moderate-intensity exercise on different equipment
3	<ul style="list-style-type: none"> How to select the right resistance/weight? Learning the correct posture and techniques of strength training Setting personal goals Preparing muscle fitness exercise logs Designing a personal exercise programme Familiarisation to strength training equipment Safe practices in strength training 	1-6	All students/participants will be required to do moderate-intensity exercise on different equipment
4	<p>Core strength training</p> <p>-Basic theory of the core muscles</p> <ul style="list-style-type: none"> Non-equipment-based Equipment-based 	1-6	All students/participants will be required to do moderate-intensity exercise on different equipment. Exercise logs will be maintained.
5	<p>Upper body muscular fitness training</p> <p>-Arms and shoulders</p> <ul style="list-style-type: none"> Non-equipment-based Free weights-based Machine/stack weight-based 	1-6	All students/participants will be required to do moderate-intensity exercise on different equipment. Exercise logs will be maintained.
6	<p>Upper body muscular fitness training</p> <p>-Chest and upper trunk</p> <ul style="list-style-type: none"> Non-equipment-based Free weights-based Machine/stack weight-based 	1-6	All students/participants will be required to do moderate-intensity exercise on different equipment. Exercise logs will be maintained.
7	<p>Upper body muscular fitness training</p> <p>- Abdomen and lower trunk</p> <ul style="list-style-type: none"> Non-equipment-based Free weights-based Machine/stack weight-based 	1-6	All students/participants will be required to do moderate-intensity exercise on different equipment. Exercise logs will be maintained.
8	<p>Lower body strength training</p> <p>-Hip, buttocks, adductors and abductors</p>	1-6	All students/participants will be required to do

	<ul style="list-style-type: none"> • Non-equipment-based • Free weights-based • Machine/stack weight-based 		moderate-intensity exercise on different equipment. Exercise logs will be maintained.
9	<p>Lower body muscular fitness training</p> <p>-Thigh and leg</p> <ul style="list-style-type: none"> • Non-equipment-based • Free weights-based • Machine/stack weight-based 	1-6	All students/participants will be required to do moderate-intensity exercise on different equipment. Exercise logs will be maintained.
10	<p>Lower body strength training</p> <p>-Thigh and leg</p> <ul style="list-style-type: none"> • Non-equipment-based • Free weights-based • Machine/stack weight-based 	1-6	All students/participants will be required to do moderate-intensity exercise on different equipment. Exercise logs will be maintained.
11	Body mechanics, posture, neck and back health	1-6	
12	Assessment – theory and practical	1-6	Students/participants will be assessed on the theoretical concepts, terminology, practical demonstrations, exercise techniques, exercise monitoring and fitness assessments, knowledge of safe practice and developing fitness programmes

Appendix 1: Assessment Criteria for Practical and Theoretical Assessment

Assessment Components & Levels of Competency	Approaching Expectations (0-5 marks)	Meeting Expectations (6-10 marks)	Above Expectations (11-15 marks)	Beyond Expectations (16-20 marks)
Practical Assessment (60%)				
Skill (Practical) (20%) Demonstrates competency in motor skills and movement patterns. Able to apply these skills and patterns to a variety of physical and sporting activities	<ul style="list-style-type: none"> Performs the assigned 'Free Weights' exercises incorrectly Provides a poor description of the exercise technique fundamentals and sport applications of the exercises 	<ul style="list-style-type: none"> Performs the assigned 'Free Weights' exercises awkwardly Provides a fair description of the exercise technique fundamentals and sport applications of the exercises 	<ul style="list-style-type: none"> Performs the assigned 'Free Weights' exercises correctly Provides an adequate description of the exercise technique fundamentals and sport applications of the exercises 	<ul style="list-style-type: none"> Performs the assigned 'Free Weights' exercises correctly and confidently Provides an accurate description of the exercise technique fundamentals and sport applications of the exercises
Skill (Theory) (20%) Demonstrates understanding of physiological concepts, principles, strategies and tactics, as they apply to strength training and the performance of physical and sporting activities	<ul style="list-style-type: none"> Poorly describes the assigned topic with little supporting evidence 	<ul style="list-style-type: none"> Adequately describes the assigned topic with little supporting evidence 	<ul style="list-style-type: none"> Accurately describes the assigned topic with some supporting evidence 	<ul style="list-style-type: none"> Accurately and comprehensively describes the assigned topic with excellent supporting evidence
Strength (Practical) (20%) Achieves a 'personal best' in an isotonic relative muscular strength 1RM test	Weight lifted for a specified number of repetitions, during the test, will be translated into a score based on the Table for College-age men & women (Heyward, V. H., & Gibson, A. L. (2014). <i>Advanced Fitness Assessment and Exercise Prescription</i> (7th ed.). Champaign, IL: Human Kinetics)			

Assessment Components & Levels of Competency	Meeting Expectations (0-10 marks)	Above Expectations (11-20 marks)	Beyond Expectations (20-30 marks)
Theory Assessment (30%)			
Written Assignment (30%) Demonstrates ability to design an 8-week, post-season, periodised, resistance training programme, to develop strength, hypertrophy, power and/or endurance for enhanced sporting performance	<ul style="list-style-type: none"> Does not show adequate understanding and may not sufficiently cover any of the points listed below Does not adequately describe the Training and Exercise Parameters required to meet the training goal of the 8-week programme Contains poorly referenced facts, errors and misconceptions 	<ul style="list-style-type: none"> Shows a fair to good understanding by covering <u>some</u> (50 - 60%) of the relevant points listed below Adequately describes the Training and Exercise Parameters required to meet the training goal of the 8-week programme Contains some poorly referenced facts, errors and misconceptions 	<ul style="list-style-type: none"> Shows a very good to excellent understanding by covering <u>many</u> (70%) of the relevant points listed below Accurately describes the Training and Exercise Parameters required to meet the training goal of the 8-week programme in a well-structured, focused and cohesive manner Provides relevant supporting evidence Shows evidence of critical thinking and in-depth understanding
	<u>Assessment of the Athlete</u> <ul style="list-style-type: none"> Physical Testing and Evaluation Training Status <u>Evaluating the Sport</u> <ul style="list-style-type: none"> Sport-Specific Exercises Muscle Balance 	<u>Training Parameters</u> <ul style="list-style-type: none"> Periodization Training Variables Training Routine <u>Exercise Parameters</u> <ul style="list-style-type: none"> Types & Order of Exercises Safe & Effective Resistance Training 	

Appendix 2: Professional Qualities

As an individual, you will be assessed on the effective demonstration of appropriate qualities as befitting a student. The considerations are detailed in the table below, and the individual's performance is rated on a 3-point scale ranging from "Above Expectation" to "Below Expectation." The weighting for these considerations is 10%.

Qualities for consideration	Expectation		
	Above (2)	Met (1)	Below (0)
Punctuality			
Appropriate attire and participation			
Adequate effort in participating in all activities with others			
Willingness to accept responsibility and learn			
Good sportsmanship			