



**SPORT SCIENCE & MANAGEMENT  
SS3113 APPLIED SPORT INJURIES**

|                           |   |                 |   |
|---------------------------|---|-----------------|---|
| <b>Academic Year</b>      | 2019/20   | <b>Semester</b> | 1 |
| <b>Course Coordinator</b> |   |                 |   |
| <b>Course Code</b>        | SS3113  |                 |   |
| <b>Course Title</b>       | Applied Sport Injuries  |                 |   |
| <b>Pre-requisites</b>     | SS2108 (Fundamentals of sports injuries)                      |                 |   |
| <b>No of AUs</b>          | 3   |                 |   |
| <b>Contact Hours</b>      | Total hours: 39<br>Lecture: 21<br>Practical and workshops: 18 |                 |   |

**Course Aims**

This course is designed to apply knowledge on sports injuries into practice. The course will be built upon a sound knowledge and understanding of the fundamental aspects of sports injuries. You will learn the skills of elastic wrapping, sports taping, kinesiotaping, and sports massage. Theoretical and applied aspects of the principles of sports injury rehabilitation, and return to play will also be covered. The course will also include youth and female gender-specific physical and physiological attributes, and injury epidemiology in these sporting populations. Learning the strategies of injury prevention and related research methods will also be a part of the course. In addition, the course will include topics on the science of current commercially available products like running shoes and compression garments and their potential in injury prevention. Learning from this course can be applied in various fields like sports safety during training and competitions, exercise prescription, training and conditioning, athlete care, first-aid and rehabilitation of injuries, and development and evaluation of injury prevention programmes.

**Intended Learning Outcomes (ILO)**

By the end of the course, you should be able to:

1. Perform the skills of different wrapping, taping and kinesiotaping techniques and associate it with the knowledge related to functional anatomy of injuries.
2. Perform the skills of different types of sports massage, enumerate the indications and effects of each type of massage and list the benefits and contraindications of sports massage.
3. Describe the principles of rehabilitation of sports injuries, articulate the stages of rehabilitation and specific approaches to rehabilitation in each stage.
4. Describe the specific characteristics of growth-related and female gender-specific risks, patterns and types of sports injuries.
5. Explain the concepts and principles of preventive measures for sports injuries.
6. Demonstrate the application of basic statistical methods in sports injury epidemiology.
7. Analyse the science behind products like running shoes and compression garments and associate it with injury prevention in users.

## Course Content

The following topics will be covered:

1. Elastic wrapping for primary care of sports injuries
2. Rigid taping techniques for sports injuries
3. Kinesiotaping techniques for sports injuries
4. Sports massage types and techniques
5. Sports injury rehabilitation and return to sport
6. Field-visit to physiotherapy and rehabilitation department of a tertiary care hospital
7. Injuries in the growing athlete
8. Injuries in the female athlete
9. Sports injury prevention: methods and strategies
10. Research methods in sports injury epidemiology
11. Science of a running shoe: evidence analysis and recommendations
12. Science of compression garments: evidence analysis and recommendations

## Assessment (includes both continuous and summative assessment)

| Component               | Course ILO Tested   | Related Programme LO or Graduate Attributes | Weighting | Team/ Individual | Assessment rubrics |
|-------------------------|---------------------|---|-----------|------------------|--------------------|
| 1. Project Presentation | 1, 2, 3, 4, 5, 6, 7 | A1, A3, B1, B3, C1, C2, D1                  | 20%       | Individual       | Appendix A         |
| 2. Assignment           | 1, 2, 3, 4, 5, 6, 7 | A1, B1, B2, B3, C1, C2, D1                  | 30%       | Team             | Appendix B         |
| 3. Examination          | 1, 2, 3, 4, 5, 6, 7 | A1, A2, B1, B2, B3                          | 50%       | Individual       |                    |
| 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  |
| <b>Creativity</b>                |   |
| 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  |
| <b>Communication</b>             |   |
| 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   |
| <b>Civic-Mindedness</b>          |   |
| 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   |
| <b>Character</b>                 |   |
| 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: {Sportspersonship}           | demonstrate appropriate safety, concern and good conduct in sport situations towards other individuals involved in the activity   |
|                                  |   |

## Formative feedback

The lectures will involve interactive discussions on the different topics, and essentially focus on applied translations of the content. You shall be required to come to the classroom with some preparedness beforehand. You will actively participate in the classroom discussions and receive frequent and immediate feedback on perceptions, learning, knowledge construction and approaches to theory-practice transfer.

During the practical and workshop sessions, feedback on learning will be verbally provided where you will have the opportunity to learn knowledge transfer into different sports contexts and develop skills of applying yourselves to solve the problems related to the injury occurrence and prevention during sport.

During the completion of the group presentation, you will be provided with verbal feedback pertaining to your assessed performance. This will include feedback on both group-based and individual performances. Generic verbal feedback will be provided on the written assignment. Lastly, generic written feedback will be provided to the class on the examination performance.

Throughout the course, you will have opportunity to use various interactive smartscreen technologies, softwares and apps to bolster learning of the content. This will include 3D apps and softwares on basic human anatomy, functional anatomy apps with self-paced learning and quizzes, and sports injury-related apps to facilitate out-of-class learning and application. You will also be experiencing real-time injury case presentations to develop the skills of applying the learning into practice. Throughout the course, you will receive frequent and timely verbal feedback on your progress, gaps in learning and conceptual understanding, and skills developed for application.

## Learning and Teaching approach

| Approach                | How does this approach support you in achieving the learning outcomes?   |
|-------------------------|--|
| Lectures                | All classroom-based lectures will involve interactive and reflective discussions on the different topics, and essentially focus on applied translations of the content. You shall be required to come to the classroom with some preparedness beforehand. You will actively participate in the classroom discussions and present your stand on the topic being discussed. This is intended to promote content learning and retention, skills to critique, facilitate knowledge analysis and decision making, and hone your problem solving skills. You will receive frequent and immediate feedback on perceptions, gaps in content knowledge and theory-practice transfer skills. You shall also receive frequent information and feedback on key learning concepts and theories to support understanding of key concepts and its applications in practice. |
| Practical and workshops | The practical and workshop sessions will: <ul style="list-style-type: none"><li>- Give real-time experiential learning to support key theories and information provided in class</li><li>- Provide tasks for you to utilise recently learned content knowledge and skills to solve specific problems.</li><li>- Understanding the science of common consumer sports</li></ul>  |

|                 |  |
|-----------------|--|
|                 | products and develop the skills of using them <ul style="list-style-type: none"> <li>- Give space and time for small group activities and discussions to allow you to assimilate the content and for sharing learning</li> <li>- Allow opportunity for verbal feedback from instructor to you on techniques and material.</li> </ul> |
| Online learning | Time will be given for learning from online materials as a part of flip teaching approach. These materials will support key concepts covered in lectures and practical sessions.   |

### Reading and References

1. Peterson, L., & Renstrom, P. (2016). Sports Injuries- Prevention and Treatment (4th Edition). CRC Press. Taylor and Francis Group. Core text.
2. Roald Bahr & Lars Engebretsen (2009). Handbook of Sports Medicine and Science. Sports Injury Prevention. Wiley-Blackwell
3. Oxford Textbook of Sports Medicine (1998). Harries M, Williams C, Stanish WD, Micheli LJ (Eds). 2nd Edition. Oxford University Press. Oxford.
4. Verhagen E., & van Mechelen W. (2010). Sports Injury Research. Oxford Scholarship Online.

### 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 field-related activities. All of you are expected to wear appropriate attire for participation, obey field 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                       |
|------------------|-----------------|----------|-----------------------------|
| Swarup Mukherjee | NIE5-03-06B     | 67903680 | swarup.mukherjee@nie.edu.sg |
| Koh Ang Hong     | NA              | NA       | anghong.koh@nie.edu.sg      |

### Planned Weekly Schedule

| Week | Topic   | Course LO | Readings/ Activities                                   |
|------|---|-----------|--|
| 1    | <ul style="list-style-type: none"> <li>• Course Overview</li> <li>• Safety aspects related to course</li> </ul> Wrapping techniques <ul style="list-style-type: none"> <li>• Basics of elastic bandage</li> <li>• Indications of wrapping</li> <li>• Preparation of parts and guidelines</li> <li>• Wrapping techniques of commonly injured joints</li> </ul> | LO1       | Chapter XX,<br>Pages XX-XX<br>Lesson type:<br>Workshop |
| 2    | Taping techniques: Rigid tape <ul style="list-style-type: none"> <li>• Basics of non-elastic adhesive tapes</li> <li>• Indications and contraindications of taping</li> <li>• Preparation of parts</li> <li>• Guidelines for tape application</li> <li>• Taping for common sports injuries</li> </ul>   | LO1       | Chapter XX,<br>Pages XX-XX<br>Lesson type:<br>Workshop |

|    |  |               |  |
|----|--|---------------|--|
| 3  | <p>Kinesiotaping in sports</p> <ul style="list-style-type: none"> <li>• Structural properties of kinesiotape</li> <li>• Basics of kinesiotape application</li> <li>• Preparation of parts</li> <li>• Guidelines for kinesiotape application</li> <li>• Kinesiotaping techniques for common sports injuries</li> </ul>  | LO1           | <p>Chapter XX,<br/>Pages XX-XX<br/>Lesson type:<br/>Workshop</p> |
| 4  | <p>Sports massage</p> <ul style="list-style-type: none"> <li>• Introduction to sports massage</li> <li>• Indications and contraindications of sports massage</li> <li>• Scientific evidence on effects of sports massage</li> <li>• Description, demonstration and practice of common massage techniques in sports</li> </ul>  | LO2           | <p>Chapter XX,<br/>Pages XX-XX<br/>Lesson type:<br/>Workshop</p> |
| 5  | <p>Principles of rehabilitation of sports injuries</p> <p>Sports-specific recovery and return to sport</p>   | LO3           | <p>Chapter XX,<br/>Pages XX-XX<br/>Lesson type:<br/>lecture</p>  |
| 6  | <p>Field Visit to Sports Physiotherapy and Rehab Centre in a tertiary care hospital</p>  | LO3           | <p>Lesson type:<br/>Practical<br/>(experiential)</p>             |
| 7  | <p>The growing athlete</p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Characteristics of musculoskeletal system in children and growing athlete</li> <li>• Epidemiology of youth sport injuries</li> <li>• Growth-related risk factors</li> <li>• Intrinsic risk factors</li> <li>• Extrinsic risk factors</li> <li>• Injury characteristics</li> <li>• Classification of injuries in children</li> <li>• Common injuries</li> <li>• Overuse injuries</li> <li>• Prevention of injuries</li> </ul> | LO3, LO4, LO5 | <p>Chapter XX,<br/>Pages XX-XX<br/>Lesson type:<br/>Lecture</p>  |
| 8  | <p>Half-term</p>   |               |  |
| 9  | <p>The Female athlete –</p> <ul style="list-style-type: none"> <li>• Gender-specific attributes in female athletes</li> <li>• Common musculoskeletal injuries in female athletes</li> <li>• Eating disorders in female athlete</li> <li>• The Female Athlete Triad</li> <li>• Low energy availability and Relative Energy Deficiency in Sport (RED-S)</li> </ul>   | LO3, LO4, LO5 | <p>Chapter XX,<br/>Pages XX-XX<br/>Lesson type:<br/>Lecture</p>  |
| 10 | <p>Sports injury prevention methods and strategies</p> <ul style="list-style-type: none"> <li>• Sequence of injury prevention</li> <li>• Magnitude of sport injuries <ul style="list-style-type: none"> <li>- Incidence and prevalence</li> </ul> </li> <li>• Severity criteria for sports injuries</li> </ul>   | LO5, LO6      | <p>Chapter XX,<br/>Pages XX-XX<br/>Lesson type:<br/>Lecture</p>  |

|    |   |          |   |
|----|---|----------|---|
|    | <ul style="list-style-type: none"> <li>• Risk factor and etiology of sports injuries</li> <li>• Models for sports injury prevention</li> </ul>  |          |   |
| 11 | <p>Research methods in sports injury epidemiology</p> <ul style="list-style-type: none"> <li>• Defining a sports injury</li> <li>• Sports injury reporting methodology</li> <li>• Injury incidence and incidence rates</li> <li>• Time of risk exposure estimation</li> <li>• Odds ratio and risk estimates</li> </ul>  | LO5, LO6 | <p>Chapter XX,<br/>Pages XX-XX<br/>Lesson type:<br/>Lecture</p>                         |
| 12 | <p>Science of a running shoe and evidence analysis</p> <ul style="list-style-type: none"> <li>• Anatomy of a running shoe</li> <li>• Advantages and disadvantages of a running shoe</li> <li>• Different foot types and their motion characteristics</li> <li>• Finding the right fit for the feet</li> <li>• Biomechanics of bare feet running</li> <li>• The minimalistic shoe – characteristics, and the existing evidence</li> <li>• Recommendations to the user</li> </ul> | LO7      | <p>Chapter XX,<br/>Pages XX-XX<br/>Lesson type:<br/>Lecture: 50%<br/>Practical: 50%</p> |
| 13 | <p>Science of compression garments and evidence analysis</p> <ul style="list-style-type: none"> <li>• Construction characteristics of compression garments</li> <li>• Evidence related to effects of compression garments on performance and recovery</li> <li>• Evidence related to effects of compression garments on injury prevention</li> <li>• Critical analysis of the existing literature</li> <li>• Recommendations to the user</li> </ul>                             | LO7      | <p>Chapter XX,<br/>Pages XX-XX<br/>Lesson type:<br/>Lecture: 50%<br/>Practical: 50%</p> |
| 14 | Class presentation  | LO1-7    |   |



Appendix A– Marking rubric

PROJECT PRESENTATION (INDIVIDUAL)

|   | A+, A, A-  | B+, B   | B-, C+, C  | D+, D   | F  |
|---|--|---|--|---|--|
| <b>Quality of presentation (max 25)</b>           | Information provided clearly answers the question set out. Presentation is clear and the flow is coherent and logical. Pace is appropriate.                                      | Information mostly answers the question set. Presentation is mostly clear and the flow generally coherent and logical.                    | There are weaknesses or absences in the information provided and the flow of presentation is unclear at times.                                       | Much of the information provided does not answer the question and the flow is difficult to understand.                              | Little relevant information and unclear flow.  |
| <b>Familiarity with content material (max 40)</b> | Demonstrates a very good understanding of the content. Able to answer all the questions from instructor/peers in a poised and articulate manner with a high level of confidence. | Demonstrates a good understanding of the content. Able to answer most of the questions from instructor/peers clearly and with confidence. | Demonstrates a basic understanding of the content. Able to answer some of the questions from instructor/peers clearly but lacks confidence at times. | Demonstrates a weak understanding of the content. Has difficulty in answering questions from instructor/peers and lacks confidence. | Does not demonstrate any understanding of the content. Unable to answer any questions from instructor/peers. |
| <b>Use of technology (max 10)</b>                 | Uses relevant technology very effectively to supplement and enhance the quality of presentation.   | Good use of technology to improve the quality of presentation.  | Some use of technology to help improve the quality of presentation.  | Little use of relevant technology in the presentation.  | No clear use of technology in the presentation.  |
| <b>Communication (max 25)</b>                     | Communication is very clear and easy to  | Communication is clear and easy to understand   | Communication is unclear at times.   | Communication is unclear and there and  | Communication is unclear and not possible  |

|  |  |  |  |   |   |
|--|--|--|--|---|---|
|  | understand. Provides convincing answer(s) to the topic/question in discussion. | most of the time. Provides good answer(s) to the topic/question in discussion. | Provides answer(s) with some gaps to the topic/question in discussion. | difficult to understand. Provides answer(s) with many gaps to the topic/question in discussion. | to understand. Does not provide any worthwhile answer(s) to the topic/question in discussion. |
|--|--|--|--|---|---|

Appendix B– Marking rubric

ASSIGNMENT (TEAM/GROUP)

|                              | A+, A, A-   | B+, B  | B-, C+, C  | D+, D   | F  |
|------------------------------|---|--|--|---|--|
| <b>Abstract (max 5)</b>      | Absolutely clear and concise. Presents the focus clearly, and highlights all the key points of the paper. Provides a brief yet reflective conclusion.   | Concise and presents the focus of the paper. Most of the key points in the paper are presented. The conclusion is appropriately structured.  | Concise and presents the focus of the paper. Some of the key points in the paper are highlighted. Conclusion provides some reflection of the findings.   | Concise but vaguely presents the focus of the paper. Most key points in the paper have been missed. Conclusion provides minimal reflection of the findings.   | The focus of the paper is vague and unclear. The key points in the paper have been missed. Conclusion is vague and no reflection of the findings.  |
| <b>Introduction (max 25)</b> | Information provided clearly presents the significance of the topic and is supported by statistics. The premise and the focus is clear. Organization and presentation of the argument is completely and clearly outlined and implemented. | Information provided is mostly clear and significance of the topic is highlighted. The focus is clearly presented. Organization and presentation of the argument is generally well outlined and implemented. | Information provided lacks adequate clarity and significance of the topic vaguely presented. The focus is not adequately clear. Organization and presentation of the argument is vague & not well implemented. | Much of the information provided lacks clarity and the significance of the topic is not well-established. The focus lacks clarity and there is a lack of clarity with respect to the organisation and presentation of the argument. | There is little relevant information and unclear flow. The premise is unclear and there is no clarity on the focus of the paper. There is a total lack of clarity with respect to the organisation and presentation of the argument. |
| <b>Research (max 40)</b>     | Research selected   | Research selected is   | Some of the research   | Most research   | Almost all research is   |

|                            |   |  |   |  |   |
|----------------------------|---|--|---|--|---|
|                            | credible, highly relevant to the argument, and presented accurately and completely. The method, results, and implications are all presented accurately. Relationship between research and theory is clearly and accurately articulated. | largely credible, relevant to the argument and presented clearly. The methods, results and implications are clearly presented. Relationship between research and theory is clearly articulated.                        | selected is not from credible sources, and at times not relevant to the argument. Methods lack adequate clarity, and findings and implications at times are vaguely presented. Articulation of the relationship between research and theory at times lacks clarity. | selected is not credible, and has minimal relevance to the argument. Methods lack clarity and findings and implications are vaguely presented. Relationship between research and theory is unclear.                | from non-credible sources. No relevance to the argument. Methods are not clear and findings and implications and vague and irrelevant. Either inaccurate or no attempt has been made to establish and relationship between research and theory. |
| <b>Conclusion (max 15)</b> | Conclusion is clearly stated and connections to the research and position are clear and relevant. The underlying logic is explicit.   | Conclusion is clearly stated with some connections to the research and position. The underlying logic is largely clear.  | Conclusion is stated with some connections to the research and position. The underlying logic is barely clear.  | Conclusion is stated with minimal connections to the research and position. The underlying logic is not very clear.  | Conclusion is stated with no connections to the research and position. The underlying logic is vague.   |
| <b>Writing (max 15)</b>    | Paper is coherently organized and the logic is easy to follow. There are no spelling or grammatical errors and terminology is fully and clearly defined. Writing is clear, concise and persuasive                                       | Paper is largely well organized and most of the argument is easy to follow. There are only a few minor spelling or grammatical errors. Some of the terms are not clearly defined. Writing is mostly clear but at times | Paper is generally well organized but at times the argument is difficult to follow. There are a number of minor spelling or grammatical errors. Many terms are not clearly defined. Writing is at times unclear and lacks conciseness.                              | Paper is not well organised and the argument is difficult to understand. Parts are poorly connected. There are a many minor spelling or grammatical errors, and most terms are not clearly defined. Writing mostly | Paper is poorly organized and difficult to read and understand. Parts are disconnected. There are several spelling and/or grammatical errors; Most terms are not clearly or correctly defined. Writing lacks                                    |

|  |  |                       |  |                                      |                             |
|--|--|-----------------------|--|--------------------------------------|-----------------------------|
|  |  | lacks<br>conciseness. |  | lacks clarity<br>and<br>conciseness. | clarity and<br>conciseness. |
|--|--|-----------------------|--|--------------------------------------|-----------------------------|

Each group member's score may vary according to observations, the group feedback, and individual's contribution to the group's final product and one another's learning.