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Physical Education and Sports Science
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SPORT SCIENCE & MANAGEMENT
SS3320 APPLIED SPORTS INJURIES

Academic Year	2025-26	**Semester**	2
Course Coordinator			
Course Code	SS3320		
Course Title	Applied Sports Injuries		
Pre-requisites	-		
No of AUs	3		
Contact Hours	39		

Course Aims

This course is designed to apply knowledge on sports injuries to various contexts of practice. The course will be built upon basic knowledge and understanding of anatomy, biomechanics and 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, followed by a field visit to a sports physiotherapy and rehabilitation centre. The course will also include youth and female gender-specific physical and physiological attributes, injury risks and 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 and applications of popular products like running shoes, foam rolling and compression garments and their potential use for injury prevention and athletic performance. This course will provide a strong foundation on applied aspects of sports injuries, and the learning from this course can be translated into various contexts like training and competitions, exercise prescription, high-performance training, strength training and conditioning, fitness development, recovery and fatigue management, coaching and athlete development, sports injury rehabilitation, and development and evaluation of injury prevention programmes.

Intended Learning Outcomes (ILO)

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

1. demonstrate the skills and techniques, indications and contraindications, and effects of elastic wrapping, rigid taping, kinesiotaping and sports massage and associate this learning with the functional anatomy and injury mechanisms.
2. describe the principles of rehabilitation of sports injuries, articulate the stages of rehabilitation and specific approaches to rehabilitation in each stage, explain the concepts and principles of preventive measures for sports injuries, and demonstrate the application of basic statistical methods in sports injury epidemiology.

3. describe the specific characteristics of growing athletes, the related risks, mechanisms and types of sports injuries in this population.
4. describe the specific characteristics and female gender-specific biological attributes and the related risks, mechanisms and types of sports injuries in this population.
5. analyse and apply the science underlying products like running shoes, foam rolling and compression garments and explain their application for injury prevention, athletic performance and recovery.

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 practice recommendations
12. Science of compression garments: evidence analysis and practice recommendations
13. Science of self-myofascial release using foam rolling: evidence analysis and practice recommendations

NTU Competencies & Graduate Attributes

NTU Competencies	
Character	√
Competence	√
Cognitive agility	√

NTU Graduate Attributes	
Graduate Attributes	Level (i.e., basic, intermediate, advanced)
1. Critical Thinking	Advanced
2. Care for Society	Intermediate
3. Collaboration	Advanced
4. Global Perspective	Intermediate
5. Problem-solving	Advanced

Assessment (includes both continuous and summative assessment)

Component	ILO Tested	Weighting	Team/ Individual	Assessment Rubrics
1. Poster Presentation	1-5	20%	Individual	Appendix 1
2. Group report (assignment)	1-5	30%	Team	Appendix 2
3. Final Examination	1-5	50%	Individual	
Total		100%		

Formative Feedback

The lectures will involve 'Blended learning' and 'Team-based Learning' approach. You will receive prompt feedback on learning based on the performance in the knowledge and application readiness exercises and classroom discussions. The feedback will facilitate content learning and retention, its utility and application in practice, and positively impact competencies like collaboration, teamwork, cognitive agility, and knowledge construction.

During the applied learning sessions, the feedback on learning and skill development will be verbally provided, facilitating the development of knowledge transfer skills into different sports and training contexts and developing problem-solving and decision-making competencies of applying yourselves to solve the problems related to the injury 'risk-mechanism-incident-outcome' continuum during different contexts in sport.

Following the poster presentation, you will be individually provided with verbal feedback pertaining to your assessed performance based on the rubric. There will also be some feedback on the group's performance. 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 the opportunity to use various interactive smartscreen technologies, software, videos and apps to promote immersive learning of the content. This will include 3D apps and software on 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 real-world connections and the skills of applying the learning into practice. Throughout the course, you will receive frequent verbal feedback on your progress gaps in learning and conceptual understanding, and suggestions will be provided to improve applied skills.

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Lectures	All classroom-based lectures will involve blended learning-based, interactive, and reflective discussions on different topics and essentially focus on the applied translation of the content into different contexts. You shall be required to come to the classroom with some preparedness beforehand. You will actively participate in classroom discussions and present your stand on the topic being discussed. This is intended to promote content learning and retention, skills to critique and peer-review, facilitate knowledge analysis and decision making

	and hone your problem-solving skills. You will receive frequent feedback on perceptions, gaps in content knowledge and theory-practice transfer skills. You shall also receive frequent feedback and support on key learning concepts and theories to support your understanding of key concepts and their applications in practice.
Practical and workshops	The practical and workshop sessions will: - Give real-time experiential learning to support key theories and information provided in class - Provide tasks for you to utilise the learned content knowledge and skills to solve specific problems - Develop an understanding of the science of common consumer sports products and skills in using them - Give space and time for small group activities and discussions to allow you to assimilate the content and for sharing learning - Allow opportunity for verbal feedback from the instructor to you on learning and demonstration of the techniques and skills.
Online learning	The course will adopt a blended learning approach. Time will be given for learning from pre-recorded lectures, reading materials and online resources as a part of the flipped teaching approach. These materials will support key concepts covered in lectures and practical sessions.

Reading and References

NIE Research and Publications

1. Lau, R., Mukherjee, S. (2023). Effectiveness of overuse injury prevention programs on upper extremity performance in overhead youth athletes: A systematic review. Sports Medicine and Health Science, 5, 91-100.

2. Lau, R., & Mukherjee, S. (2022). Prevalence rates of shoulder and elbow overuse injuries among competitive overhead youth athletes in Singapore population. Orthopaedic Journal of Sports Medicine. doi: https://doi.org/10.1177/23259671231156199.

3. Mukherjee, S., Fok, R.J, & van Mechelen, W. (2022). Electrical muscle stimulation and strength gains in healthy adults: a systematic review. Journal of Strength and Conditioning Research. 37 (4): 938-950.

4. Sim, A,. & Mukherjee, S. (2021). Potential Low Energy Availability (LEA) Risk Amongst Amateur and Recreational Athletes in Singapore. Physical Activity and Health. 5(1), 166-177. DOI: https://doi.org/10.5334/paah.120

5. Mukherjee, S., & Liew, Y.H. (2019). Effects of Compression Garments on Skeletal Muscle Physiology, Performance and Recovery in Young Healthy Adults: A Systematic Review. Sports and Exercise Medicine Open Journal, 5(1), 11-17. DOI: 10.17140/SEMOJ-5-169

6. Mukherjee, S., Lye, C.T.J, Leong, H.F. (2017). Fundamental motor skill proficiency of 6-to 9-year old Singaporean children. Perceptual and Motor Skills. 124 (3), 584-600. DOI: 10.1177/0031512517703005

7. Mukherjee, S. (2016). Sports injuries in youth athletes: the past and present continuous concern. Sports and Exercise Medicine- Open Journal. Editorial, SE (2), Se1-Se4. http://dx.doi.org/10.17140/SEMOJ-SE-2-e001

8. Mukherjee, S., Chand, V., Wong, X.X., Choong, P.P., Lau, V. S. M., Wang, S.C.L., Tou, N.X., & Ng, K.W. (2016). Perceptions, awareness and knowledge of the female athlete triad amongst coaches- are we meeting the expectations for athlete safety? International Journal of Sports Science and Coaching. 11 (4), 545-551. DOI: 10.1177/1747954116654781

9. Mukherjee, S. (2015). Retrospective designs in sports injury surveillance studies: all is not lost. Sports and Exercise Medicine- Open Journal. 1 (5), 164-166.

10. Mukherjee, S. (2015). Sports injuries in university physical education teacher education students: a prospective epidemiological investigation. Jacobs Journal of Sports Medicine. 2 (1), 1-8.

11. Mukherjee, S. (2014). Exercise prescription. In Papaioannou A, Hackfort D (Eds). Routledge Companion to Sports and Exercise Psychology. Global Perspectives and Fundamental Concepts (pp 739-768). Psychology Press, Taylor & Francis Group, New York.

12. Mukherjee, S., Leong, H.F., Chen, S., Foo, Y. X.W., Pek, H.K. (2014). Injuries in competitive Dragon Boating. Orthopaedic Journal of Sports Medicine. 2 (11), doi:10.1177/2325967114554550. eCollection 2014.

13. Mukherjee, S. (2013). Traumatic upper limb injuries during the field hockey Junior World Cup 2009. Research in Sports Medicine. 21, 318-329.

14. Mukherjee, S. (2012). Head and face injuries during the men's field hockey Junior World Cup 2009. The American Journal of Sports Medicine. 40 (3), 686-690.

Other Readings and References

15. Peterson, L., & Renstrom, P. (2016). Sports Injuries- Prevention and Treatment (4th Edition). CRC Press. Taylor and Francis Group. Core text.

16. Frontera, W.R. (2003). Rehabilitation of Sports Injuries: Scientific Basis. Blackwell Science.

17. Denegar, C.R., Saliba, E., & Saliba, S. (2010). Therapeutic Modalities for Musculoskeletal Injuries. Human Kinetics.

18. Hutson, M., & Speed, C. (2011). Sports Injuries. Oxford University Press.

19. Verhagen E., & van Mechelen W. (2010). Sports Injury Research. Oxford Scholarship Online.

20. Hohmann, E., Reaburn, P., & Imhoff, A. (2012). Runner's knowledge of their foot type: Do they really know? The Foot. 22:205-210

21. Richards, C.E., Magin, P.J., & Callister, R. (2009). Is your prescription for distance running shoes evidence-based? British Journal of Sports Medicine.43:159–162. doi:10.1136/bjsm.2008.046680

22. Bonacci, J., Saunders, P.U., Hicks, A. et a. (2013). Running in a minimalist and lightweight shoe is not the same as running barefoot: a biomechanical study. British Journal of Sports Medicine. 47(6):387-92. doi: 10.1136/bjsports-2012-091837

23. Coetzee, D.R., Albertus, Y., Tam, N., & Tucker, R. (2018). Conceptualising minimalist footwear: an objective definition, Journal of Sports Sciences, 36:8, 949-954, DOI: 10.1080/02640414.2017.1346816

24. Xiong, Y., & Tao, X. (2018). Compression Garments for Medical Therapy and Sports. Polymers. 10, 663; doi:10.3390/polym10060663

25. Hill J., Howaston, G., Someren, K,V,. et al. (2014). Compression garments and recovery from exercise-induced muscle damage: a meta-analysis. British Journal of Sports Medicine. 48(18):1340-6. doi: 10.1136/bjsports-2013-092456

26. Wiewelhove, T., Döweling, A., Schnieder, C., et al. (2019). A Meta-Analysis of the Effects of Foam Rolling on Performance and Recovery. Frontiers in Physiology. 10:376. doi: 10.3389/fphys.2019.00376

27. Hendricks, S., Hill, H., Hollander, S. N., et al. (2020). Effects of foam rolling on performance and recovery: A systematic review of the literature to guide practitioners on the use of foam rolling. Journal of Bodywork and Movement Therapies. 24(2):151-174. doi: 10.1016/j.jbmt.2019.10.019

28. Cheatham, S.W., Kolber, M.J., Cain, M., & Lee M. (2015). The effects of self-myofascial release using a foam roll or roller massager on joint range of motion, muscle recovery, and performance: a systematic review. The International Journal of Sports Physical Therapy. 10 (6): 827-838

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, 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 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 recognise 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 NTU Student Academic Integrity Policy and Procedures link in the Student Portal for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Special note: Generative AI tools will be allowed to the extent stipulated for each assignment in the assignment instructions, and any such use must be duly referenced or disclosed.

Course Instructors

Instructor	Office Location	Phone	Email
TBA			

Planned Weekly Schedule

Week	Topic	ILO	Readings/ Activities
1	Course Overview • Safety aspects related to the course Wrapping techniques • Basics of elastic bandage • Indications of wrapping • Preparation of parts and guidelines • Wrapping techniques of commonly injured joints	1	Activity: Workshop on elastic wrapping Ref 1, Ch 2, 5; Ref 2, Part 2, Ch 3 & 4; Ref 3, Ch 3; Learning videos
2	Taping techniques: Rigid tape • Basics of non-elastic adhesive tapes • Indications and contraindications of taping • Preparation of parts • Guidelines for tape application • Taping for common sports injuries	1	Activity: Workshop on rigid taping Ref 1, Ch 2, 5; Ref 2, Part 2, Ch 3 & 4; Ref 3, Ch 3; Learning videos
3	Kinesiotaping in sports • Structural properties of kinesiotape • Basics of kinesiotape application • Preparation of parts • Guidelines for kinesiotape application • Kinesiotaping techniques for common sports injuries	1	Activity: Workshop on Kinesiotaping Ref 1, Ch 2, 5; Ref 2, Part 2, Ch 3 & 4; Ref 3, Ch 3; Learning videos
4	Sports massage •Introduction to sports massage •Indications and contraindications of sports massage • Scientific evidence on the effects of sports massage • Description, demonstration and practice of common massage techniques in sports	1 • Scientific evidence on the effects of sports massage • Description, demonstration and practice of common massage techniques in sports	Activity: Workshop on Sports massage Ref 1, Ch 2, 5; Ref 2, Part 2, Ch 3 & 4; Ref 3, Ch 3;
5	Principles of rehabilitation of sports injuries	2	Lesson type: lecture

	Therapeutic modalities Sports-specific recovery and return to sport		Ref 1, Ch 2 & 8; Ref 2, Part 2: Ch 3,4 & 5, Part 4: Ch 10-14; Ref 3, Ch 3, Ch 7-12; Ref 4, Section 2, Ch 2.8; Ref 7, 12-16
6	Field Visit to Sports Physiotherapy and Rehab Centre in a tertiary care hospital	2	Lesson type: Practical (experiential and immersive)
7	The growing athlete •Introduction •Characteristics of the musculoskeletal system in children and growing athlete •Epidemiology of youth sport injuries •Growth-related risk factors •Intrinsic risk factors •Extrinsic risk factors •Injury characteristics •Classification of injuries in children •Common injuries •Overuse injuries •Prevention of injuries	3	Lesson type: Lecture Chapter XX, Pages XX-XX Lesson type: Lecture Ref 1, Ch 23; Ref 4, Section 4, Ch 4.2; Ref 5, 10, 15 & 16
Recess Week			
8	The Female athlete – •Gender-specific attributes in female athletes •Common musculoskeletal injuries in female athletes •Eating disorders in female athletes •The Female Athlete Triad •Low energy availability and Relative Energy Deficiency in Sport (RED-S)		Lesson type: Lecture Ref 4, Section 4, Ch 4.3; Ref 8 & 11
9	Sports injury prevention methods and strategies • Models of sports injury prevention • Severity criteria for sports injuries • Risk factors and etiology of sports injuries	2	Lesson type: Lecture Ref 1, Ch 3; Ref 4, Section 1, Ch 1.10 Ref 5; Ref 12-16

	Research methods in sports injury epidemiology • Defining a sports injury • Sports injury reporting methodology • Injury incidence and incidence rates • Time of risk exposure estimation • Odds ratio and risk estimates		
10	Science of a running shoe and evidence analysis • Anatomy of a running shoe • Advantages and disadvantages of a running shoe • Different foot types and their motion characteristics • Finding the right fit for the feet • Biomechanics of bare feet running • The minimalistic shoe – characteristics and the existing evidence • Recommendations to the user	5	Lesson type: Lecture: 30% Practical: 70% Ref 1, Ch 4; Ref 17-20
11	Science of compression garments and evidence analysis • Construction characteristics of compression garments • Evidence related to the effects of compression garments on performance and recovery • Evidence related to the effects of compression garments on injury prevention • Critical analysis of the existing literature • Recommendations to the user	5	Lesson type: Lecture: 40% Practical: 60% Ref 9, 21, 22
12	Science of self-myofascial release and foam rolling • Anatomical and physiological characteristics of fascia	5	Lesson type: Lecture: 20% Practical: 80% Ref 23-25

	• Effects of different forms of exercise on fascial morphology and function • Science and techniques of self-myofascial release • Construction characteristics of foam rollers • Evidence related to the effects of foam rolling on performance and recovery • Evidence related to effects of foam rolling on injury prevention • Critical analysis of the existing literature • Recommendations to the user		
13	Poster presentation	1, 2, 3, 4, 5	

Appendix 1: Assessment Criteria for Poster Presentation (20% Final Grade) – marked out of 100)

	A+, A, A-	B+, B	B-, C+, C	D+, D	F
Quality of presentation (max 25)	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.
Demonstration of material (max 40)	Able to clearly demonstrate and thoroughly explain skeletal muscle movements associated with sport and exercise. Able to answer questions in a poised and articulate manner with a high level of confidence.	Good demonstration and explanation of skeletal muscle movements associated with sport and exercise. Able to answer most of the questions clearly and with confidence.	Clear but basic demonstration and explanation of skeletal muscle movements associated with sport and exercise. Able to answer some of the questions clearly but lacks confidence at times.	Poor demonstration and weak explanation of skeletal muscle movements associated with sport and exercise. Has difficulty answering questions and lacks confidence.	Unable to demonstrate or explain skeletal muscle movements associated with sport and exercise. Unable to answer questions.
Use of technology (max 10)	Uses relevant technology (incl. AI/GAI tools) very well to supplement and enhance the quality of presentation.	Good use of technology (incl. AI/GAI tools) to improve the presentation.	Some use of technology (incl. AI/GAI tools) to help improve the presentation.	Little use of relevant technology (incl. AI/GAI tools) in the presentation.	No clear use of technology (incl. AI/GAI tools) in the presentation.
Communication and audience engagement	Communication is very clear and easy to	Communication is clear and easy to understand	Communication is unclear at times. There	Communication is unclear and there and	Communication is unclear and not possible

(max 25)	understand. Engages and interacts with the audience in a proactive and persuasive manner.	most of the time. Demonstrates some effort to engage and interact with the audience	is minimal effort to engage and interact with the audience.	difficult to understand. There is no notable effort to engage and interact with the audience.	to understand. There is no effort to engage and interact with the audience.

Appendix 2: Assessment Criteria for Group Work/Report (30% Final Grade – marked out of 100)

	A+, A, A-	B+, B	B-, C+, C	D+, D	F
Team: Groupwork and data collection* (max 15)	Clear teamwork, planning and group cohesion with appropriate division of work by each member of the group contributing to the successful collection of data.	Good teamwork and cohesion, but improvement needed in the planning of roles by group members for data collection.	Obvious improvements needed in teamwork and cooperation of members to improve data collection.	Team members working in small cliques with infrequent whole group cooperation.	Poor teamwork with little or no cooperation among group members during data collection processes.
Introduction (max 20)	Information provided clearly presents the significance of the topic and is supported by statistics. The premise and the focus is clear. Organisation 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. Organisation 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. Organisation 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.
Research (max 30)	Research selected is credible, highly relevant to the argument, and presented accurately and completely. The method,	Research selected is largely credible, relevant to the argument and presented clearly. The methods, results and implications are clearly	Some of the research selected is not from credible sources and, at times, irrelevant to the argument. Methods lack adequate clarity, and	Most research selected is not credible and has minimal relevance to the argument. Methods lack clarity, and findings and implications	Almost all research is from non-credible sources. No relevance to the argument. Methods are not clear, and findings and implications are vague

	results, and implications are all presented accurately. Relationship between research and theory is clearly and accurately articulated.	presented. Relationship between research and theory is clearly articulated.	findings and implications are sometimes vaguely presented. Articulation of the relationship between research and theory at times lacks clarity.	are vaguely presented. Relationship between research and theory is unclear.	and irrelevant. Either inaccurate or no attempt has been made to establish the relationship between research and theory.
Conclusion (max 15)	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.
Writing (max 20)	Paper is coherently organised, 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-organised, 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, lacks conciseness.	Paper is generally well organised, but the argument is sometimes 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 many minor spelling or grammatical errors, and most terms are not clearly defined. Writing mostly lacks clarity and conciseness.	Paper is poorly organised 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 clarity and conciseness.