Department of Political Science
University of the Punjab, Lahore

Course Outline

Programme	Diplomacy and Strategic Studies	**Course Code**		**Credit Hours**	3
Course Title	**Advances in Modern Warfare: Domains and Technologies**				

Course Introduction

Military technology has played a significant role in the history of warfare, and its importance continues to grow in the modern era. As the nature of conflict evolves and becomes increasingly complex, new technologies are being developed to address the challenges of modern warfare. Military technology is at the forefront of innovation, from advanced weaponry and unmanned aerial vehicles (UAVs) to cyber warfare and artificial intelligence (AI). It represents a critical component of national security. The development and implementation of military technology are critical for national security and have significant economic implications.

Governments and militaries worldwide invest billions of dollars each year in developing new military technologies, making it a critical component of the military-industrial complex. The technological advancements made by the military can also have far-reaching effects on society, including improvements in public safety and national defense. In recent years, the rise of advanced military technologies has profoundly impacted global politics and warfare. Using UAVs, advanced weaponry, and cyber warfare has transformed the nature of conflict and revolutionized military strategy. As military technology advances, it is crucial to understand its implications for national security and global politics and the ethical considerations involved in its development and use.

This course explores the latest advances in modern warfare, including emerging domains and technologies that are transforming the nature of conflict.

Learning Outcomes

On the completion of the course, the students will:

1. Be acquainted with the basic concepts and major debates in international relations
2. Be equipped with sufficient knowledge of prevalent issues
3. Have a thorough overview of international relations that will help them in further, more advanced courses
4. Design a significant roadmap for future discussions and debates to enhance their intellectual caliber
5. Receive an impressive collection of reading and reference material to help them in future research projects and similar research-based activities

Course Content		Assignments/Readings
Week 1-2	Introduction to Modern Warfare - Overview of modern warfare - Evolution of warfare	Jordan, D., Kiras, J. D., Lonsdale, D. J., Speller, I., Tuck, C., & Walton, C. D. (2016). *Understanding modern warfare*. Cambridge University Press.
Week 3-4	Emerging Domains - Cyber warfare - Space warfare - Information warfare - Electromagnetic warfare	Gervais, V. (2021). Emerging technologies and the future of warfare.
Week 5-6	Advanced Technologies - Artificial intelligence and machine learning - Autonomous systems and robotics - Hypersonic weapons - Directed energy weapons	Cohen, E. (2018). Technology and warfare. *Strategy in the contemporary world: an introduction to Strategic Studies*, 127-143.
Week 7-8	Network-Centric Warfare - Command and control systems - Communications networks - Intelligence, surveillance, and reconnaissance (ISR)	Cebrowski, A. K., & Garstka, J. J. (1998, January). Network-centric warfare: Its origin and future. In *US Naval Institute Proceedings* (Vol. 124, No. 1, pp. 28-35).

	- Data analytics and fusion	
Week 9-10	Electronic Warfare and Countermeasures - Electronic attack and defense - Radar and communication systems - Cyber-electromagnetic activities - Counter-IED technologies	Spezio, A. E. (2002). Electronic warfare systems. *IEEE Transactions on Microwave Theory and Techniques*, *50*(3), 633-644.
Week 11-12	Electronic Warfare and Countermeasures - Electronic attack and defense - Radar and communication systems - Cyber-electromagnetic activities - Counter-IED technologies	Grant, P. M., & Collins, J. H. (1982, June). Introduction to electronic warfare. In *IEE Proceedings F (Communications, Radar and Signal Processing)* (Vol. 129, No. 3, pp. 113-132). IET Digital Library.
Week 13-14	Autonomous and Unmanned Systems - UAVs and UCAVs - Autonomous ground vehicles - Naval autonomous systems - Swarming technologies	Binding, M. (2018). Have Autonomous and Unmanned Systems Changed War Fundamentally?.
Week 15-16	Future of Modern Warfare - Trends and predictions - Implications for national security - Ethics and legal considerations	Jordan, D., Kiras, J. D., Lonsdale, D. J., Speller, I., Tuck, C., & Walton, C. D. (2016). *Understanding modern warfare*. Cambridge University Press.
Textbooks and Reading Material		
The lectures will supplement discussions through books and online academic material. The objective would be to engage students in reading and listening to expert opinions to develop their own understanding of various concepts that are essential in the subject. The curriculum will not depend on a fixed set of readings and online lectures but will		

diversify to accommodate research articles and opinions as well as interviews to provide a broad spectrum analysis and discourse.

Recommended Books (material can be provided as lectures proceed)

1. "The Future of War: Power, Technology, and American World Dominance" by George and Meredith Friedman (2020)
2. "The Kill Chain: Defending America in the Future of High-Tech Warfare" by Christian Brose (2020)
3. "The Drone Age: How Drone Technology Will Change War and Peace" by Michael Boyle (2019)
4. "Cyberwar: How Russian Hackers and Trolls Helped Elect a President" by Kathleen Hall Jamieson (2018)
5. "Artificial Intelligence and the Future of Warfare" by Robert H. Latiff (2017)
6. "The Future of Land Warfare" by Michael E. O'Hanlon (2019)
7. "The Changing Face of War: Lessons of Combat, from the Marne to Iraq" by Martin van Creveld (2006)
8. "The Future of Naval Warfare" by Richard H. Shultz Jr. and James A. Russell (2019)
9. "Space Warfare: A Guide to the Next Hundred Years" by John J. Klein (2019)
10. "The Future of Air Power: A Guide to Understanding and Preparing for the Next Century of Air Warfare" by Colin S. Gray (2019)

Teaching Learning Strategies

1. Relevant material will be provided beforehand to the class both in printed and electronic form to match with the course contents designed
2. Reciprocal teaching method can be implemented to allow students a chance to speak their mind and discuss their problems
3. Brainstorming sessions will be encouraged with instructional scaffolding to allow students to develop their intellectual capabilities before being introduced to technical subjects
4. Didactic questioning by the instructor will be a viable teaching tool to initiate small group discussions in a think-pair-share collaborative teaching environment.
5. Individual presentations may also be assigned to exclusively focus on students with learning difficulties or exceptional students with a potential to offer more to the class environment.

Assignments: Types and Number with Calendar

1. Week Four: Student report submission for previous lectures taught
2. Week Six-Eight: Surprise Quiz or Show-and-Tell Presentation on topics covered
3. Week Eleven: Research Report post-Midterms
4. Week Fifteen: Grouped presentations of Poster Competition on topics assigned

Assessment

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.