Poh Gang Hao

HH2020: Science and War

Course Description

Warfare has shaped the social and political fabric of the twentieth century. As such military history still has an important role to play within any historical curriculum. However, the study of the history of warfare should be situated in such ways that link it to broader themes in social, cultural, and political history. This class fulfills this goal by linking military history to the development of science and technology. The relationship between science, technology, and warfare raises important problems and questions (many of ongoing policy relevance) about state funding of science, the responsibility of the scientist, and the place of science within society.

This module examines the relationship between science, technology, and warfare during the modern period. You will learn how science and technology has affected the course of wars, strategy, and tactics, as well as how warfare has affected the development of science and technology. This module will be of relevance to you if you are interested in military history or the history of science and technology.

The course will look at both primary sources in translation and secondary works that epitomize key aspects of the history sketched above. Students should be prepared to engage in rigorous discussion in every class, sharing their thoughts, findings, and analysis of the source materials.

Course Policies

Grading Breakdown:

- In-class participation, 20%
- Group presentation, 10%
- Film storyboard design, 20%
- Final Paper, 50%

Description of assessments:

1. Presentation based on group work (10%):

In-class presentations in groups. The size of the groups will depend on the total size of the class. Topics will be based on specific weapons/technologies, to be provided in the second week of class.

2. Participation in class activities (20%):

This component will be made up of your attendance at seminars, and participation in class discussions.

3. Documentary Film Storyboard (20%):

Create a storyboard for a half-hour documentary or historical film based on one of the topics in the first half of the course (up to the mid-semester break). This will involve thinking carefully about how to present historical research and historical information in a visual / video format.

4. Final essay (50%):

This assessment component consists of a research essay of 2000-2500 words. You will be required to develop your own topic in consultation with the instructor, collect primary sources appropriate to that topic, and develop a clear historical argument.

Formative feedback:

You will receive formative feedback through written responses to your papers and presentations. You will also receive verbal feedback through in-class discussions or one-on-one meetings, as necessary.

General expectations:

You are expected to complete all assigned pre-class readings and activities, attend all seminar classes punctually, and take all scheduled assignments and tests by due dates. You are expected to take responsibility for following up with course notes, assignments, and course-related announcements for seminar sessions you have missed. You are expected to participate in all seminar discussions and activities.

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. A short summary (500 words) of the weeks reading should also be submitted to make up for the absence.

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

Late Work and Extensions:

Any assessable material that is late will be penalized at the rate of 10% (of the maximum grade) per day. Missing a presentation or not scheduling a presentation will result in a zero grade for that component.

Extensions will only be granted in very special cases and only then when requested at least one week in advance of a deadline.

Electronics Policy:

Laptops and tablets are permitted for reading course materials, but cellphones are not. If these devices become a source of distraction, they will be banned on site.

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 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, you must 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.

GAI Usage:

Use of General Artificial Intelligence (GAI) is permitted in the following situations: 1) Assist in generating key ideas only; 2) Assist in refining syntax and grammar for correct language submission only.

The final write-up MUST be the student's own work. Students must preserve a digital paper trail showing the way the GAI assistant was used. This should be a Word document specifying the particular GAI assistant used and include the prompts given to the GAI assistant and the GAI output, or outputs if several are generated. **Use of GAI assistance is not permitted in the development or generation of this assignment or project.**

On the Digital Paper Trail:

Students are required, besides submitting the final work in the NTULearn facility, to also submit the paper trail as a Word document or documents, in a second and separate assignment section for this purpose under NTULearn. For assignments where the submission is non-digital, the students can create a photo journal or a blog to document the journey and submit the pdf of this instead.

This digital paper trail must be maintained for later reference, at least until the end of the Academic Year following the semester in which the relevant assignment is submitted. This is to preserve the potential evidence in case there is a later complaint or suspicion relating to academic integrity violations regarding that submission, or for further investigation by the school or other schools or the university when other academic integrity matters are raised regarding the same student, and it is deemed desirable to cross-check conduct in earlier courses.

The student must sign and submit with the assignment/project write-up a declaration regarding such use. In addition, the student must provide footnote or in-text references in the submission indicating any text paraphrase or significant fact or idea that originated with the GAI assistant. The updated referencing guideline from NTU library is now available. Click here to see.

See example below:

Reference list entry example (with a shareable link generated by the AI tool)

OpenAI. (2023). ChatGPT (Aug 7 version) [Large language model].

https://chat.openai.com/share/46ce4720-19bd-4c21-84f0-7a69ec4af03d

***Students should note that failure to submit this paper trail fully or in a timely fashion may lead to a presumption that the student has an improper intention or purpose in such failures in any relevant academic integrity proceeding regarding that assignment submission. It may even, on its own be an independent academic integrity violation if found to be deliberate.

Part 1: War and Warfare in the Early Modern Period

Week 1: Introduction

- Introduction to military history and the history of science
- Screening of *Day after Trinity*, sections of Marco Polo (2014) showing the siege of Xiang Yang in 1273, and sections of Rise of Empires: Ottomans (2022) on the Ottoman siege of Constantinople in 1353 and the first large-scale use of cannons.

Week 2: Military Technology in Early Modern China and Japan

Objectives and Qns:

- What are the key technological advancements in Imperial China and Tokugawa Japan that secured their military preeminence in East Asia?
- How did the advent of gunpowder weapons change war and warfare in Early Modern East Asia?

Readings:

- William McNeill (1982) *The Pursuit of Power: Technology, Armed Force, and Society since A.D. 1000* (Chicago: Chicago University Press, 1982) ["The era of Chinese predominance", pp. 24-62]
- Joseph Needham, Ho Ping Yu, Lu Gwei Djen and Wang Ling. *Science and civilization in China: Volume 5: Chemistry and chemical technology: Part 7: Military technology: the gunpowder epic*. Cambridge University Press, 1986. ["Ancestry (II): The recognition and purification of saltpeter," "Gunpowder compositions and their properties," "Proto-gunpowder and gunpowder," and "Bombs and grenades." pp. 94-126 and pp. 161-191]
- David Howell, "The Social Life of Firearms in Tokugawa Japan" in *Journal of Japanese Studies,* 29, No. 1 (2009) pp. 65-80.

Group project topics assigned.

Week 3: Warfare in Early Modern Europe

Objectives and Qns:

- How did the atmosphere of constant warfare shape technological advancements in Europe?
- What technologies enabled the Renaissance military revolution?

Readings:

- William McNeill (1982) *The Pursuit of Power: Technology, Armed Force, and Society since A.D. 1000* (Chicago: Chicago University Press, 1982) ["The business of war in Europe, 1000-1600" and "Advances in Europe's Art of War, 1600-1750", pp. 63-143]
- Frank Tallet (1992) *War and Society in Early Modern Europe 1495–1715* (Routledge, London). ["The changing art of war", pp. 21-68] [NTU online: XX(1056812.2)]
- Bert S. Hall (1997) *Weapons and warfare in Renaissance Europe* (Johns Hopkins University Press) ["Technology and the military revolution", pp. 201-236]

Week 4: Colonial Encounters

Objectives and Qns:

- How did the advancement in weapons technology enable the rise of colonialism?
- Understand colonialism as a military phenomenon and the use of violence to achieve imperial expansion across the world.

Readings:

- Jared Diamond, *Guns, Germs, and Steel* ["Collision at Cajamarca" and "Necessity's mother", pp. 67-82 and 239-264]
- Geoffrey Parker, *The Military Revolution and the Rise of the West, 1500-1800* (Cambridge University Press, 1996). [Introduction, Chapters 1 and 4; pp. 1-44 and 115-145]
- Jeremy Black, *War and the World: Military Power and the Fate of Continents, 1450-2000* (New Haven, CT: Yale University Press, 1998). ["Fifteenth and sixteenth-century expansion and warfare", pp. 18-59]

Writing Workshop 1: Identifying research topics

Part 2: The Great Wars

Week 5: Industrialization

Objectives and Qns:

- What impacts did industrialization have on warfare in the 19th century?

Readings:

- William McNeill (1982) *The Pursuit of Power: Technology, Armed Force, and Society since A.D. 1000* (Chicago: Chicago University Press) ["The initial industrialization of war, 1840-84" and "Intensified Military-Industrial Interaction, 1884-1917", pp. 223-306.
- John Ellis (1975) *Social History of the Machine Gun* (John Hopkins University Press) [Chapters 1-4, pp.9-109]

Writing Workshop 2: Developing historical questions

Group-presentation due

Week 6: World War I- Chemistry and Psychology

Objectives and Qns:

- Understand the usage and impacts of chemical weapons in the First World War
- How did the warring nations react to the usage of chemical weapons?

Readings:

- Sarah Jansen (2000) "Chemical-Warfare Techniques for Insect Control: Insect 'Pests' in Germany Before and After World War I," *Endeavour* 24: 28–33.
- L. Fritz Haber (1986). *The Poisonous Cloud: Chemical Warfare in the First World War*. Oxford University Press. [Chapters 3, 6, and 8; pp. 22-40, 106-138, and 176-206]
- Peter Leese (2002) *Shell Shock: Traumatic Neurosis and the British Soldiers of the First World War*. Palgrave [Chapters 2 and 3, pp. 15-48]

Writing Workshop 3: Finding Primary Sources

Week 7: World War II, part 1- The Mobilization of Science

Objectives and Qns:

- What were some of the game-changing military technologies invented as a result of WWII?
- Why did governments invest heavily in the advancement of new technologies such as radar and penicillin?

Readings:

- Peter Galison (1997) *Image and Logic*: *A Material History of Microphysics* (University of Chicago Press) [Sections 4.1, 4.2 and 4.6; pp. 239-245 and 303-311]
- Robert Buderi (1996) *The Invention That Changed the World: How a Small Group of Radar Pioneers Won the Second World War and Launched a Technological Revolution* (Simon & Schuster) [Chapters 3-5; pp. 52-113]
- Nicolas Rasmussen (2009) *On Speed: The Many Lives of Amphetamine* (NYU Press). ["Speed and total war"]
- Peter Neushel (1993) "Science, Government and Mass Production of Penicillin," *Journal of the History of Medicine and Allied Sciences* 48: 371-95.

Writing Workshop 4: Analysing Primary Sources I

Week 8: World War II, part 2- The Atomic Bomb

Objectives and Qns:

- Understand the profound impact of the Atomic Bomb on post-WWII concepts of war and warfare.
- What was the rationale behind the invention of such weapons of mass-destruction?

Readings:

- Richard Rhodes, *The Making of the Atomic Bomb* ["The New World" and "Physics and Dessert Country"; pp. 394-485]
- Mark Walker, *Nazi Science: Myth, Truth, and the German Atomic Bomb.* [Chapter 8, "Hitler's Bomb"; pp. 183-206]

Documentary Film Storyboard due

Writing Workshop 5: Analysing Primary Sources II

Part 3: Cold War and Weapons of Mass Destruction

Week 9: Mutually Assured Destructions and Nuclear Proliferation

Objectives and Qns:

- How did the world react to the power of the atomic bomb?
- Understand the phenomenon of Nuclear Proliferation and the concept of Mutually Assured Destructions.
- Why did nations pursue nuclear power despite knowing the dangers of their usage?

Readings:

- Fred Kaplan (1991) *Wizards of Armageddon* (Stanford University Press). [Chapters 4-6, 12-13; pp. 51-110 and 185-219]
- Itty Abraham (1998) *The Making of the Indian Atomic Bomb: Science, Secrecy, and the Postcolonial State* (Zed Books) [Introduction and "Learning to Love the Bomb"; pp. 6-33 and 113-154]
- John Wilson Lewis and Xue Litai (1991) *China Builds the Bomb* (Stanford University Press). [Chapters 1,6,9; pp.1-10, 137-169, and 219-238]

Writing Workshop 6: Developing an Argument I

Week 10: Cold War- Operations Research, Cybernetics, and Computing

Objectives and Qns:

- As the US and USSR strove to avoid total war, how did their Cold War rivalry spur other forms of military advancements?
- What was the role of cybernetics in the Cold War-era weapons race?
- Define Operations Research.

Readings:

- Schweber and Fortun (1993) "Scientists and the Legacy of World War II: The Case of Operations Research" *Social Studies of Science* 23, no. 4: 595-642.

- Paul Edwards, *The Closed World: Computer and the Politics of Discourse in Cold War America* ["Why build computers? The military role in computer research", pp. 43-74]
- Peter Galison (1994) "Ontology of the Enemy: Norbert Wiener and the Cybernetic Vision" *Critical Inquiry* 21, no. 1: 228-266.

Writing Workshop 7: Developing an Argument II

Week 11: Hot war- Vietnam and the 1960s

Objectives and Qns:

- Understand the new weapons that shaped the course of the war.
- How did military intelligence factor into the war?

Readings:

- John J. Tolson (1999) *Vietnam Studies: Airmobility, 1961-1971* (Department of the Army, Washington, DC) Available at: http://www.history.army.mil/html/books/090/90-4/CMH_Pub_90-4-B.pdf [Foreword, Preface, "The early years in Vietnam, 1961-1965, pp. 25-50]
- Robert M. Neer (2013) *Napalm: An American Biography* (Harvard University Press). ["Harvard's genius", "Anonymous Research No. 4", "Freedom's Furnace," "Vietnam syndrome", pp. 7-44 and 91-125]

- John Marks (1979) *The search for the Manchurian Candidate: The CIA and Mind Control: The Secret history of the Behavioral Sciences* ("LSD" pp. 57-78). Available at: http://www.druglibrary.org/schaffer/lsd/marks.htm

- Fred Wilcox (1983 [2011]) *Waiting for an Army to Die: The Tragedy of Agent Orange* (Seven Stories Press). [Chapters 1-2,10; pp. 3-30 and 147-174]

Writing Workshop 8: Writing a research paper

Part 4: The War on Terror

Week 12: **Public Holiday (No Class)**

Week 13: Global Terrorism and Counter Terrorism

Readings (To be confirmed)

- M. R.Habeck (2006). *Knowing the enemy: jihadist ideology and the war on terror*.
- Alex Lubin (2021). *Never-ending war on terror*.
- Charles.Webel & J. A. Arnaldi (2011). *The ethics and efficacy of the global war on terrorism: fighting terror with terror* (1st ed.).

Final Papers Due.