

## Jawaharlal Nehru University

### Special Centre for National Security Studies

#### COURSE TITLE: EMERGING TECHNOLOGIES AND NATIONAL SECURITY

Course Number:	SN-705
Course Teacher:	Dr. Gaurav Tyagi
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Course Credit:	03
Duration:	One semester
Instruction Method:	Lectures, tutorials and seminars
Evaluation Method:	Sessional work and semester examination
Contact Hours:	One hour after the class & by appointment

#### Objective

Technology is a major determinant in inter-state relations since it affects the power dynamics. Owing to how technological advancements have led nations to wage and win wars, this is one dimension that cannot be overlooked in a study on national security. This is truer than ever in these times since the rate of change of technology has accelerated like never before.

India has a complex neighbourhood with multiple security challenges. Growing techno capabilities of the adversaries have to be monitored, understood and countered primarily through India's own technological advancements. This course is designed to apprise the students of new scientific developments in military technologies, emerging technologies and their impact on national security.

#### Course Outline

- **Introduction to Science & Technology and National Security**  
Relationship between Science and Technology and National Security; Concept and Definition of Critical Technology, Foundational Technology, Emerging Technology, New Technology etc
- **Weapons of Mass Destruction**  
Chemical, Nuclear, Biological and Radiological weapons
- **Information and Communication Technology (ICT)**  
Information Warfare: The game of narratives; Rise and use of social media – information explosion and its implications
- **Cyber Technology and Modern Warfare**  
Cyber-attacks & data breaches; Cyber hacking & exploitation; State sponsored malware & cyber weapons; Phishing & social engineering; Hardware security & supply chain infections; Steganography, Hidden communication & covert channels; Information leakage using mobile apps & services; Securing air-gapped networks; Advanced cryptography & post-quantum security

- **Space Security**  
Weaponization and Militarization of Space; Military aircrafts & guided missiles; Satellite & anti-satellite technology; Space weapons; Space cyber security
- **Emerging Strategic Technologies**  
Artificial Intelligence; Quantum Computing; Blockchain Technology; Additive manufacturing; Internet of Things; Nanotechnology; Synthetic biology; Genetic Engineering; Agro terrorism; Industry 4.0; Neuroscience and Neurotechnology; Directed Energy Weapons; Unmanned Aerial Vehicles; Autonomous Weapons & Decision Support Systems; Blue Ocean Technology; Rare Earth Elements; Hypersonic; Green Technology; Wearable Technologies, Wireless, cellular & mobile technologies; SDN, 5G/6G networks etc
- **Technology, Security and Global Politics**  
Science diplomacy and National Security; Technology Denial and National Security

## READINGS

### **Introduction to Science and Technology and National Security**

- A J Echevarria II, *“Imagining Future Wars”*, Pentagon Press, 2007.
- E Cohen, *“Technology and Warfare”*, Strategy, Oxford, 2002.
- A Grubler, *“Technology and Global Change”*, Cambridge, 1998.
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### **Weapon of Mass Destruction**

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### **Information and Communication Technology**

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### **Cyber technologies for offensive and defensive**

- J R Lindsay, “*Information Technology and Military Power*”, Strategic, 2020.
- R A Clarke, “*The Fifth Domain: Defending Our Country, Our Companies, and Ourselves in the Age of Cyber Threats*”, Penguin Press, 2019.
- J Carr, “*Inside Cyber Warfare: Mapping the Cyber Underworld*”, O’Reilly, 2012.
- B Buchanan, “*The Hacker and the State: Cyber Attacks and the New Normal of Geopolitics*”, Harvard University Press, 2020.
- S Singh, “*The Code Book: The Science of Secrecy from Ancient Egypt to Quantum Cryptography*”, Anchor, 1999.
- J Erickson, “*Hacking: The Art of Exploitation*”, No Starch Press, 2008.
- A Honig and M Sikorski, “*Practical Malware Analysis: The Hands-On Guide to Dissecting Malicious Software*”, No Starch Press, 2012.
- M Sikorski & A Honig, “*Applied Cryptography: Protocols, Algorithms, and Source Code in C*”, Wiley, 1995.
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### **Space Security**

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## Emerging strategic technologies

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