Course title: Law and Policy for Maps and Remote Sensing			
Course code: NRG 162	**No. of credits:** 2	**L-T-P:** 30-0-0	**Learning hours:** 30
Pre-requisite course code and title (if any): None			
Department: Department of Natural and Applied Sciences			
Course coordinator: Dr. Ayushi Vijhani		**Course instructor:** Dr. Kavita	
Contact details: ayushi.vijhani@terisas.ac.in			
Course type: Core		**Course offered in:** Semester 2	

Course Description: This course focuses on the evolving laws, policies, and institutions that have long- term ramifications for earth mapping and remote Sensing. It also deals with legal systems, related linkages with land use/cover systems, remote sensing & map policy. It provides an overall guiding framework for development and implementation of remotely sensed data to make it useful in geographic information systems. The course structure further helps to critically assess the strengths and weaknesses of legal instruments of remote sensing and platforms for a variety of application scenarios viz; geosciences, water resources, land use planning, forests, Agriculture and Environmental Management.

Course objectives

1. To introduce the law and policy both at the national and international level relating to remote sensing and maps.
2. To explain the role of legal regulations, policy and institutions in the conservation and management of natural resources.
3. Application of Remote sensing in Natural Hazards.
4. To understand the significance of regulations on remote sensing and mapping and its impact on regional and international discourses/debates. It will appraise the students about government policies both macro and micro to deal with the issues of environmental monitoring and assessment.

Course content

Module	Topic	L	T	P
1.	**Introduction to the Legal System** The objective of this module is to gain greater familiarity with different legal terms, legal systems, sources of law, and hierarchy of courts in India. Further underscores the difference between International and Municipal Law. This module also addresses the following questions. What are the primary and secondary sources of Law? Which law prevails in the event of conflict between International law and Domestic Law?	6		
2.	**Relevant Laws** This module discusses various laws related to land use & planning, agriculture, forests and environmental conservation. There is long debate on protection of data obtained by remote sensing, that still necessitates further attention in this module. **Subtopics** • **Forest and Wildlife Law**: Indian Forest Act, 1927- Legal classification of forests, Restrictions on the rights, Forest Conservation Act, 1980, Wildlife Protection Act 1972. • **Land Law**: Concepts in land related rights; easement rights- Tenured rights – community rights – restrictions on the rights relating to land, National Land Use Policy. • **Intellectual Property Law**: Relevant to maps, information and data.	5		

3.	**National Law and Policy on Remote sensing and Mapping** The main objective of the module is to examine laws and policies related to Mapping and Remote Sensing in India. It further examines the issues arising from commercialization of remote sensing. Following developments also discussed in this module. National Drone Policy, The National Geospatial Policy-2016, Geospatial Information Regulations Bill- 2016, The National Map Policy -2005, Guidelines for Implementing National Map Policy, Civil Aviation Rules, The Civil Aviation Requirements- 2012, The Remote Sensing Data Policy 2001-2011, National data Sharing and Accessibility Policy-2012.	5		
4.	**Application of Remote sensing in Natural Resources & Natural hazards** Law relating to renewable and non-renewable Resources, the Environment Protection Act, 1986; Disaster Management Act, 2005; Coastal Regulation Zone Notification/Draft-2018.	5		
5.	**International Instruments relating to law and policy on Remote Sensing & Mapping** This module focusses on the international regulations on remote sensing and maps. **Subtopics** The Convention on International Liability and Damage caused by Space objects, 1972; Montreal Convention on Unification of Certain Rules for International Carriage by Air, 1999; UN Principles relating to Remote Sensing of the Earth from Outer Space. *Laws in other Jurisdictions* U. K. National Remote Sensing Policy 1984, U.S., Canada, Security Issues &Evidentiary value (Case studies- *Dow* v. *U.S*., *EOSAT* v. *NASA & NOAA*)	9		
	Total	**30**		

Evaluation criteria

- **Minor test 1 :** **15%** [Syllabus- Modules 1 & 5] (Third week of February) (Learning outcome 1)
- **Minor test 2 :** **15%** [Syllabus- Modules 2 & 3] (First week of April) (Learning outcome 2)
- **Assignments :** **20%** [Third week of April] (All learning outcomes)
- **Major test :** **50%** [Syllabus- Modules 1-5] (Second week of May] (All learning outcomes)

Learning outcomes

By the end of the course, the students are expected to:

1. Be familiar with the laws, policies and institutions in the field of maps and remote sensing both at the national and international level.
2. Understand the significance of regulations on remote sensing and mapping in the conservation of natural resources, land use & planning, agriculture, forests and overall environmental monitoring & assessment.
3. Acquire the ability to critically evaluate the role of law and policy in conservation and management of Environment.

Pedagogical approach
The course will be delivered through class lectures.

Course Reading Materials

Module 1:

1. Bryan A. Garner, *Black's Law Dictionary, Abridged, 9th Volume* (2010)
2. Ugo Mattei & Luca G. Pes, *Civil Law and Common Law: Toward Convergence? in The Oxford Handbook of Law and Politics*, Gregory Caldeira et.al 267-280 (eds., OUP 2008)
3. William Tetley, *Mixed Jurisdictions: Common Law v. Civil Law (Codified and Uncodified)*, 60(3) Louisiana Law Review 669-738 (2000)
4. M.P Singh, *Securing the Independence of The Judiciary- The Indian Experience* 10(2) Indiana International & Comparative Law Review 245-292 (2000)
5. Arghya Sengupta & Akriti Gaur, *Treaty-making and implementation in India: a constitutional paradox* 57(1-2) Indian Journal of International Law 47-61 (2017)

Module 2:

1. Atsuyo Ito, *Legal Aspects of Satellite Remote Sensing*, 99-147 & 199-241 (BRILL 2011)
2. Ramachandra Guha, *Forestry in British and Post-British India: A Historical Analysis*, 18(44) Economic and Political Weekly 1882-1896 (1983)
3. Armin Rosencranz & Sharachchandra Lele, *Supreme Court and India's Forests*, 43(5) Economic and Political Weekly 11-14 (2008)
4. Sudhakar Reddy et.al., *Nationwide classification of forest types of India using remote sensing and GIS, Environmental Monitoring and Assessment* 187:777 (2015)
5. Neelotpalam Tiwari & Himanshu Pabreja, *India's Protected Areas: Are They Really Protected or at the Mercy of Wildlife Boards?* 21(1) Journal of International Wildlife Law & Policy, 23-45 (2018)
6. Meenakshi Gogoi, *The Nexus between Sovereignty and 'Eminent Domain' under the Land Acquisition Act, 1894, and the Land Act, 2013*, 48(2) Social Change (2018)
7. Robert Barr, *Spatial Data and Intellectual Property Rights, in The Map Library in the New Millennium* 176-187(eds Robert Parry & CR Perkins, American Library Association, 2001)
8. P Jothimani & K Venugopal, *GIS Data Dissemination and Intellectual Property Rights*, Indian Cartographer 336-341 (2002)
9. J. Richard West, *Copyright Protection for Data Obtained by Remote Sensing: How the Data Enhancement Industry Will Ensure Access for Developing Countries*, 11(2) Northwestern Journal of International Law & Business 403-441 (1990)
10. Malay Adhikari, *Legal Regime of Intellectual Property Rights of Spatial Data with Special Reference to India*, Geospatial World Forum (Conference Proceedings, 2011)

Module 3:

1. Ranjana Kaul, *A Review of India's Geospatial Policy, in Space India 2.0: Commerce, Policy, Security and Governance Perspectives* (Rajeswari Pillai Rajagopalan & Narayan Prasad eds., ORF 2017)
2. Jayanta Kumar Ghosh & Abhishek Dubey, *Impact of India's New Map Policy on Accuracy of GIS Theme*, 37 (1) Journal of Indian Society of Remote Sensing 1-7 (2009)
3. Adya Garg, *Legal Challenges to Mapping in India- Laws, Policies, and Cases,* The Centre For Internet & Society (11 May 2016)
4. Anuj Srivas, *How the Controversial Geospatial Bill Snowballed – And Was Then Shoved Into Cold Storage*, The Wire (07 Mar 2017)

Module 4:

1. Orhan et. al., *Geoinformation for Disaster and Risk Management Examples and Best Practices, Joint Board of Geospatial Information Societies and United Nations Office for Outer Space*

Affairs (Denmark, 2010)

2. Atsuyo Ito, *Legal Aspects of Satellite Remote Sensing*, 149-194 (BRILL 2011)
3. Manikiam, *Remote Sensing Applications in Disaster Management*, 54(1) Mausam 173-182 (2003)
4. Olalekan Mumin Bello & Yusuf Adedoyin Ainab, *Satellite Remote Sensing as a Tool in Disaster Management and Sustainable Development: Towards a Synergistic Approach*, 120(19) Procedia
   - Social and Behavioral Sciences, 365-373 (2014)

Module 5:

1. Carl Q. Christol, *International Liability for Damage Caused by Space Objects*, 74(2) American Journal of International Law 346-371 (1980)
2. Alexander F. Cohen, *Cosmos 954 and the International Law of Satellite Accidents*, 10(7) Yale Journal of International Law 78-91 (1984)
3. *International Space Law: United Nations Instruments*, UN Office for Outer Space Affairs (2017)
4. Joseph A. Burke, *Convention on International Liability for Damage Caused by Space Objects: Definition and Determination of Damages After the Cosmos 954 Incident*, 8(2) Fordham International Law Journal
   255-285 (1984)
5. Deekshatulu, B.L., Raghu, V. & Chandrasekhar, M.G., *Overview of the Legal Aspects of Remote Sensing*, 25(3) Journal of the Indian Society of Remote Sensing 1250138 (1995)
6. Atsuyo Ito, *Legal Aspects of Satellite Remote Sensing*, 17-98 & 244-298 (BRILL 2011)
7. Bin Cheng, *A New Era in the Law of International Carriage by Air: From Warsaw (1929) to Montreal (1999)*, 53(4) International and Comparative Law Quarterly833-859 (2004)
8. JC Batra, *Modernization of the Warsaw System - Montreal 1999*, 65(3) Journal of Air Law and Commerce 429-444 (2000)
9. Frans von der Dunk, *United Nations Principles on Remote Sensing and the User, in Earth Observation Data Policy and Europe*, edited by Ray Harris (Lisse: A Balkema eds., 2002), pp. 29–40

Advanced Reading Materials

1. George Cho, *Geographic Information Systems and the Law: Mapping the Legal Frontiers* (Wiley 1998)
2. Patricia Birnie, Alan Boyle & Catherine Redgwel, *International Law and the Environment*, (3rd edn. OUP 2009)
3. James B. Campbell & Randolph H. Wynne., *Introduction to Remote Sensing*, The Guilford Press 2011
4. Shyam Divan & Armin Rosencranz, *Environmental Law and Policy in India: Cases, Materials, and Statutes* 288- 365 (OUP 2001)
5. Rajeswari Pillai Rajagopalan & Narayan Prasad, *Space India 2.0: Commerce, Policy, Security and Governance Perspectives* (Observer Research Foundation, 2017)

Cases

1. *Dow v. U.S.*
2. *EOSAT v. NASA & NOAA*
3. *J. Mohanraj v. Google and Others*

Journals

1. Journal of Environmental Law & Policy
2. International Journal of Remote Sensing
3. Air & Space Law
4. Remote Sensing of Environment

Course Reviewers

Dr. Shiju MV, Associate Professor, Christ University, Bangalore
Dr. Risham Garg, Associate Professor, National Law University, Delhi