**Unit 1: Reasons to Regulate Internet Services and Networks**

* **History, Structure, and roles of the FCC**
* History of the FCC
  + Created by Communications Act of 1934
    - “for the purpose of regulating interstate and foreign commerce in communication by wire and radio…”
  + Combined responsibilities previously residing in the Federal Radio Commission (Title III), plus the Department of Commerce, and the Interstate Commerce Commission (Title II)
  + Original responsibilities
    - Allocate, allot, assign and otherwise manage all non-federal government use of the radio spectrum
    - Regulate interstate communications, common carrier communications and facilities (wired and wireless)
* Organization of the FCC
  + 5 Commissioners, restrictions on political affiliation
  + 5-year term of office, appointed by President, confirmed by the Senate
  + Operating funds from Congress
  + Functions
    - “Ex ante” or command and control regulation
    - Rulemakings to implement legislative mandate
    - Enforce rules/regulations through adjudications
    - Issue licenses
    - Standard setting
* Constraints on FCC Authority
  + Must meet “public interest, convenience, and necessity”
  + Legislative mandates either direction (passing legislation) or indirectly (oversight hearings, reducing budget)
  + Administrative Procedures Act: establishes right to sue the FCC
  + Appeals: petition the FCC for reconsideration or in federal court
* FCC Public Trust Safeguards
  + Outside influence: limits on gifts from outside sources and bribery prohibition
  + Financial restrictions: financial interest in regulated entities and position of close relatives
  + Employment restrictions: matters relating to prior employment and limitations in new employment

*Structure of 1934 Communications Act*

* Title II: Governs common carrier provisions of telephony
* Title III: Establishes regulatory regime for radio spectrum and broadcast services
* Title VI: Addresses cable television and other services over cable

*Federal Communications Commission (FCC) Organization*

* Media Bureau: Broadcast licenses for TV and Radio
* International Bureau: Satellite Systems
* Wireless Telecom Bureau: Cellular Providers
* Office of Engineering and Technology: Unlicensed Spectrum
  + Wireline Competition Bureau: Wireline Telephony

*Levels of Government Regulation*

* Municipal
* State (Public Utility Commissions – PUCs)
* Federal
  + Executive Branch
    - National Telecommunications and Information Administration (NTIA)
      * President’s principal adviser on telecommunications and information policy issues
      * Controls spectrum used by government
      * Manages grant and loan programs
    - Department of Justice
      * Brings antitrust cases
      * Must approve mergers
  + Legislative Branch (Congress)
    - Broad policy making authority to establish new laws
    - House Energy and Commerce Committee
      * Subcommittee on Commerce, Science and Transportation
    - Senate Committee on Commerce, Science and Transportation
      * Subcommittee on Communications, Technology, and the Internet
  + Judiciary Branch
    - U.S. Court of Appeals (12 Regional Circuits)
      * Most FCC appeals to licensing decisions and rule making proceedings heard by U.S. Court of Appeals for the District of Colombia
    - U.S. Supreme Court
    - Judges: generalists with few resources
  + Fourth Branch: Independent Regulatory Commissions
    - Independent from Executive and Legislative branches through powers delegated by legislative branch
    - Independence within government
      * Commissioners from different political parties
      * Odd number of commissioners, staggered terms, difficult to remove
    - Independent from industry
      * Agency budget from Government, conflict of interest regulations for employees
    - Set policies or rules, through action taken must be under authority of basic laws
      * Must follow general rules as set by Administrative Procedures Act
    - Hear cases, invoke punishments, like judiciary
    - Must give notice, hearing to a violator
      * Actual authority to coerce is not with Agency. If someone refused to follow, then must go to court to enforce.
    - Due process: rates must not be confiscating
      * Courts examine regulations to make sure agency following purpose and will call into question procedural errors
* International (International Telecommunications Union- ITU)

*Independent Regulatory Commissions*

* Federal Communications Commission
* Federal Trade Commission
* Security Exchange Commission
* Federal Energy Regulatory Commission
* Consumer Product Safety Commission
* Nuclear Regulatory Commission
* Commodity Futures Trading Commission
* **Justification and obligations of common carrier regulation** 
  + Common Carrier Regulations and Obligations
    - Common Carrier Regulation
      * Reserved for essential services that are public necessity/utility
      * Subject to pervasive regulation to protect public interest since competition not permitted (wasteful)
        + Companies operate in define service territories with licenses
      * Must offer “just and reasonable” rates that mimic competitive market
      * Earn revenues sufficient to cover costs and reasonable rate of return, not monopoly returns
    - Common Carrier Obligations
      * Rates must be non-discriminatory (cost-based differentiation is OK)
      * Overall rate regulation through tariffs (no excessive profits)
      * Control over market entry and exit
    - Obliged to offer reasonable service rates (no excessive monopoly profits)
* **Types of market failures justifying regulation** 
  + Market Failures
    - Weak competition (abuse of market power) due to natural monopoly or network effects
    - Market prices do not reflect real costs and benefits to society (negative externalities)
    - Insufficient supply of public goods
    - Missing or incomplete markets
    - Information failures, such as imperfect information or lack of access to information for decision takes (including consumers and public authorities)
  + Regulatory Failures
    - Inadequately defined property rights/legal framework
    - Poorly defined targets and objectives
    - Unintended consequences resulting from public intervention
    - Regulatory capture of public authorities
    - Implementation and enforcement failures
  + Natural Monopoly
    - Market failure resulting from:
      * Large fixed costs
      * Declining incremental costs with output
      * Demand variability (idle capacity)
    - Causes lower productive and allocative efficiency
    - Difference in social surplus from competition is deadweight loss from monopoly
  + Public Good
    - Product or service for which demand is non-rivalrous
    - Marginal costs of next consumers is zero, but still need to recovers costs (potential to underproduce)
    - Concern to television broadcasting
    - Ex. Watching TV doesn’t impact others ability to watch TV
* **Lessig’s view of the generational stages of development for the Internet over time and their implications for civil liberties on the Internet**

**Unit 2: Achieving Broadband Universal Service through Regulation and National Broadband Plans**

* **Focus of the U.S. National Broadband Plan** 
  + Maximize competition
  + Add broadband to universal service plan
  + Efficient allocation of government assets
* **Universal Service** 
  + Government sponsored subsidy to add or keep users of a desirable service by low rates
  + Principal market/regulatory failures justification
    - Network Effects (demand-side phenomenon)
      * Value increases with the number of other consumers
      * Occurs not only with communications services, but platforms
      * Addressed through interoperability mandates and interconnection requirements (between providers)
      * Lack of market solutions
  + Connect America Fund (CAF) established to fund broadband (fixed and mobile)
  + Universal Service
    - Must serve all
    - Funded by explicit and implicit subsidies to achieve “affordability”
    - Essential services
      * Telephone in 1910
    - Broadband in 2010 (in areas of only one provider)
  + Benefits society by enhancing economic development, democratic participation, and public safety
* **Definition of Broadband for universal service** 
  + Factors
    - Speed (advertised and consistency)/Latency
    - Usage allowances and price
  + Policy benchmark (Section 706)
  + Status of mobile
    - Digital Subscriber Line (DSL) and Fiber-to-the Home
      * DSL is low cost when telephone network is present
      * Low broadbands speeds unless fiber is extended close to customer
      * Speeds are inconsistent
  + Cable Network: Hybrid Fiber-Coax (HFC)
  + Wireless Network: Wireless Internet Service Provider (WISP) or Long Term Evolution (LTE)
* **Local access network technologies** 
  + Types of local access networks
    - Digital Subscriber Line (DSL) and Fiber-to-the Home
      * DSL is low cost when telephone network is present
      * Low broadbands speeds unless fiber is extended close to customer
      * Speeds are inconsistent
    - Cable Network: Hybrid Fiber-Coax (HFC)
    - Wireless Network: Wireless Internet Service Provider (WISP) or Long Term Evolution (LTE)
  + Comparative advantages of different types
    - DSL
      * DSL is low cost when telephone network is present
      * Low broadbands speeds unless fiber is extended close to customer
      * Speeds are inconsistent
    - FTTX- Fiber to the….
    - PON Deloyment
      * One fiber “split” to service around 32 homes
      * Bidirectional – can be sent both ways
    - Fiber Optic Networking Technology
      * Gigabit Passive Optic Network (G-PON)
        + Lowest cost and most broadly deployed FTTP
    - FTTH
      * Hig capacity with unlimited bandwidth
      * Low operation costs (immunity to electrical noise and interference
      * Very high fixed cost
    - Cable
      * Reasonable incremental costs to increase speed
      * High capacity broadband
      * Consistent service speeds
      * Upstream capacity limits
    - Wireless
      * Low cost in last mile
      * Standards lowering equipment costs
      * Speed limitations
* **Comparison of international NBPs** 
  + Difference between broadband/Internet access defined as a legal versus human rights
  + Timeline of focus for NBPs; popularity of NBPs
  + Best practices of NBPs
  + Impact of NBPs on fixed and mobile broadband adoption

**Unit 3: Using Network Neutrality to Insure Access to the Internet**

* **Key Terms:** 
  + **Telecommunications (Title II) and Information Services, commercial and private mobile services, and broadband Internet access service**
  + **Internet conduct standard, transparency rule**
  + **Zero rating and sponsored data plans**
  + **Reasonable network and management practices**
  + **Transit, paid and settlement-free peering, private and public interconnection, and internet exchange points**
* **Reasons for net neutrality** 
  + **Preservice the “virtuous cycle”**
* **Preserving Open Internet Rules (2015)**
  + **BIAS is a telecommunications service/Mobile BIAS a commercial mobile service**
  + **No blocking (subject to reasonable network management)**
  + **Not throttling (subject to reasonable network management)**
  + **No paid prioritization**
  + **No unreasonable interference or disadvantage standard (subject to reasonable network management)** 
    - **Also known as Internet Conduct Standard**
* **Reinstating information service classification of BIAS**
* **Reinstating private mobile service classification of mobile BIAS**
* **Returning broadband privacy authority to the Federal Trade Commission (FTC)**
* **“Lite-Touch” Regulatory Framework that favors *ex post* enforcement over *ex ante* regulatory intervention** 
  + **Eliminate Internet conduct standard**
  + **No need for no-blocking, no-throttling, and no-prioritization rules**
  + **Need for the transparency rule**
* **New Transparency Rule** 
  + **Network management practices to disclose** 
    - **From 2010: congestion management, application specific behavior, device attachment rules, and security practices**
    - **New: any blocking, throttling, affiliated prioritization, or paid prioritization in which they engage**
* **Network Interconnection** 
  + **Role of interconnection in evolution of Internet** 
    - **Hierarchy of ISPs (e.g., Tier 1, 2, CDNs…)**
  + **Motivations for Peering (Settlement Free, Paid, Policies that are Open, Selective, or Restrictive)**
  + **Key traffic trends impacting agreements associated with destination, volume, symmetry, and peak usage**
  + **Degree to which interconnection is regulated**

*Why has communications been a “regulated industry”?*

* Government limited entry and exit from market using “licenses: or “franchises”
* Government established key economic terms for companies to provide service through “tariffs”
* Government set rates to achieve “universal service”