M.C.A (5th Semester)/MSc(CA) (3rd Semester)
040010509/040020312: Wireless Communications

Course Objectives: To understand the fundamentals concept of mobile communication systems, and wireless computer networks

Course Outcomes: Upon completion of the course, students shall be able to

CO1: Identify the fundamental components of wireless communication.

CO2: Interpret techniques used for medium access in wireless communication.

CO3: Classify technical details of telecommunication.

CO4: Examine technical aspects of Wireless LAN.

CO5: Recognize the concept of Mobile Network Layer.

CO6: Discover concept of Mobile Transport Layer.

Unit	Sub Unit	No. of Lecture (Hour)	Topics	Reference	Teaching Methodology	Evaluation
1	**Wireless Transmission**					
	1.1	1	Radio Transmissions	#JS Chapter2.1 : page no. 26-30	Chalk & talk, Discussion ,Presentation	
	1.2	1	Signals	#JS Chapter2.2 : page no. 31		
	1.3	1	Signal Propagation	#JS Chapter2.4 : page no. 35-39		
	1.4	2	Modulation	#JS Chapter 2.6 : page no. 47-53		
	1.5	1	Multiplexing	#JS Chapter 2.5: page no. 42-46		
2	**Medium Access Control**					
	2.1	1	Frequency Division Multiple Access	#JS Chapter 3.3 : page no. 73	Chalk & talk, Discussion, Presentation	**Quiz:1**
	2.2	1	Time Division Multiple Access	#JS Chapter 3.4 : page no. 74		
	2.3	2	Code Division Multiple Access	#JS Chapter 3.5: page no. 82		
	2.4	2	Carrier Sense Multiple Access	#JS Chapter 3.4.4: page no. 76		
	2.5	2	ALOHA	#JS Chapter 3.4.2: page no. 75-76		
3	**Telecommunication System**					
	3.1	5	Global System for Mobile Communication: Mobile services, System Architecture, Radio interface, Protocols, Localization and Calling, Handover, Security, New data	#JS Chapter 4.1: page no. 98-122	Chalk & talk, Discussion, Presentation	

			Services			
	3.2	5	Code Division Multiple Access	#JS Chapter 3.5 page no. 82-83		**Unit Test:1**
4	**Wireless Local Area Network**					
	4.1	2	IEEE 802.11: Architecture, Protocol architecture, MAC	#JS Chapter 7.3 : page no. 207-224	Chalk & talk, Discussion, Presentation	
	4.2	3	HIPERLAN: Architecture, Protocol architecture, MAC	#JS Chapter 7.4 : page no. 239-268		
	4.3	3	PAN and Bluetooth	#JS Chapter 7.5: page no. 269-292		
	4.4	2	Ad hoc Networking			
5	**Mobile Network Layer**					
	5.1	2	Mobile IP, packet delivery,	#JS Chapter 8.1 : page no. 304-310	Chalk & talk, Discussion, Presentation	**Unit Test:2**
	5.2	2	Tunneling & encapsulation	#JS Chapter 8.1.6 : page no. 315-318		
	5.3	2	DHCP	#JS Chapter 8.2 : page no. 328-329		
	5.4	2	Ad hock network: Routing & routing algorithms	#JS Chapter 8.3 : page no. 330-342		
6	**Mobile Transport Layer**					
	6.1	2	Mobile TCP	#JS Chapter 9.2.3 : page no. 360-361	Chalk & talk, Discussion, Presentation	**Seminar & Internal Exam**
	6.2	1	Implication of TCP	#JS Chapter 9.2.3 : page no. 362		
	6.3	1	Indirect TCP	#JS Chapter 9.2.1 : page no. 355-357		
	6.4	2	Snooping TCP	#JS Chapter 9.2.2 : page no. 358-359		

Text Book:
1. Jochen Schiller, Mobile Communications, Pearson **[#JS].**
Reference Book:
   1.   William Stalling, Wireless Communication & Networks, Person Education **[#WS].**

Course Objectives and Course Outcomes Mapping:

 ➢ Fundamental concept of mobile communication systems: CO1, CO2 and CO3.
 ➢ Understand the concept of Wireless computer networks: CO4, CO5 and CO6.

Course Units and Course Outcomes Mapping:

Unit No.	Unit	Course Outcome					
		CO1	CO2	CO3	CO4	CO5	CO6
1	Wireless Transmission	✓					
2	Medium Access Control	✓	✓				
3	Telecommunication System	✓		✓			
4	Wireless Local Area Network	✓			✓		
5	Mobile Network Layer	✓				✓	
6	Mobile Transport Layer	✓					✓

Course Outcomes and Programme Outcomes Mapping:

Sr No.	Course Outcomes	Programme Outcomes					
		PO1	PO2	PO3	PO4	PO5	PO6
1	CO1	✓					
2	CO2						
3	CO3						
4	CO4						✓
5	CO5		✓				✓
6	CO6		✓			✓	

Modes of Transaction (Delivery):

- ❖ Lecture Method is generally used but along with it, as and when required, discussion method would be fruitful. It shall be supplemented with various appropriate audio-visual aids.
- ❖ Seminars shall be conducted to enhance their communication and presentation skills & shall be based on units 5 & 6.

Activities/Practicum:

The following activities shall be carried out by the students:
- ❖ Students shall be search on Internet for other Wireless Technology and prepare presentations on it.

The following activities shall be carried out by the teacher:
- ❖ Form the groups of 3 students for seminar.
- ❖ Assign seminar title to each group.
- ❖ Teacher shall provide information on networking simulation tools like NS/2 or Wireshark.
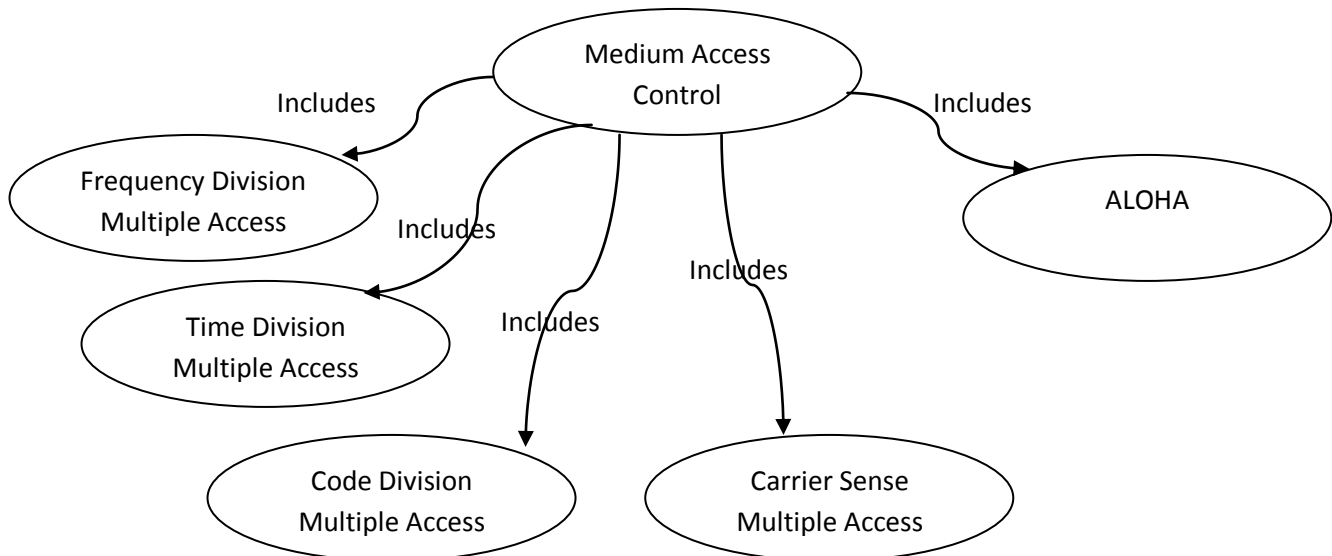
Concept Map:

It is a hierarchical / tree based representation of all topics covered under the course. This gives direct / indirect relationship /association among topics as well as subtopics.
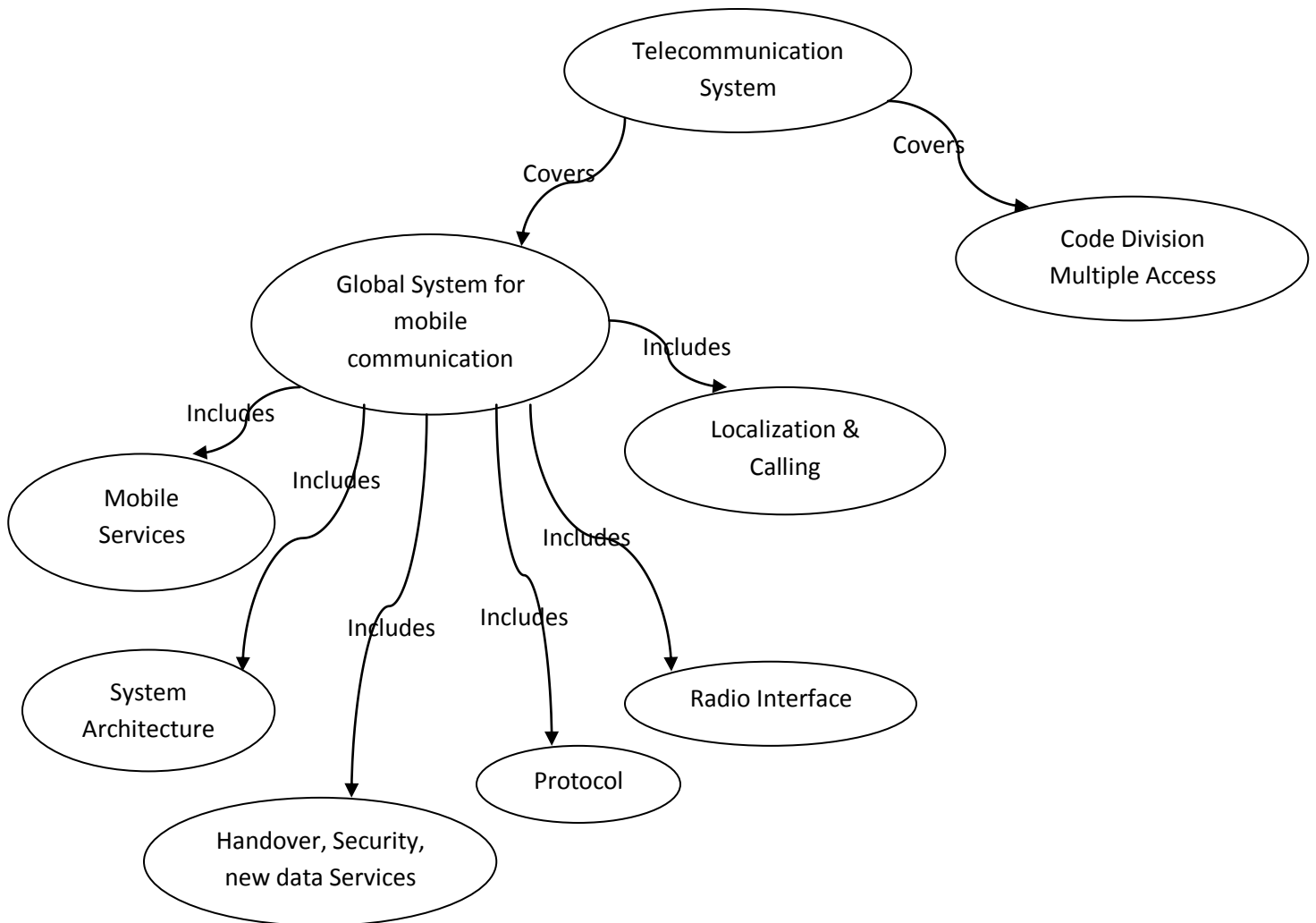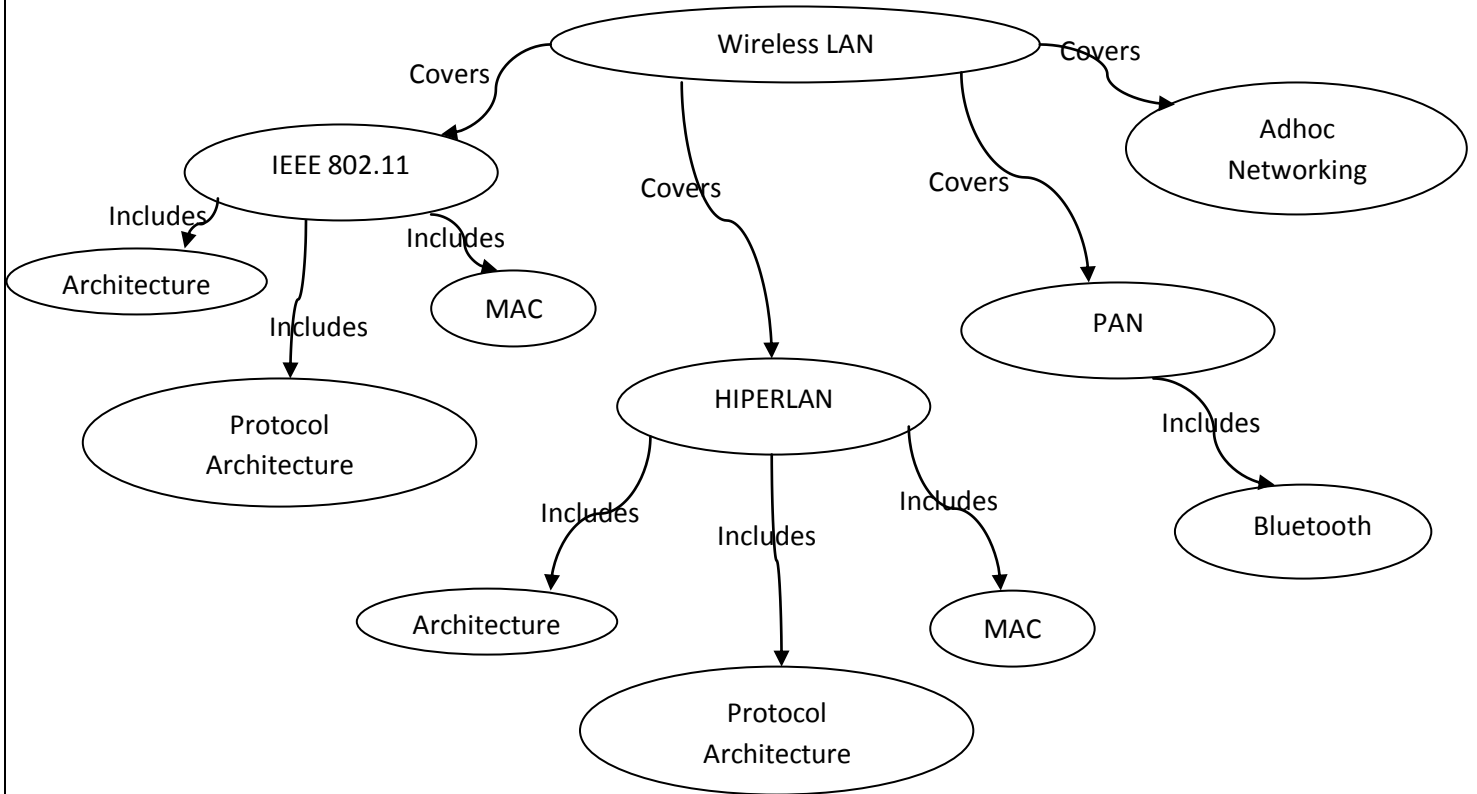
Wireless Communication
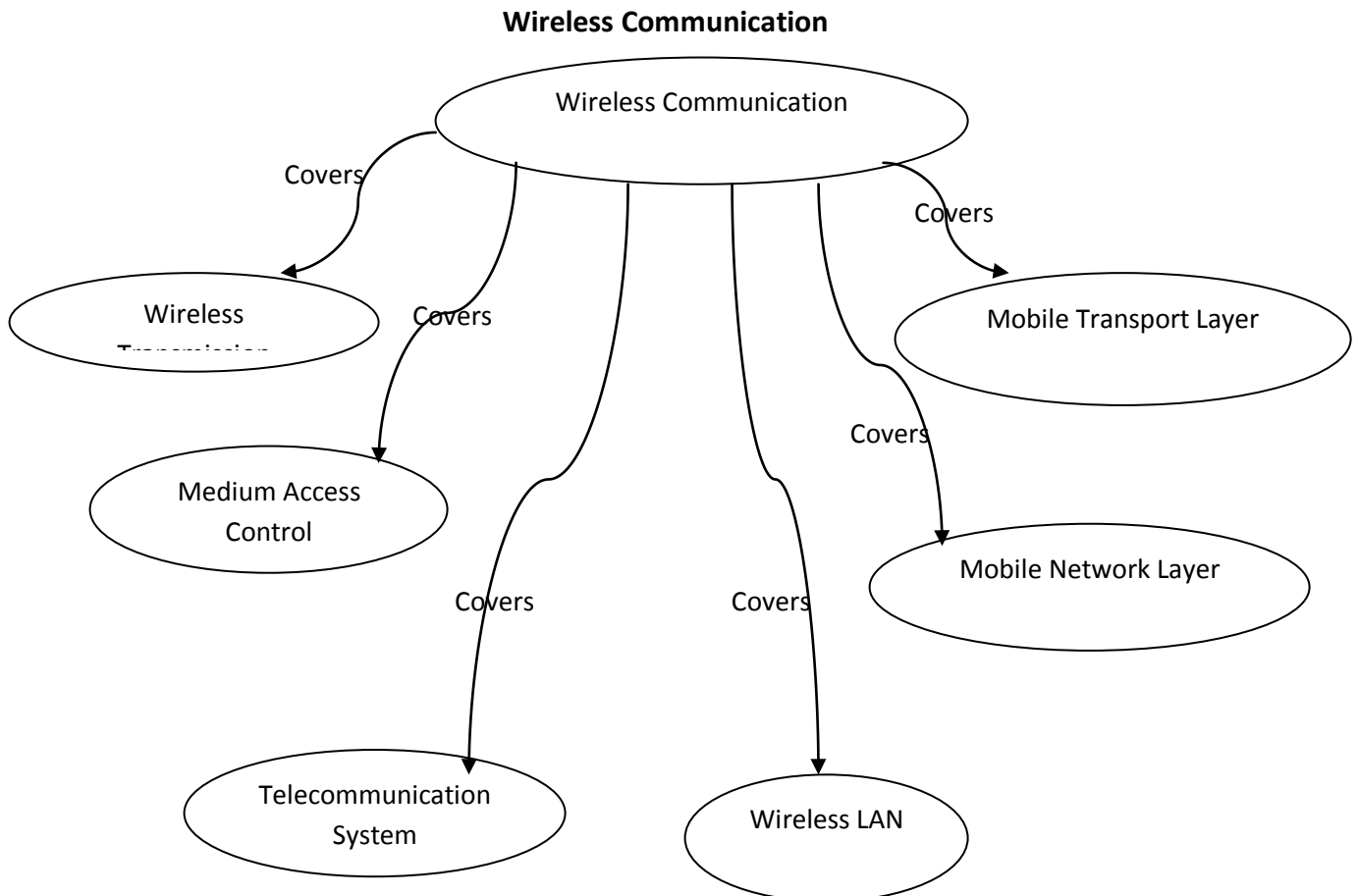
Unit: 1 Wireless Transmission
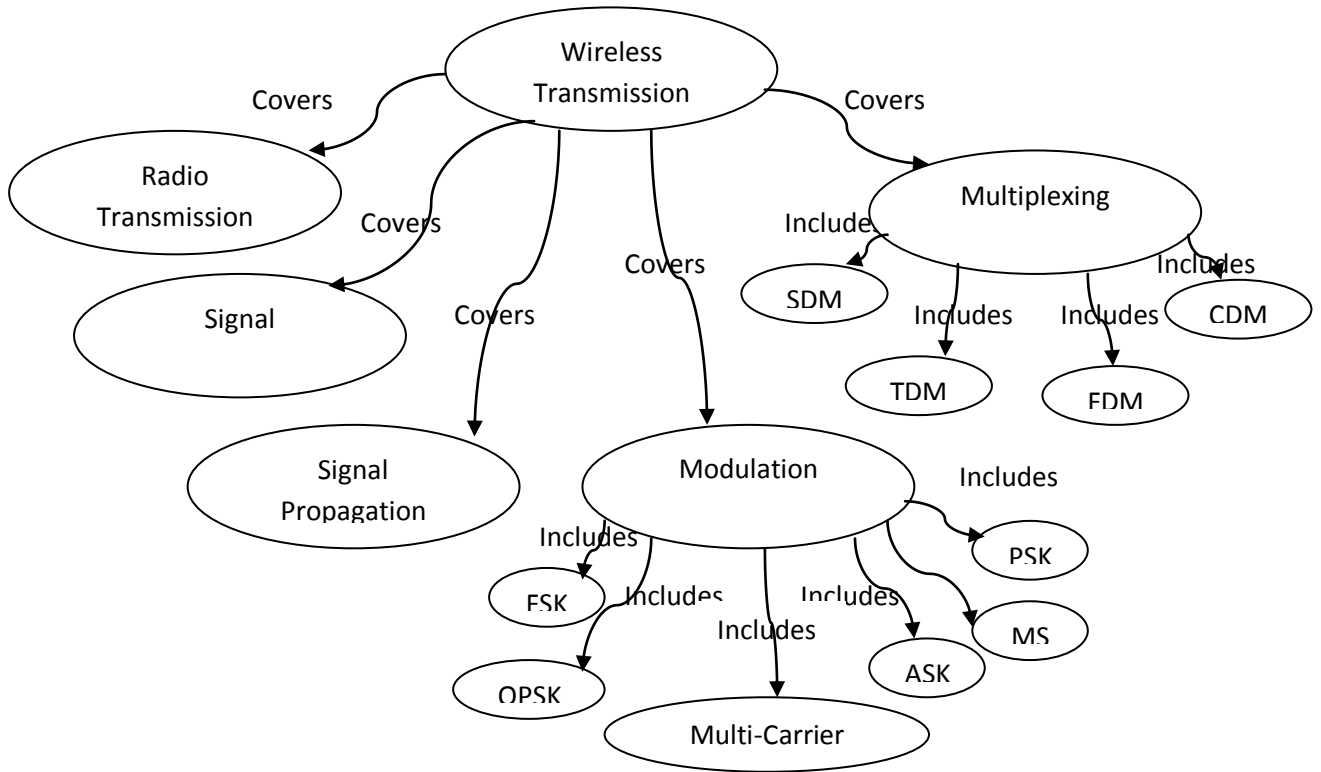
Unit: 2 Medium Access Control

Unit: 3 Telecommunication Systems

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                        ┌──────────────────┐
                        │ Telecommunication │
                        │      System       │
                        └──────────────────┘
                    Covers          Covers
                                          ┌────────────────┐
        ┌──────────────────┐              │  Code Division  │
        │ Global System for │             │ Multiple Access │
        │      mobile       │             └────────────────┘
        │   communication   │ Includes
        └──────────────────┘        ┌──────────────┐
     Includes   Includes            │ Localization & │
                      Includes      │    Calling     │
  ┌──────────┐                      └──────────────┘
  │  Mobile   │    Includes
  │ Services  │        Includes
  └──────────┘
  ┌──────────────┐        ┌──────────────┐
  │   System      │        │ Radio Interface │
  │ Architecture  │        └──────────────┘
  └──────────────┘
        ┌──────────────┐   ┌──────────┐
        │   Protocol    │   │ Protocol │
        └──────────────┘   └──────────┘
  ┌────────────────────┐
  │ Handover, Security, │
  │  new data Services  │
  └────────────────────┘
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Telecommunication System

Covers — Global System for mobile communication

Covers — Code Division Multiple Access

Global System for mobile communication Includes:
- Mobile Services
- System Architecture
- Handover, Security, new data Services
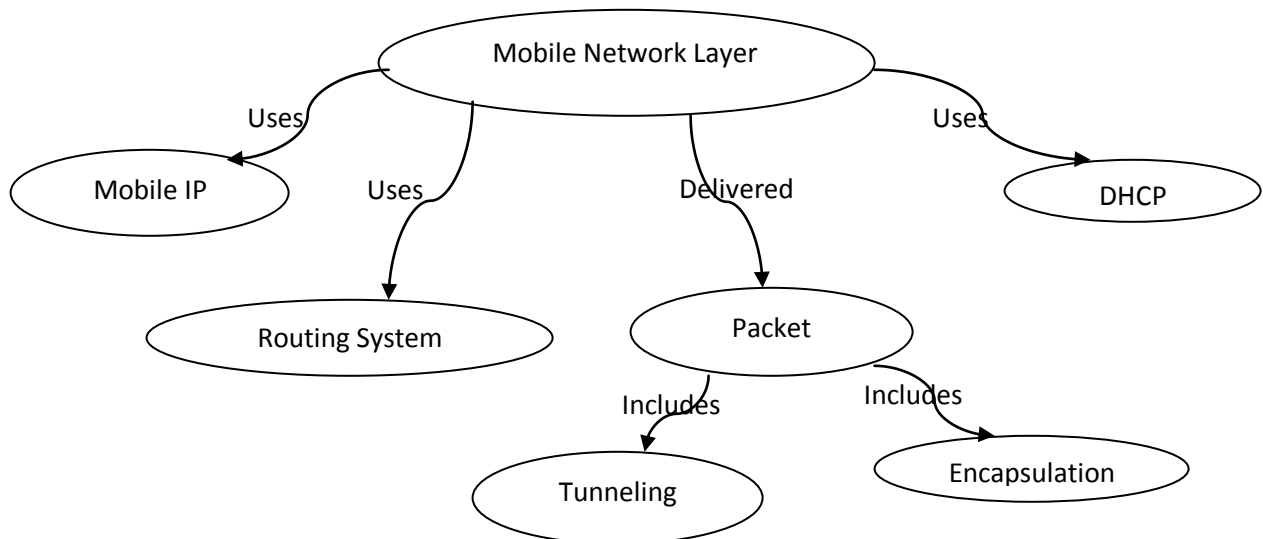- Protocol
- Radio Interface
- Localization & Calling

Unit: 4 Wireless LAN

Unit: 5 Mobile Network Layer

Unit: 6 Mobile Transport Layer