**Unit-V: Advanced Transceiver Schemes**

**Session -1 Spread Spectrum**

* Introduction :
* Spread spectrum: Introduces

1. Jamming
2. interference
3. PN sequence
4. Walsh code

* **Presentation:**
* [**http://www.bee.net/mhendry/vrml/library/cdma/cdma.htm**](http://www.bee.net/mhendry/vrml/library/cdma/cdma.htm)**ss**
* [**http://www.ecgf.uakron.edu/ugweje/web/Research/Publication/NASAseminarLecture3.PDF**](http://www.ecgf.uakron.edu/ugweje/web/Research/Publication/NASAseminarLecture3.PDF)**ss**
* [**http://www.3csysco.com/Pubs/Spread%20Spectrum%20Techniques%20and%20Technology.pdf**](http://www.3csysco.com/Pubs/Spread%20Spectrum%20Techniques%20and%20Technology.pdf)**ss**
* [**http://pdfserv.maximintegrated.com/en/an/AN1890.pdf**](http://pdfserv.maximintegrated.com/en/an/AN1890.pdf)**ss**
* **Recall by keywords**
* DS-SS
* FH-SS
* **Recall by keywords**
* Spread spectrum
* Bandwidth
* principle
* security
* anti jamming capability
* spectrum utilization
* DS-SS
* Principle of operation
* Tx-RX
* **Quiz**

1. List and briefly define twoclasses of FH-SS.
2. Write two common techniques used to protect a data?
3. List out three benefits that can be provided by spread spectrum system?
4. Difference between slow and fast hopping?
5. Compute meritsof SS?
6. Compare DS-SS and FH-SS?
7. Few points about PN sequence?

**Session -2 Spread Spectrum**

**Recap:** Asking questions

* **Spread spectrum**
* **Direct sequence**
* **Pn sequence**

Presentation by slides:

* FH-SS/ FHMA
* [**http://www.slideshare.net/Dominque23/ppt-4741566**](http://www.slideshare.net/Dominque23/ppt-4741566)**ss**
* [**http://kom.aau.dk/~petarp/papers/DAFH-AFR.pdf**](http://kom.aau.dk/~petarp/papers/DAFH-AFR.pdf)**ss**
* [**http://www.youtube.com/watch?v=2oa7pyQchT8&feature=related**](http://www.youtube.com/watch?v=2oa7pyQchT8&feature=related)
* [**http://www.youtube.com/watch?v=55Ig4wHfWIA&feature=related**](http://www.youtube.com/watch?v=55Ig4wHfWIA&feature=related)

conclusion :Rapid fire

* **Frequency hopping**
* **Slow,fast hopping**

**Session -3 Code Division Multiple Access**

* Recap by key words
* Fdma
* Tdma
* cdma

Presentation by slides:

* Video: <http://www.youtube.com/watch?v=SCmKGsEWImg>
* [**http://www.youtube.com/watch?v=LD5zjFkeyiM(cdma)**](http://www.youtube.com/watch?v=LD5zjFkeyiM(cdma))
* [**http://freevideolectures.com/Course/2329/Wireless-Communication/2**](http://freevideolectures.com/Course/2329/Wireless-Communication/2)
* [**http://www.slideshare.net/Annie05/radio-access-network-presentation**](http://www.slideshare.net/Annie05/radio-access-network-presentation)
* Conclusion by Quiz

1. Enumerate the role of CDMA in 2G?
2. Discuss on effects of Multipath Propagation on Code Division Multiple Access
3. In general terms, power control means?
4. Draw RAKE receiver.
5. State the principle behind RAKE receiver?

**Session -4Cellular Code-Division-Multiple-Access Systems**

* Recall by keyword
* Principle Behind Code Division Multiple Access
* Methods to increase capacity
* Presentation:Effects of Multipath Propagation on Code DivisionMultiple Access

Power ControlMethods for Capacity Increases

Video: <http://www.youtube.com/watch?v=qy0-X7CTqss>

* [**http://www.slideshare.net/waqas1234/mc-ch6-presentation**](http://www.slideshare.net/waqas1234/mc-ch6-presentation) **CDMA**
* [**http://www.slideshare.net/deepakecrbs/ai-cdma**](http://www.slideshare.net/deepakecrbs/ai-cdma)
* [**http://www.slideshare.net/bsnlpandian/cdma-presentation-4525288**](http://www.slideshare.net/bsnlpandian/cdma-presentation-4525288)**cdma**

Conclusion: Recall by keywords

1.Enumerate on power control of CDMA?

2.List out the Methods to increase capacity.

3.Briefly describe the cellular CDMA.

**Session -5 Orthogonal Frequency Division Multiplexing**

* **Recall by keyword**

1. Spread spectrum
2. CDMA

* **Presentation :**Implementation of Transceivers
* **Through** Analogy explanation principle of OFDM is explained
* **In a room if a set of 3 members are operating Cell phone with another set of three members means , there is no cross talk because of orthogonal principle.**
* [**http://wcours.gel.ulaval.ca/2010/h/GEL4200/default/5notes/OFDM\_extract\_Prasad.pdf**](http://wcours.gel.ulaval.ca/2010/h/GEL4200/default/5notes/OFDM_extract_Prasad.pdf)**ofdm**
* [**http://www.radio-electronics.com/info/rf-technology-design/ofdm/ofdma-cdma.php**](http://www.radio-electronics.com/info/rf-technology-design/ofdm/ofdma-cdma.php)
* **Quiz**

1. State the principle of OFDM system?
2. Draw transceiver implementation?
3. Compare analog and digital implementation?

**Session -6 Orthogonal Frequency Division Multiplexing**

Introduction :Brainstorming

**Presentation :**Cyclic Preﬁx Principle , condition

Board activity Presentation

Conclusion: Recall by keywords

1. multiple carrier

2.MIMO

3.FDM/OFDM

4.techniques used by OFDM.

5.Role of cyclic prefix.

6.Applications of OFDM.

**Session: 7 GSM**

**Recall by words:**

1G,2G , 3Gstandards

**Presentation:**GSM Architecture ,Logical and Physical Channels

Role play: We can select 10 number of students and assign each student to act as one of the logical and physical channel. Now initiate them to work for call forwarding and call establishing channel.

<http://www.youtube.com/watch?v=m_q6zVTV6Ac>

Conclusion &Summary

* Bandwidth
* Uplink, downlink frequency
* Multiple access scheme
* BSS,NSS and OSS
* Logical channels
* Power control
* Super Frame structure
* Services of GSM

**Session -8 Interim Standards (IS-95)**

Recap: Asking questions

**Presentation :**System Overview,Air Interface ,Logical and Physical Channels

<http://www.projectpda.com/images/glossery/cdma2000_system_low_res.jpg>

<http://shanmg.files.wordpress.com/2006/11/evo-3g.jpg>

<http://www.cdg.org/images/what_is_cdmaOne.gif>

* **Quiz**
* What are the differences among the two standards.
* In the context of power control, what is the difference between open loop and closed loop?
* Differentiate dedicated and common channels?
* State the significance of SIM card

**Session -9 3 G Standards**

* Recap: Asking questions

**Presentation :** Third Generation Wireless Networks and Standards-3GPP standard,UMTS- standards

<http://skullsmokers.files.wordpress.com/2011/01/rf_3g_overvw_umts_wireless_ntwk.gif>

<http://www.tech-faq.com/wcdma.html>

<http://www.3gpp.org/Technologies/Keywords-Acronyms/article/w-cdma>

<http://www.3gpplive.org/>

Conclusion &Summary:Learner led presentation

* What are the differences among the 2 G and 3G standards.
* In the context of standards, what is the UMTS?
* Few words about 3GPP?
* State the significance of 4G