**UNIT IV**

 **MULTIPLE ACCESS TECHNIQUES**

SS&MA techniques : FDMA, TDMA, CDMA, SDMA application in wire and wireless communication : Advantages (merits) :

**SESSION PLAN**

|  |  |
| --- | --- |
| Session 1 | * FDMA , Advantages, Disadvantages, Applications
 |
| Session 2 | * TDMA , Advantages, Disadvantages, Applications
 |
| Session 3 | * CDMA , Advantages, Disadvantages, Applications
 |
| Session 4 | * SDMA , Advantages, Disadvantages, Applications
 |
| Session 5 | Comparisons of TDMA, FDMA, CDMA and SDMA |
| Session 6 | * Application of FDMA in 1G mobile communication, TDMA in 2G mobile communication
 |
| Session 7 | * TDMA in 2.5G mobile communication, CDMA in IS95 standard
 |
| Session 8 | * CDMA in 3G mobile communication, Application of SDMA
 |
| Session 9 | * Advantages of TDMA over FDMA
* Advantages of CDMA over TDMA
 |

**UNIT - IV**

**MULTIPLE ACCESS TECHNIQUES**

**SESSION – 1**

Introduction: MULTIPLE ACCESS TECHNIQUES (Learning Aid & Methodology: Brainstorming & Quiz)

In “Introduction : MULTIPLE ACCESS TECHNIQUES” the software is being a well-known term; the faculty can begin the session by conducting a brainstorming activity so as to know the knowledge of the learners about the Earth segment

Quiz questions:

1. What is meant by multiple accesses?
2. What are the techniques?

FDMA (Learning Aid & Methodology: Presentation & Discussion)

 The faculty gave the idea of FDMA through presentation, then from the students.

References:

1. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&ved=0CD8QFjAD&url=http%3A%2F%2Fwww.jsati.com%2Fwhy-satellite-how-MultipleAccess.asp&ei=sMUyUv\_6IsOOrQfow4GIAg&usg=AFQjCNFOlxGmej3gFn\_Ul7V4JY8Ewx9PVg&bvm=bv.52164340,d.bmk
2. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=9&cad=rja&sqi=2&ved=0CFYQFjAI&url=http%3A%2F%2Fwww.telecomabc.com%2Ff%2Ffdma.html&ei=xcUyUsGIEI\_PrQfot4CgDg&usg=AFQjCNFWr521dYVRc\_3-SKGLU10gMNL5KQ&bvm=bv.52164340,d.bm006B

Advantages, Disadvantages, Applications (Learning Aid & Methodology: Group discussion)

 The faculty gave presentation on Advantages, Disadvantages, Applications and from the students be got the answers for the Advantages, Disadvantages, Applications.

References:

1. lenst.det.unifi.it/~mucchi/DOCS/ING/3bis.Multiplexing.pdf‎
2. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=8&cad=rja&sqi=2&ved=0CFAQFjAH&url=http%3A%2F%2Felectronicdesign.com%2Fcommunications%2Ffundamentals-communications-access-technologies-fdma-tdma-cdma-ofdma-and-sdma&ei=xcUyUsGIEI\_PrQfot4CgDg&usg=AFQjCNEYamWV5\_naKd2mhhtrIG\_WD10Qbw&bvm=bv.52164340,d.bmk

Conclusion & Summary (Learning Aid & Methodology: Rapid Fire)

 The faculty prepared some questions from the session. The questions were rapidly asked with the students and the wrong answers were corrected by the faculty.

1. What is meant by FDMA?
2. What are the Advantages, Disadvantages, Applications of FDMA?

**SESSION – 2**

Recap - FDMA, Advantages, Disadvantages, Applications (Learning Aid & Methodology: Brain storming & Quiz)

The faculty can begin the session by conducting a brainstorming activity so as to know the knowledge of the learners about the term Meeting real time constraints.

1. What is meant by FDMA?
2. What are the Advantages, Disadvantages, Applications of FDMA?

TDMA (Learning Aid & Methodology: Presentation & Discussion)

 The faculty gave the idea of TDMA through presentation, then from the students.

References:

1. www.satsig.net/vsat-equipment/**tdma**-explanation.htm‎

Advantages, Disadvantages, Applications (Learning Aid & Methodology: Group discussion)

 The faculty gave presentation on Advantages, Disadvantages, Applications and from the students be got the answers for the Advantages, Disadvantages, Applications.

References:

1. www.mobileburn.com/definition.jsp?term=**TDMA**

Conclusion & Summary (Learning Aid & Methodology: Rapid Fire)

 The faculty prepared some questions from the session. The questions were rapidly asked with the students and the wrong answers were corrected by the faculty.

1. What is meant by TDMA?
2. What are the Advantages, Disadvantages, Applications of TDMA?

**SESSION – 3**

Recap: TDMA, Advantages, Disadvantages, Applications (Learning Aid & Methodology: Brainstorming)

 The faculty can begin the session by conducting a brainstorming activity so as to know the knowledge of the learners about the term Meeting real time constraints.

1. What is meant by TDMA?
2. What are the Advantages, Disadvantages, Applications of TDMA?

CDMA (Learning Aid & Methodology: Presentation & Discussion)

 The faculty gave the idea of TDMA through presentation, then from the students.

References:

1. cellphones.about.com › [Electronics](http://www.about.com/gadgets/) › [Cell Phones](http://cellphones.about.com/) › [Phone Glossary](http://cellphones.about.com/od/phoneglossary/)
2. www.home.agilent.com › [Home](http://www.home.agilent.com/agilent/home.jspx?nid=-11143.0.00&cc=US&lc=eng) › [Industries & Technologies](http://www.home.agilent.com/agilent/commonlanding.jspx?mode=Industry&nid=-536884603.0.00&cc=US&lc=eng) › [Cellular](http://www.home.agilent.com/agilent/application.jspx?nid=-34869.0.00&cc=US&lc=eng)‎

Advantages, Disadvantages, Applications (Learning Aid & Methodology: Group discussion)

 The faculty gave presentation on Advantages, Disadvantages, Applications and from the students be got the answers for the Advantages, Disadvantages, Applications.

References:

Conclusion & Summary (Learning Aid & Methodology: Rapid Fire)

 The faculty prepared some questions from the session. The questions were rapidly asked with the students and the wrong answers were corrected by the faculty.

1. What is meant by CDMA?
2. What are the Advantages, Disadvantages, Applications of CDMA?

**SESSION – 4**

Recap: CDMA , Advantages, Disadvantages, Applications (Learning Aid & Methodology: Rapid fire)

 The faculty can begin the session by conducting a brainstorming activity so as to know the knowledge of the learners about the term Meeting real time constraints.

1. What is meant by CDMA?
2. What are the Advantages, Disadvantages, Applications of CDMA?

SDMA (Learning Aid & Methodology: Presentation & Discussion)

 The faculty gave the idea of TDMA through presentation, then from the students.

References:

1. hp**cdma**.nic.in/‎
2. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=12&cad=rja&ved=0CF8QFjAL&url=http%3A%2F%2Fsearchnetworking.techtarget.com%2Fdefinition%2Fspatial-division-multiple-access&ei=4MYyUpNOzb6uB9GdgcgD&usg=AFQjCNEdjGNjxvvYxYdKmPZAR2qR8somcw&bvm=bv.52164340,d.bmk

Advantages, Disadvantages, Applications (Learning Aid & Methodology: Group discussion)

 The faculty gave presentation on Advantages, Disadvantages, Applications and from the students be got the answers for the Advantages, Disadvantages, Applications.

References:

1. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=13&cad=rja&ved=0CG0QFjAM&url=http%3A%2F%2Fetd.lib.fsu.edu%2Ftheses%2Favailable%2Fetd-04092004-143712%2Funrestricted%2FCh\_2MultipleAccess.pdf&ei=4MYyUpNOzb6uB9GdgcgD&usg=AFQjCNHHqelT-t7vw2jLCJgCZ60LL\_2f2w&bvm=bv.52164340,d.bmk

Conclusion & Summary (Learning Aid & Methodology: Rapid Fire)

 The faculty prepared some questions from the session. The questions were rapidly asked with the students and the wrong answers were corrected by the faculty.

1. What is meant by SDMA?
2. What are the Advantages, Disadvantages, Applications of SDMA?

**SESSION – 5**

Recap: SDMA , Advantages, Disadvantages, Applications (Learning Aid & Methodology: Quiz)

 The faculty can begin the session by conducting a brainstorming activity so as to know the knowledge of the learners about the term Meeting real time constraints.

1. What is meant by SDMA?
2. What are the Advantages, Disadvantages, Applications of SDMA?

Comparisons of TDMA, FDMA, CDMA and SDMA (Learning Aid & Methodology: Presentation)

 The Introduction to Multi-state system and function sequence was discussed through presentation and explanation.

References:

1. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=9&cad=rja&ved=0CFoQFjAI&url=http%3A%2F%2Fwww.mission10x.com%2Fmission-10x%2Fdocuments%2Fbookrack%2Fcdma\_kingsygrace.pdf&ei=UsgyUsacMMfarAfOzYCwBA&usg=AFQjCNGsoY\_w0zgebL2bxRcNEYcBIdclKg&bvm=bv.52164340,d.bmk

Comparisons of TDMA, FDMA, CDMA and SDMA (Learning Aid & Methodology: Presentation)

 The Implementation multi state (timed) system was discussed through images and videos of the same events and the faculty had given the presentation and explanation with the example of Traffic light controller.

References:

1. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=10&cad=rja&ved=0CF8QFjAJ&url=http%3A%2F%2Fwww.scribd.com%2Fdoc%2F59334384%2FMACA-TDMA-FDMA-CDMA-SDMA&ei=UsgyUsacMMfarAfOzYCwBA&usg=AFQjCNFwEVfSabLDQfGt8URVhA2RC537RQ&bvm=bv.52164340,d.bmk

Conclusion & Summary (Learning Aid & Methodology: Recall by keywords)

 This session was concluded with the rapid fire of simple questions to the audience.

1. Which is applicable for high speed transmissions?
2. Which MA is preferred for secured transmission?

**SESSION – 6**

Recap: Comparisons of TDMA, FDMA, CDMA and SDMA (Learning Aid & Methodology: Quiz)

This session was started by the faculty with simple questions to the audience.

1. Which is applicable for high speed transmissions?
2. Which MA is preferred for secured transmission?

Application of FDMA in 1G mobile communication (Learning Aid & Methodology: Board presentation)

 The introduction about the Multi state system (timed) was given to the students by the faculty through board explanation.

References:

1. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=10&cad=rja&ved=0CF8QFjAJ&url=http%3A%2F%2Fwww.scribd.com%2Fdoc%2F59334384%2FMACA-TDMA-FDMA-CDMA-SDMA&ei=UsgyUsacMMfarAfOzYCwBA&usg=AFQjCNFwEVfSabLDQfGt8URVhA2RC537RQ&bvm=bv.52164340,d.bmk

TDMA in 2G mobile communication (Learning Aid & Methodology: Board activity & Presentation)

 The explanation of Traffic light sequence-Animatronics dinosaur was given to the students by the faculty through board presentation.

References:

1. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=10&cad=rja&ved=0CF8QFjAJ&url=http%3A%2F%2Fwww.scribd.com%2Fdoc%2F59334384%2FMACA-TDMA-FDMA-CDMA-SDMA&ei=UsgyUsacMMfarAfOzYCwBA&usg=AFQjCNFwEVfSabLDQfGt8URVhA2RC537RQ&bvm=bv.52164340,d.bmk

Conclusion & Summary (Learning Aid & Methodology: Tit-for-Tat)

 The set of questions (Definitions) were written by the two different groups, five per group, and they are instructed to fire the questions alternatively. One group framed the questions from the first subtopic and the next five questions were framed by another group from the second subtopic.

**SESSION – 7**

Recap: Application of FDMA in 1G mobile communication, TDMA in 2G mobile communication (Learning Aid & Methodology: Quiz)

 Some questions were prepared by the faculty on the Application of FDMA in 1G mobile communication, TDMA in 2G mobile communication and asked with the students.

TDMA in 2.5G mobile communication (Learning Aid & Methodology: Board Presentation)

 The TDMA in 2.5G mobile communication is presented through the presentation by the faculty.

References:

1. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&cad=rja&ved=0CDsQFjAC&url=http%3A%2F%2Fdiginole.lib.fsu.edu%2Fcgi%2Fviewcontent.cgi%3Farticle%3D2279%26context%3Detd&ei=YcFFUr2zJIeFrAfA3IHQDA&usg=AFQjCNGrS6UN\_6mqs1-6aei17V4Gyb0qpg&bvm=bv.53217764,d.bmk

CDMA in IS95 standard (Learning Aid & Methodology: Board presentation)

 The introduction about the CDMA in IS95 standard was given to the students by the faculty through board explanation.

References:

1. <https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&ved=0CDcQFjAB&url=http%3A%2F%2Fwww.wirelessdevnet.com%2Fchannels%2Fwireless%2Ftraining%2Fmobilewirelesstoday4.html&ei=esFFUrqKJ4PQrQe-9oDIDw&usg=AFQjCNFqVW7MizbV_734KJ5NO0ZLPXu4Xw&bvm=bv.53217764,d.bmk>
2. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&ved=0CEUQFjAD&url=http%3A%2F%2Fwww.sis.pitt.edu%2F~dtipper%2F2720%2F2720\_Slides9.pdf&ei=esFFUrqKJ4PQrQe-9oDIDw&usg=AFQjCNFPb7\_\_OqbRYzesXcrz5SqLd0fJQA&bvm=bv.53217764,d.bmk

Conclusion & Summary (Learning Aid & Methodology: Recall by key words)

 The students were asked to list out the important technical words which are discussed in this session. Then the keywords are consolidated by the faculties and described in short.

 The keywords are: TDMA in 2.5G mobile communication, CDMA in IS95 standard

**SESSION – 8**

RECAP: TDMA in 2.5G mobile communication, CDMA in IS95 standard (Learning Aid & Methodology: Brainstorming)

 Some questions were prepared by the faculty on the topic TDMA in 2.5G mobile communication, CDMA in IS95 standard

CDMA in 3G mobile communication (Learning Aid & Methodology: Board Presentation)

 The CDMA in 3G mobile communication is presented through the presentation by the faculty.

References:

1. <https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=15&cad=rja&ved=0CHEQFjAO&url=http%3A%2F%2Fwsl.stanford.edu%2F~ee359%2Fcdma.pdf&ei=lsFFUvf-O8KGrAe0_4DQBw&usg=AFQjCNHmxJo548NgKIPx2Gez0DObRK1gfg&bvm=bv.53217764,d.bmk>
2. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=9&cad=rja&ved=0CFwQFjAI&url=http%3A%2F%2Fin.answers.yahoo.com%2Fquestion%2Findex%3Fqid%3D20111030070923AAmv6I2&ei=lsFFUvf-O8KGrAe0\_4DQBw&usg=AFQjCNFHd-oTDDlN\_DPPCVvPYcSiR14s4g&bvm=bv.53217764,d.bmk

Application of SDMA (Learning Aid & Methodology: Board presentation)

 The Application of SDMA was given to the students by the faculty through board explanation.

References:

1. <https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&ved=0CDAQFjAB&url=http%3A%2F%2Fsearchnetworking.techtarget.com%2Fdefinition%2Fspatial-division-multiple-access&ei=5MFFUqmLFsHUrQfAhoGYAg&usg=AFQjCNEdjGNjxvvYxYdKmPZAR2qR8somcw&bvm=bv.53217764,d.bmk>
2. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&cad=rja&ved=0CFIQFjAF&url=http%3A%2F%2Fwireless.vt.edu%2Fsymposium%2Fproceedings%2F1998%2F(23)Pseudo-Blind%2520Algorithm%2520for%2520SDMA%2520Application.pdf&ei=5MFFUqmLFsHUrQfAhoGYAg&usg=AFQjCNHQBMkIK9sKpJ996PZZv1d-AGq9qg&bvm=bv.53217764,d.bmk

Conclusion & Summary (Learning Aid & Methodology: Quiz)

 The students were asked to list out the important technical words which are discussed in this session. Then the keywords are consolidated by the faculty and described in short.

 The keywords are: CDMA in 3G mobile communication, CDMA in 3G mobile communication

**SESSION – 9**

RECAP: CDMA in 3G mobile communication, Application of SDMA (Learning Aid & Methodology: Quiz)

 Some questions were prepared by the faculty on the topics CDMA in 3G mobile communication, Application of SDMA

Advantages of TDMA over FDMA (Learning Aid & Methodology: Board Presentation)

 Advantages of TDMA over FDMA are presented through the presentation by the faculty.

References:

1. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&ved=0CDcQFjAB&url=http%3A%2F%2Fwww.knight-sky.com%2Fcase-studies%2FKS\_Technical\_Notes\_Series\_TDMA.pdf&ei=BMJFUvzKGsTlrAfuxoBw&usg=AFQjCNHqJoTZN0G1LwYq8s3aHBm852bDaQ&bvm=bv.53217764,d.bmk

Advantages of CDMA over TDMA (Learning Aid & Methodology: Board Presentation)

 The Advantages of CDMA over TDMA was presented to the students by the faculty through board explanation.

References:

1. https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&ved=0CDMQFjAB&url=http%3A%2F%2Fwww.tutorialspoint.com%2Fgsm%2Ftdma\_and\_cdma.htm&ei=HMJFUvvIFMSFrAfhwoCIBA&usg=AFQjCNF1zmABZoPCHQXz0yZeFrAI9U3FTg&bvm=bv.53217764,d.bmk

Conclusion & Summary (Learning Aid & Methodology: Recall by key words)

 The students were asked to list out the important technical words which are discussed in this session. Then the keywords are consolidated by the faculties and described in short.

 The keywords are: Advantages of TDMA over FDMA, Advantages of CDMA over TDMA.