**Gayatri Vidya Parishad College of Engineering for Women**

**Madhurawada, Visakhapatnam-530048**

Lecture Plan

Class: IV ECE-2 Subject: Satellite Communications

Name of Faculty: L. Sarika

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| S.no | Unit | Topic Covered | No. of Classes Required |
| 1. | UNIT I INTRODUCTION | Origin of Satellite Communications | 2 |
| 2. | Historical Background | 2 |
| 3. | Basic Concepts of Satellite Communications, | 2 |
| 4. | Frequency allocations for Satellite Services, | 2 |
| 5. | Applications, Future Trends of Satellite Communications | 2 |
| 6. | UNIT II ORBITAL MECHANICS AND LAUNCHERS: | Orbital Mechanics | 2 |
| 7. | Look Angle determination, Orbital perturbations | 2 |
| 8. | Orbit determination, launches and launch vehicles | 2 |
| 9. | Orbital effects in communication systems performance | 2 |
| 11. | UNIT III SATELLITE SUBSYSTEMS | Attitude and orbit control system | 2 |
| 12. | telemetry, tracking, Command and monitoring | 2 |
| 13. | power systems | 1 |
| 14. | communication subsystems | 1 |
| 15. | Satellite antenna Equipment reliability and Space qualification. | 2 |
| 17. | UNIT IV SATELLITE LINK DESIGN | Basic transmission theory | 2 |
| 18. | system noise temperature and G/T ratio,  Design of down links, up link design | 2 |
| 19. | Design of satellite links for specified C/N, System design example | 2 |
| 20. | MULTIPLE ACCESS: Frequency division multiple access (FDMA) Intermodulation Calculation of C/N | 2 |
| 21. | Time division Multiple Access (TDMA) Frame structure, Examples. Satellite Switched TDMA Onboard processing, | 2 |
| 22. | DAMA, Code Division Multiple access (CDMA),Spread spectrum transmission and reception. | 2 |
| 23. | UNIT V EARTH STATION TECHNOLOGY | Introduction, Transmitters, Receivers, Antennas. | 1 |
| 24. | Tracking systems, Terrestrial interface, Primary power test methods | 1 |
| 25. | LOW EARTH ORBIT AND GEO-STATIONARY SATELLITE SYSTEMS: Orbit consideration, coverage and frequency considerations. | 2 |
| 26. | Delay & Throughput considerations, System considerations. | 2 |
| 27. | Operational NGSO constellation Designs. | 2 |
| 29. | UNIT VI SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM | Radio and Satellite Navigation | 1 |
| 30. | GPS Position Location principles, GPS Receivers and codes | 2 |
| 31. | Satellite signal acquisition | 2 |
| 32. | GPS Navigation Message, GPS signal levels | 2 |
| 33. | GPS receiver operation, | 1 |
| 34. | GPS C/A code accuracy, Differential GPS. | 2 |

TEXT BOOKS: 1. Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley Publications, 2nd Edition, 2003. 2. Satellite Communications Engineering – Wilbur L. Pritchard, Robert A Nelson and Henri G.Suyderhoud, 2nd Edition, Pearson Publications, 2003.

REFERENCES: 1. Satellite Communications: Design Principles – M. Richharia, BS Publications, 2nd Edition, 2003. 2. Satellite Communication - D.C Agarwal, Khanna Publications, 5th Ed. 3. Fundamentals of Satellite Communications – K.N. Raja Rao, PHI, 2004 4. Satellite Communications – Dennis Roddy, McGraw Hill, 2nd Editi