

SATELLITE COMMUNICATIONS

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|--|---------------|---------------------------------|-------|----------------------|--------|
| Course Code | 20EC2702 B | Year | IV | Semester | I |
| Course Category | OE-III | Branch | ECE | Course Type | Theory |
| Credits | 3 | L-T-P | 3-0-0 | Prerequisites | -- |
| Continuous Internal Evaluation: | 30 | Semester End Evaluation: | 70 | Total Marks: | 100 |

| Course Outcomes | |
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| Upon successful completion of the course, the student will be able to | |
| CO1 | Illustrate the basic concepts of satellite communication and different Frequency allocations for satellite services. (L2) |
| CO2 | Analyze the satellite orbits and link design for transmission & reception of signals (L4) |
| CO3 | Analyze various satellite subsystems and its functionality. (L4) |
| CO4 | Choose appropriate multiple access technique for a given satellite communication application (L3) |

| Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low) | | | | | | | | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1 | 2 | | | | | | | | | 1 | | | | 1 |
| CO2 | | 3 | | | | | | | | 2 | | | | 2 |
| CO3 | | 3 | | | | | | | | 2 | | | | 2 |
| CO4 | 2 | | | | | | | | | 2 | | | | 2 |

| Syllabus | | |
|----------|---|------------|
| Unit No. | Contents | Mappe d CO |
| I | Introduction: Historical Back-ground, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications. | CO1 |
| II | Orbital Mechanics And Launchers: Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbit determination, launches and launch vehicles, Orbital effects in communication systems performance. | CO1, CO2 |
| III | Satellite Subsystems: Attitude and orbit control system, telemetry, tracking, Command and monitoring, power systems, communication subsystems, Satellite antenna Equipment reliability and Space qualification. | CO1, CO3 |
| IV | Satellite Link Design: Basic transmission theory, system noise temperature and G/T ratio, Design of down links, up link design, Design of satellite links for specified C/N, System design example. | CO1, CO2 |
| V | Multiple Access: Frequency division multiple access (FDMA) Intermodulation, Calculation of C/N. Time division Multiple Access (TDMA) Frame structure, Examples. Satellite Switched TDMA On-board processing, DAMA, Code Division Multiple access (CDMA). | CO4 |

| Learning Resources |
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| Text Books |
| 1. Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnut, WSE, Wiley Publications, 2 rd Edition, 2003 2. Satellite Communications Engineering – Wilbur L. Pritchard, Robert A Nelson and Henri G.Snyderhoud Pearson Publications, 2 nd Edition, 2003. |
| Reference Books |
| 1. Satellite Communications : Design Principles - M. Richharia, BS Publications, 2 rd Edition, 2003 2. Satellite Communication - D.C Agarwal, Khanna Publications, Mc.Graw Hill, 5 th Edition, 2008. 3. Fundamentals of Satellite Communications – K.N. Raja Rao, PHI, 2004. 4. Satellite Communications – Dennis Roddy, McGraw Hill, 2 nd Edition, 1996 |
| e- Resources & other digital material |
| 1. https://nptel.ac.in/courses/117/105/117105131/3 . https://nptel.ac.in/courses/108/105/108105159/ |
