

## Topics to be Covered

- Unit 1** - Introduction to Satellite Communications
- Unit II** - Orbital Mechanics
- Unit III** - Satellite Subsystems
- Unit IV** - Design of Satellite Links
- Unit V** - Multiple Access Techniques
- Unit VI** - Satellite Applications

# School of Electrical, Electronics and Communication Engineering

Course Code : BECE3103

Course Name: Satellite Communications

- **Unit 1 - Introduction to Satellite Communications**
- **Unit II – Orbital Mechanics**
- **Unit III - Satellite Subsystems**
- **Unit IV - Design of Satellite Links**
- **Unit V – Multiple Access Techniques**
- **Unit VI – Satellite Applications**
- **Principles and architecture of satellite Communication,**
- **Brief history of Satellite systems, advantages, disadvantages,**
- **Applications and frequency bands used for satellite communication,**
- **active and Passive satellite, Synchronous satellite, Satellite Launch.**

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- **Orbital equations**
- **Kepler's laws**
- **orbital parameters**
- **orbital perturbations**
- **station keeping**
- **geo stationary and non Geo-stationary orbits**
- **LEO, MEO**

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  - Unit V – Multiple Access Techniques
  - Unit VI – Satellite Applications
- Study of Architecture and Roles of various sub-systems of a satellite system
    - Telemetry, tracking, command and monitoring (TTC & M),
    - Attitude and Orbit control system (AOCS),
    - Communication Sub-system,
    - Power Sub-systems

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- **Unit IV - Design of Satellite Links**
  - Basic transmission,
  - System noise temperature,
  - G/T ratio
  - Design of down link / uplink
- Unit V – Multiple Access Techniques
- Unit VI – Satellite Applications

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- Unit IV - Design of Satellite Links
- **Unit V – Multiple Access Techniques**
  - Multiple Access Techniques: FDMA, FDMA down link analysis. TDMA, Satellite-switched TDMA, CDMA, DAMA, On board signal processing for FDMA/TDM Operation.
- Unit VI – Satellite Applications

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- **Unit VI – Satellite Applications**
  - Satellite mobile services, VSAT, GPS, Radarsat, Direct broadcast satellites (DBS)- Direct to home Broadcast (DTH)

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## Activity based learning (CO6) – CAT3

- CANSAT
- India's Recently launched Satellites
- India's Planned Space Missions
- Frequently Asked Questions - for ISRO, RRB, SSC, ESE exams





## Outcomes of the Course (COs)

Learners will be able to

- CO1 : Define orbital mechanics and launch methodologies
- CO2 : Describe satellite subsystems
- CO3 : Design link power budget for satellites
- CO4 : Explain satellite access techniques
- CO5 : Compare competitive satellite services
- CO6 : To conduct a simulation-based design project requiring some independent reading, programming.

## References

- Timothy Pratt Charles W. Bostian, Jeremy E. Allnutt “Satellite Communications” Wiley India. 2nd edition 2002
- Tri T. Ha “Digital Satellite Communications” Tata McGraw Hill, 2009
- Dennis Roddy “Satellite Communication” 4th Edition, McGraw Hill, 2009

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Thank You

E-mail : [jebashiney@gmail.com](mailto:jebashiney@gmail.com) / [jeba.shiney@galgotiasuniversity.edu.in](mailto:jeba.shiney@galgotiasuniversity.edu.in)

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