

# EE540 Advance Electromagnetic Theory & Antennas

Prof. Rakesh S. Kshetrimayum

Dept. of EEE, IIT Guwahati, India



# Syllabus

- Review of Maxwell's Equation and boundary conditions
- time harmonic electromagnetic fields
- vector potentials
- electromagnetic theorems and concepts:
  - uniqueness
  - image theory
  - field equivalence principle
  - reciprocity



# Syllabus

- Plane, cylindrical and spherical waves
- radiation and scattering
- dipole antennas and arrays
- aperture antennas:
  - radiation from open ended rectangular and circular waveguides
  - horn antennas
  - parabolic antennas
  - slot antennas and arrays
- microstrip antennas



# References

- R. S. Kshetrimayum, *“Electromagnetic Field Theory”*, Cengage, 2012.
- C. A. Balanis, *“Advanced Engineering Electromagnetics,”* John Wiley & Sons, 2009.
- C. A. Balanis, *“Antenna Theory: Analysis and Design,”* John Wiley & Sons, 2009.
- T. A. Milligan, *“Modern Antenna Design”*, Wiley-IEEE Press, 2005.
- Y. Huang and K. Boyle, *“Antennas: From Theory to Practice”*, Wiley, 2008.
- R. J. Marhefka, A. S. Khan and J. D. Kraus, *“Antennas and Wave Propagation”*, Tata McGraw - Hill Education 2010.
- J. M. Jin, *“Theory and Computation of Electromagnetic Fields”*, IEEE Press, 2010
- D. G. Fang, *“Antenna Theory & Microstrip Antennas”*, CRC Press, 2010



## References & Feedbacks

- H. G. Visser, “*Antenna theory and applications*”, Wiley, 2012
- W. L. Stutzman and G. A. Thiele, “*Antenna Theory and Design*”, Wiley, 2012
- D. Hysell, “*Antennas and Radar for Environmental Scientists and Engineers*”, Cambridge University Press, 2018
- T. S. Bird, *Fundamentals of aperture antennas and arrays*, Wiley, 2016
- A. J. Sangster, *Compact slot array antennas for wireless communications*, Springer, 2019

### Feedbacks:

- Any suggestions: email me at [rakesh@comsoc.org](mailto:rakesh@comsoc.org)