



VIVEKANANDHA
COLLEGE OF ENGINEERING FOR WOMEN
 (An Autonomous Institution, Affiliated to Anna University, Chennai)
 Elayampalayam, Tiruchengode-637 205



Department of Electronics and Communication Engineering
Lesson Plan:
U15EC517 Transmission lines and Waveguides
III ECE A & B

| Session No. | Topics Covered | Duration in Minutes | Teaching Aid | Books Referred |
|--|--|---------------------|--------------|----------------|
| UNIT – I: <u>TRANSMISSION LINE THEORY</u> | | | | |
| 1 | A line of cascaded T Sections. | 45 Min | BB | T1,T2 |
| 2 | Transmission lines General Solution - Physical significance of the equations | 45 Min | BB | T1,T2 |
| 3 | Infinite line –wavelength | 45 Min | PPT | T1 |
| 4 | Velocity of propagation , Distortion less line | 45 Min | PPT | T1,R2 |
| 5 | The telephone cable | 45 Min | BB | T1 |
| 6 | Reflection on a line not terminated in Z_0 | 45 Min | BB | T1 |
| 7 | Reflection coefficient | 45 Min | BB | T1,R2 |
| 8 | Open and short circuited lines | 45 Min | BB | T1 |
| 9 | Intertion Loss. | 45 Min | BB | T1,R2 |
| 10 | TUTORIAL 01 | 45 Min | BB | T1,R2 |
| 11 | TUTORIAL 02 | 45 Min | BB | T1,R3 |
| 12 | TUTORIAL 03 | 45 Min | BB | T1 |
| UNIT – II: <u>THE LINE AT RADIO FREQUENCIES</u> | | | | |
| 13 | Parameters of the open wire at RF frequencies | 45 Min | PPT | T1 |
| 14 | Voltage and currents on the dissipationless line -Standing waves, nodes, standing wave ratio | 45 Min | PPT | T1,R4 |
| 15 | Input impedance of the dissipationless line | 45 Min | BB | T1,R2 |
| 16 | Input impedance of open and short circuited lines – Power and impedance measurement on lines | 45 Min | BB | T1 |
| 17 | The eighth wave line, quarter wave line, half wave line | 45 Min | PPT | T1 |
| 18 | The Smith chart and its applications | 45 Min | PPT | T1 |
| 19 | – single stub and double matching with the Smith chart | 45 Min | BB | T1,R2 |
| 20 | Problem solving using Smith chart. | 45 Min | BB | T1,R1 |
| 21 | Problem solving using Smith chart. | 45 Min | BB | T1,R4 |
| 22 | TUTORIAL 04 | 45 Min | BB | T1,R1 |
| 23 | TUTORIAL 05 | 45 Min | BB | T1,R3 |
| 24 | TUTORIAL 06 | 45 Min | BB | T1 |
| UNIT – III: <u>GUIDED WAVES</u> | | | | |
| 25 | Waves between parallel planes of perfect conductors | 45 Min | PPT | T1,R1 |
| 26 | Transverse electric and transverse magnetic waves | 45 Min | PPT | T1,R2 |
| 27 | Characteristics of TE and TM Waves | 45 Min | BB | T1,R3 |
| 28 | Transverse Electromagnetic waves | 45 Min | BB | T1,R4 |
| 29 | Manner of wave travel | 45 Min | BB | T1,R5 |
| 30 | Velocities of the waves | 45 Min | BB | T1 |
| 31 | Attenuation with planes of finite conductivity TE | 45 Min | BB | T1 |
| 32 | TM & TEM case | 45 Min | PPT | T1 |
| 33 | Characteristic impedance. | 45 Min | PPT | T1 |
| 34 | TUTORIAL 07 | 45 Min | BB | T1 |
| 35 | TUTORIAL 08 | 45 Min | BB | T1 |
| 36 | TUTORIAL 09 | 45 Min | BB | T1 |

UNIT – IV:RECTANGULAR WAVEGUIDES

| | | | | |
|----|---|--------|-----|-------|
| 37 | Application of Maxwell's equations to the rectangular wave guide | 45 Min | PPT | T1 |
| 38 | TM Waves in Rectangular Wave guides | 45 Min | PPT | T1 |
| 39 | TE Waves in Rectangular Waveguides | 45 Min | BB | T1 |
| 40 | Characteristic of TE and TM Waves | 45 Min | BB | T1 |
| 41 | Cutoff wavelength and phase velocity | 45 Min | BB | T1,R7 |
| 42 | Impossibility of TEM waves in waveguides | 45 Min | PPT | T1,R7 |
| 43 | Dominant mode in rectangular waveguide | 45 Min | BB | T1,R7 |
| 44 | Attenuation of TE and TM modes in rectangular waveguides | 45 Min | BB | T1,R7 |
| 45 | Wave impedances and characteristic impedance – Excitation of modes. | 45 Min | BB | T1,R7 |
| 46 | TUTORIAL 10 | 45 Min | BB | T1,R7 |
| 47 | TUTORIAL 11 | 45 Min | BB | T1 |
| 48 | TUTORIAL 12 | 45 Min | BB | T1 |

UNIT – V:CIRCULAR WAVE GUIDES AND RESONATORS

| | | | | |
|----|---|--------|-----|-------|
| 49 | Cylindrical wave guides | 45 Min | BB | T1 |
| 50 | The Transverse Electric Magnetic wave in the coaxial line | 45 Min | BB | T1 |
| 51 | Attenuation in the coaxial line 1 | 45 Min | PPT | T1 |
| 52 | Attenuation in the coaxial line 2 | 45 Min | PPT | T1 |
| 53 | Attenuation in guides due to imperfect conductors 1 | 45 Min | PPT | T1 |
| 54 | Attenuation in guides due to imperfect conductors 2 | 45 Min | BB | T1,R7 |
| 55 | Excitation of wave guides | 45 Min | BB | T1,R7 |
| 56 | Guide terminations | 45 Min | BB | T1,R7 |
| 57 | Resonant cavities | 45 Min | PPT | T1,R7 |
| 58 | TUTORIAL 13 | 45 Min | BB | T1,R7 |
| 59 | TUTORIAL 14 | 45 Min | BB | T1 |
| 60 | TUTORIAL 15 | 45 Min | BB | T1 |

TEXT BOOKS:

1.J. D. Ryder, “Networks, Lines and Fields”, PHI, New Delhi, 2003.

2.E.C. Jordan and K.G. Balmain “Electro Magnetic Waves and Radiating System”, PHI, New Delhi, 2003.

REFERENCES:

1.Mathew N.O.Sadiku — “Elements of Electro Magnetics”, 2nd Edition, Oxford, New York, 1999.

2.Ramo,Whineery and Van Duzer, “Fields and Waves in Communication Electronics” John Wiley, 2003

| | | |
|--------------------|----------------------------------|---------------------------|
| | Prepared by | Approved by |
| Signature | | |
| Name | Nagarajan.P | Dr.D.SASIKALA |
| Designation | Assistant Professor / ECE | PROF & HOD-ECE |
| Date | 15/06/2017 | 15/06/2017 |