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**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**LESSON PLAN – NEW & RENEWABLE ENERGY SOURCES (EE-415)**

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| Faculty Name: G. SATISH | Year / Sem: B.Tech in EEE 4/1 | Academic Year: 2019-20 |

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| **L. No** | **Name of the Topic** | **Reference Book** | **Delivery Method** |
| 1 | Renewable Energy Technologies | T1(1-4) | PPT |
| 2 | Basic Principles of Energy Conversion | T1(7) | Chalk & Talk |
| 3 | Heat and Mechanical Energy Conversion Principes | T1(8) | PPT |
| 4 | Solar Radiation Conversion: PhotoVoltaic Conversion | T1(5) | Chalk & Talk |
| 5 | Photo Electro Chemical Conversion | T1(8) | Chalk & Talk |
| 6 | Solar Thermal Conversion | T1(8-9) | Chalk & Talk |
| 7 | Fuel Cells | T1(10-11) | PPT |
| 8 | Basic Principles of Hydrogen - Oxygen fuell cell | T1(10-11) | Chalk & Talk |
| 9 | Factors Effecting the Output - Maximum Power Output | T1(11) | Chalk & Talk |
| 10 | Bio Energy Conversion Process | T1(12) | Chalk & Talk |
| 11 | Combustion and Composting of Bio Mass | T1(12) | Chalk & Talk |
| 12 | Production of Heat by Bio Mass | R2(47-49) | PPT |
| 13 | Bio Logical Conversion into Gaseous and Liquid Bio Fuels | R2(49-50),W1 | Chalk & Talk |
| 14 | Introduction to Solar Cells | R2(49-50) | Chalk & Talk |
| 15 | P-N Junction Under Illumination: | R2(73-76) | Chalk & Talk |
| 16 | Solar Cell | R2(76-81) | Chalk & Talk |
| 17 | Generation of Photo Voltage, Light Generted Current | R2(102-103) | Chalk & Talk |
| 18 | I-V Equation of Solar Cell, | R2(103-105) | PPT |
| 19 | Solar Cell Characteristics: Upper limits of cell parameters | R2(105) | Chalk & Talk |
| 20 | Short Circuit Current | R2(105) | Chalk & Talk |
| 21 | Open Circuit Voltage, Fill Factor | R2(107-109) | Chalk & Talk |
| 22 | Efficency, Losses in Solar Cells | R2(110-111) | Chalk & Talk |
| 23 | Model of Solar Cell | R2(111-112) | PPT |
| 24 | Efficency, Losses in Solar Cells | R2(168-170) | Chalk & Talk |
| 25 | Effect of Series - Shunt Resistance on Efficiency | R2(170-172) | Chalk & Talk |
| 26 | Effect of Solar Radiation on Efficiency | R2(172-173) | Chalk & Talk |
| 27 | Effect of Temperature on Efficiency | R2(173-177) | Chalk & Talk |
| 28 | Basic Design Aspects of Solar Cells | R2(178-180) | PPT |
| 29 | Thin Film Solar Cell Technologies | R2(180-183) | Chalk & Talk |
| 30 | Generic Advantages of Thin Film Technologies | R2(188-192) | Chalk & Talk |
| 31 | Materials for Thin Film Technologies | R2(192-193) | Chalk & Talk |
| 32 | Solar Photo Voltaic Modules: | R2(149-150) | Chalk & Talk |
| 33 | Solar PV Modules from Solar Cells | R2(195-197) | Chalk & Talk |
| 34 | Series & Parallel Connection of Solar Cells | R2(197-200) | PPT |
| 35 | Mismatch in Series & Parallel Connection | R2(200-202) | Chalk & Talk |
| 36 | Design and Structure of PV Modules | R2(228-230),W2 | Chalk & Talk |
| 37 | Number of Solar Cells in a Module, wattage of Modules | R2(230-231) | Chalk & Talk |
| 38 | Fabrication of PV modules | R2(230-231) | PPT |
| 39 | PV Module Power Output, | R2(277-283) | Chalk & Talk |
| 40 | I-V Equation of PV Modules | R2(263-267) | Chalk & Talk |
| 41 | Ratings of PV Modules | R2(230-231) | Chalk & Talk |
| 42 | I-V and Power Curves of PV modules | R2(231-235) | PPT |
| 43 | DC-Dc Convertors Used in solar Systems | R2(235-239) | Chalk & Talk |
| 44 | Maximum Power Point Tracking Algorithms | R2(231-235) | Chalk & Talk |
| 45 | Wind Energy Systems | R2(256-259) | Chalk & Talk |
| 46 | Generation Schemes with Variable Speed Turbines | R2(296-298) | Chalk & Talk |
| 47 | Classification of Schemes | R2(495-497) | Chalk & Talk |
| 48 | Operating Area | R2(497-500) | Chalk & Talk |
| 49 | Induction Generators | R1(501-506) | PPT |
| 50 | Doubly fed Induction generators | R1(533-537) | Chalk & Talk |
| 51 | Equivalent Circuits | R1(537-542) | Chalk & Talk |
| 52 | Reactive Power and Harmonics | R2(510-516),W3 | Chalk & Talk |
| 53 | Double Output System with VSI | R2(521-524) | PPT |
| 54 | Variable Voltage, Variable Frequency Generation | R2(439-440),W4 | Chalk & Talk |
| 55 | Circuit Model and Steady State Operation and Characteristics | R2(440-442) | Chalk & Talk |
| 56 | Simple single pool tidal system. | R2(443-445) | Chalk & Talk |
| 57 | Effect of Wind Generator on the Network | R2(315-316) | PPT |
| 58 | Wind Speed Measurements | R2(316-319),W5 | Chalk & Talk |
| 59 | Wind Speed Statistics | W6 | Chalk & Talk |
| 60 | Site and Turbine Selection | W6 | Chalk & Talk |

**TEXT BOOKS**:

T1: Renewable Energy by Bent Soren Sen, Academic Press, 4th Edition

T2: Solar Photovoltaic Fundamentals, Technology and Applications, Chetan Singh Solanki, PHI Publications, 2nd Edition

T3: Wind Electrical Systems by S.N Bhadra, D.Kastha and s Banerjee, Oxford Press Publications

**REFERENCE BOOKS:**

R1: Power Plant Technology by EL-Wakil, Mc Graw-Hill

R2: Non-Conventional Energy Sources by G.D.Rai, Khanna Pub.

R3: Renewable Energy Sources by John Twidell & Toney Weir : E&F.N. Spon

R4: Renewable Energy Sources Their impact on global warming and pollutions by Abbasi &

Abbasi-PHI

**Web Resources:**

W1: https://en.wikipedia.org/wiki/Solar\_System

W2: https://en.wikipedia.org/wiki/Wind

W3: https://en.wikipedia.org/wiki/Tidal\_power

W4: <https://en.wikipedia.org/wiki/Geothermal_energy>

W5: <https://en.wikipedia.org/wiki/Biomass>

W6: http://www.eolss.net/sample-chapters/c08/e3-08-01-04.pdf