| Course Description | |
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| **Course title** | Solar PV |
| **Course code** | ECE 351 |
| **College** | Engineering |
| **Department / Program** | Electrical Engineering/ Renewable Energy |
| **Year/ Level** | 4/8 |
| **Course Type** | **A.**<br>☐ University<br>☐ College<br>☐ Department<br>■ Program<br>☐ Others<br>b.<br>■ Required<br>☐ Elective |
| **Credited Hours** | (3 Cr. Hrs) |
| **Contact Hours** | (LT:2, LB:2 ,TR:0) |
| **Pre-requisites (if any)** | ECE210<br>ECE346 |
| **Co-requisites (if any)** | --- |
| **Course description** | PV including the solar irradiation and the sunlight properties, semiconductors physics, PN junctions, PV principle of operation, PV materials, PV design, PV efficiency, limitations of PV cells, PV panel design aspects, techniques for testing PV systems and components, illustrations of solar PV systems, PV integration with electric grids, 3-hours in Lab including basics and characterization, measuring the |

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| | effects of temperature, dust and light shading on the performance of the solar PV systems. |
| **Course Main Objectives** | On successful completion of this course students will be able to:<br>- Describe sun trajectory and its effect on solar irradiation<br>- Describe the basics of semiconductors physics and PN junctions, the principle of the direct solar photon conversion into electricity and various PV technologies.<br>- Analyse solar photovoltaic system energy resources and the fundamentals of PV conversion in the general mix energetic context dominated by climate warming mitigation.<br>- Investigate the solar PV systems, from cells to grids, with a particular emphasis on the challenges of grid-integration of PV and the development of storage technologies.<br>- Assess contemporary solar photovoltaic system applications, site evaluation, efficiency limits and relationship with energy conservation.<br>- Explain the layout and design requirements for solar photovoltaic systems in residential and commercial constructions.<br>Identify various environmental and social impacts, codes and certifications of PV systems. |
| **Learning Outcomes** | **Knowledge and Understanding**<br>Define the concepts of solar PV |
| | **Skills:**<br>Apply Solar PV concepts and laws to solve problems. |
| | **Values:**<br>Work individually or in teams in laboratories and on research projects professionally. |
| **References** | 1- Solar PV and Wind Energy Conversion Systems: An Introduction to Theory, Modeling with MATLAB/SIMULINK, and the Role of Soft Computing Techniques (Green Energy and Technology), S. Sumathi, L. Ashok Kumar, P. Surekha, Springer<br>2- Grid Integration of Solar Photovoltaic Systems, Majid Jamil, M Rizwan, D P Kothari, CRC Press<br>3- Photovoltaic Systems, James P. Dunlop…, In partnership with NJATC |