Course Description	
Course title	Advanced Solar Cells and Systems
Course code	ECE 454
College	Engineering
Department / Program	Electrical Engineering/ Renewable Energy
Year/ Level	5/9
Course Type	**A.** ☐ University ☐ College ☐ Department ■ Program ☐ Others b. ☐ Required ■ Elective
Credited Hours	3 CR
Contact Hours	(LT:2, LB:2 ,TR:0)
Pre-requisites (if any)	ECE230
Co-requisites (if any)	---
Course description	Advanced Solar Cells and Systems including novel solar cells technologies, in detailed solar cells modules operation principles an physics, measurement techniques and performance analysis of the solar cells. Including also the systems of tandem solar cells, concentrator (CPV and HCPV) and hybrid solar PV (3-generations).

Course Main Objectives	- Understand the nature of solar radiation and the energy input to a photovoltaic system. - Apply the fundamental physics to explain the operation principle of single-junction. - solar cells, and understand the materials properties and device structures are critical to photovoltaic. - Identify the technological steps which are used in the manufacture of solar cells. - Evaluate the performance of photovoltaic devices by using their characteristics, - including current-voltage (I-V) and spectral response curves. - Acknowledge the principles, fabrication and performances of various types of - advanced solar cells, including thin-film and tandem cells, dye-sensitized cells, - nanostructured cells, organic photovoltaic, and thermo photovoltaic devices. - Acknowledge solar module, solar photovoltaic system, and power conditioning and control.
Learning Outcomes	**Knowledge and Understanding** Define the concepts of Solar cells systems and technologies
	Skills: Apply understood concepts and laws to solve problems.
	Values: Work individually or in teams in laboratories and on research projects professionally.
References	1- The Physics of Solar Cells: Perovskites, Organics, and Photovoltaic Fundamentals, Juan Bisquert, CRC Press 2- Applied Photovoltaics, S. Wenham, M. Green, M. Watt, R. Corkish, Alistair Sproul, Earthscan Ltd