



**Benha University**

*Dr. Mohamed Ahmed Ebrahim*



Undergraduate Course

# ***Solar Cells Fundamental***

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# Content

- 1 • **Sunlight energy.**
- 2 • **Photovoltaic devices.**
- 3 • **Energy conversion.**
- 4 • **Solar radiation measurement.**
- 5 • **Solar cell application.**
- 6 • **Principles of solar cell operation.**
- 7 • **Principles of solar cell structure.**
- 8 • **Electrical and optical characteristics of solar cell.**
- 9 • **Solar cell equivalent circuit.**
- 10 • **Solar cell standards.**
- 11 • **Calibration and testing of solar cell.**
- 12 • **Different types of solar cells (crystalline silicon & thin film).**

# Content

- 13 • ***Energy production by a PV array.***
- 14 • ***Energy balance in stand alone PV systems.***
- 15 • ***Calibration and testing of PV modules.***
- 16 • ***PV system monitoring.***
- 17 • ***Safety considerations in PV system.***
- 18 • ***Site assessment***
- 19 • ***System design***
- 20 • ***Maximizing cell efficiency.***
- 21 • ***Types and adaptation of PV.***
- 22 • ***PV circuits properties.***
- 23 • ***PV applications and systems.***
- 24 • ***Social and environment aspects.***