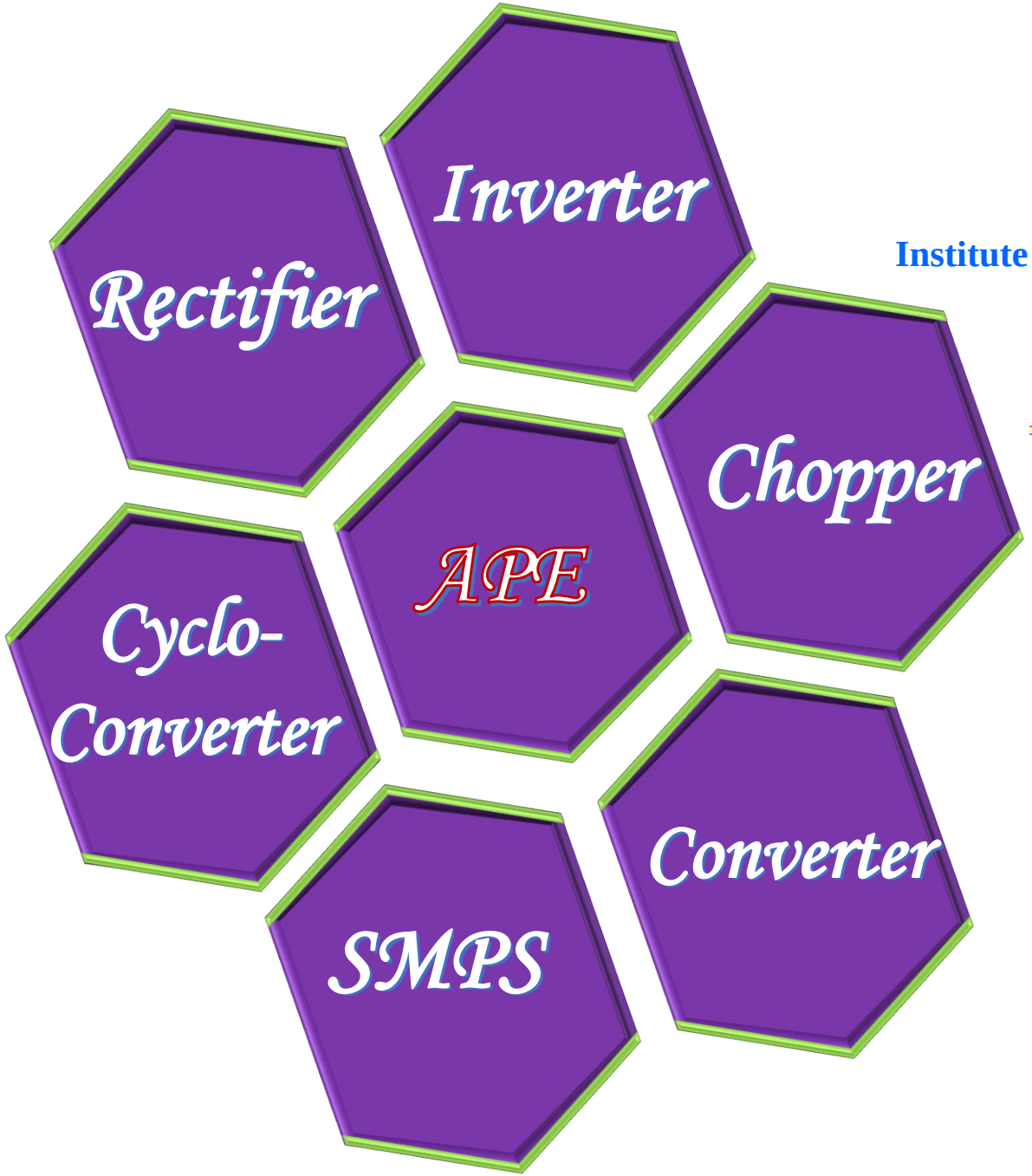


VISHWANIKETAN'S
Institute of Management, Entrepreneurship and Engineering Technology [iMEET]
(Affiliated to Mumbai University)

Department of Electrical Engineering

Subject : Advanced Power Electronics

Class : T.E. Electrical **Sem : VI**

Subject Teacher : Prof. Rohit G. Ramteke

Power Electronics

- **Around 40 percent of the world's power needs are currently met by electrical energy and that proportion is expected to rise as countries cut carbon emissions and shift to renewable energy sources.**
- **As the trend towards electrification and renewable energies increases, emerging technologies such as power electronics are becoming ever more important.**
- **The systems and machines of the modern world increasingly depend on power electronics to run efficiently and sustainably.**
- **Without this technology, electric motors would always run at full speed.**
- **The traditional application area of power electronics is variable speed drives for electrical motors.**
- **Power-electronics technologies are able to vary the speed of motor drives, making processes more efficient and reducing the amount of energy consumed.**
- **Power electronics is an umbrella term that encompasses the systems and products involved in converting and controlling the flow of electrical energy.**

Power Quality Constraints

- Harmonics
- Transients
- Voltage Sag & Swell
- Flickers & Noises
- Reactive Power

Course Contents

01 Study of Electrical Power Generation, Transmission and Distribution System

02 Need and Applications of Power Electronics based Devices

03 Various Types of Power Electronics based Converters

04 Power Quality Constraints

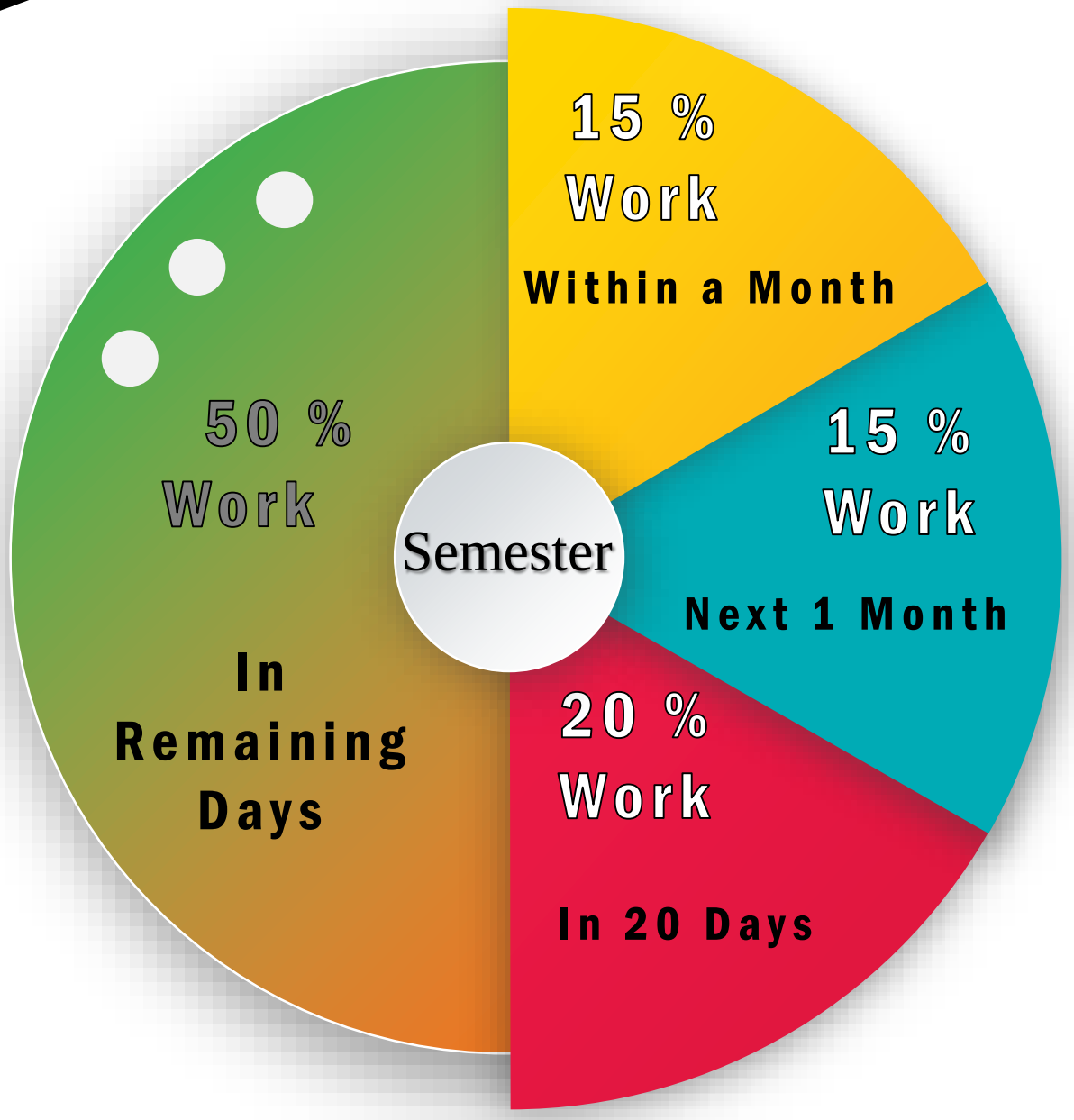
05 Control Techniques for Power Electronics based Devices

06 Simulation and Results

Set of Activities

1. Study/Survey of Various Power Electronics based Devices
2. Presentation on Survey
3. Consideration of any one Power Electronics based Device from the Application point of view
4. Presentation on Application Oriented Power Electronics based Device
5. Design/Sketch/Layout of system considering particular Power Electronics based Device
6. Simulation and Results
7. Project Report

Duration


15 %
Work
Within a Month
15 %
Work
Next 1 Month
20 %
Work
In 20 Days
In
Remaining
Days
50 %
Work
Semester

EVALUATION SCHEME
[25 Marks]

Project Report
[08-Marks]

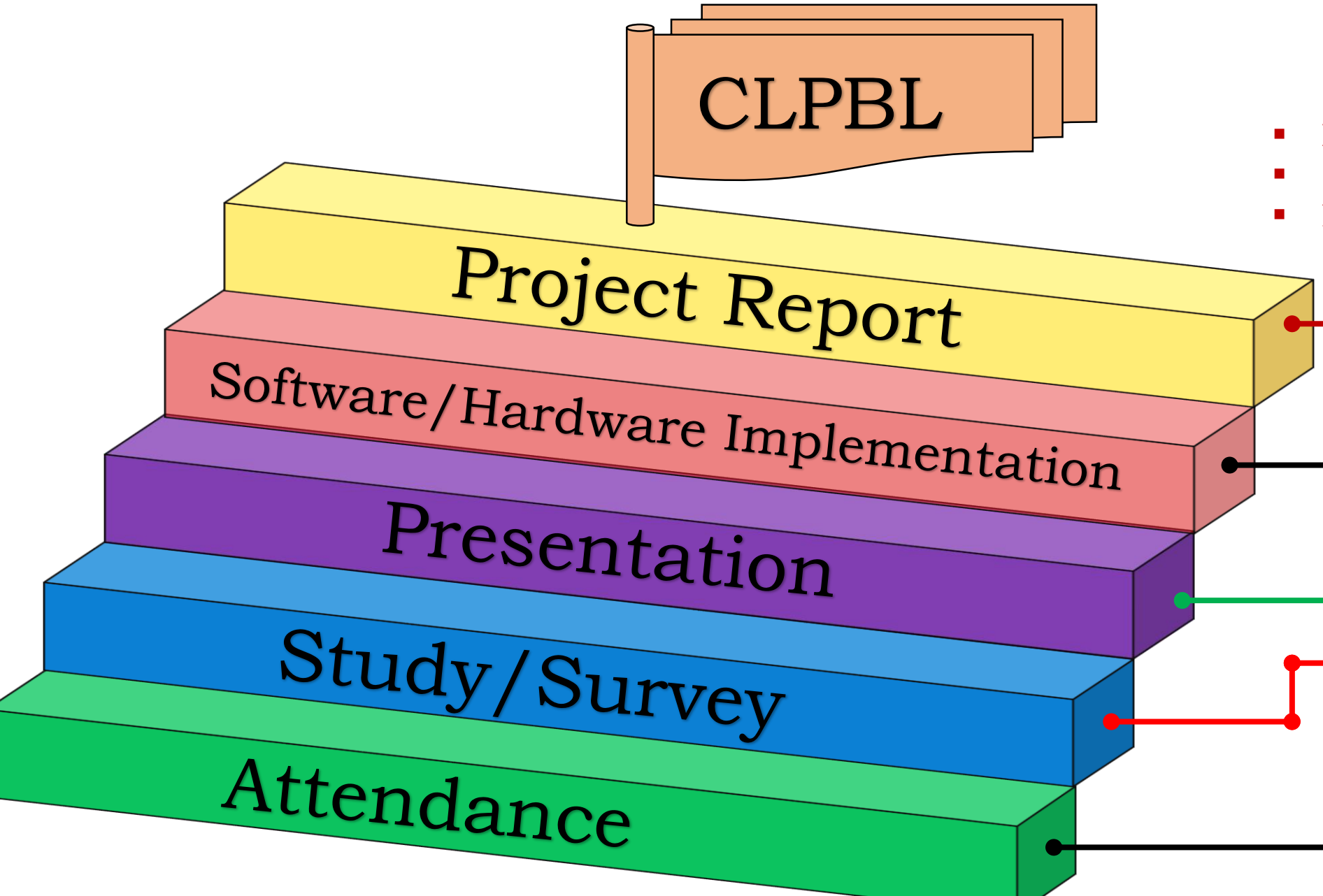
Attendance
[05-Marks]

Software/ Hardware Implementation
[07-Marks]

Study/Survey
[03-Marks]

Presentation
[02-Marks]

Rubric of Evaluation Scheme



- **Literature Survey - 02 Marks**
- **Contents of Report - 03 Marks**
- **Formatting of Report- 03 Marks**

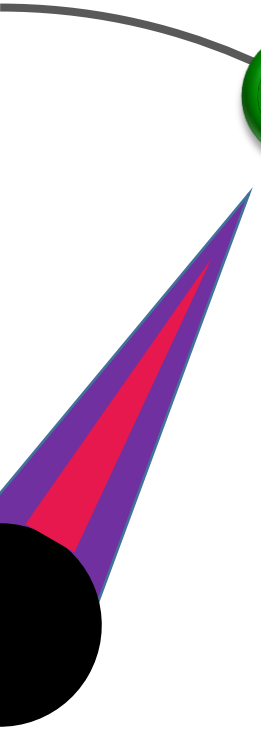
- **Design of System – 03 Marks**
- **Running the Model – 04 Marks**

- **Presentation- 02 Marks**

- **Literature Survey- 03 Marks**

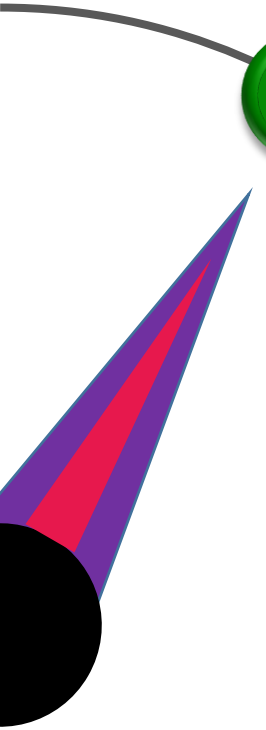
- **Above 75%- 05 Marks**
- **65% - 74% - 03 Marks**
- **51% - 64% - 02 Marks**
- **Below 50% - 01 Mark**

Projects based on Power Electronics

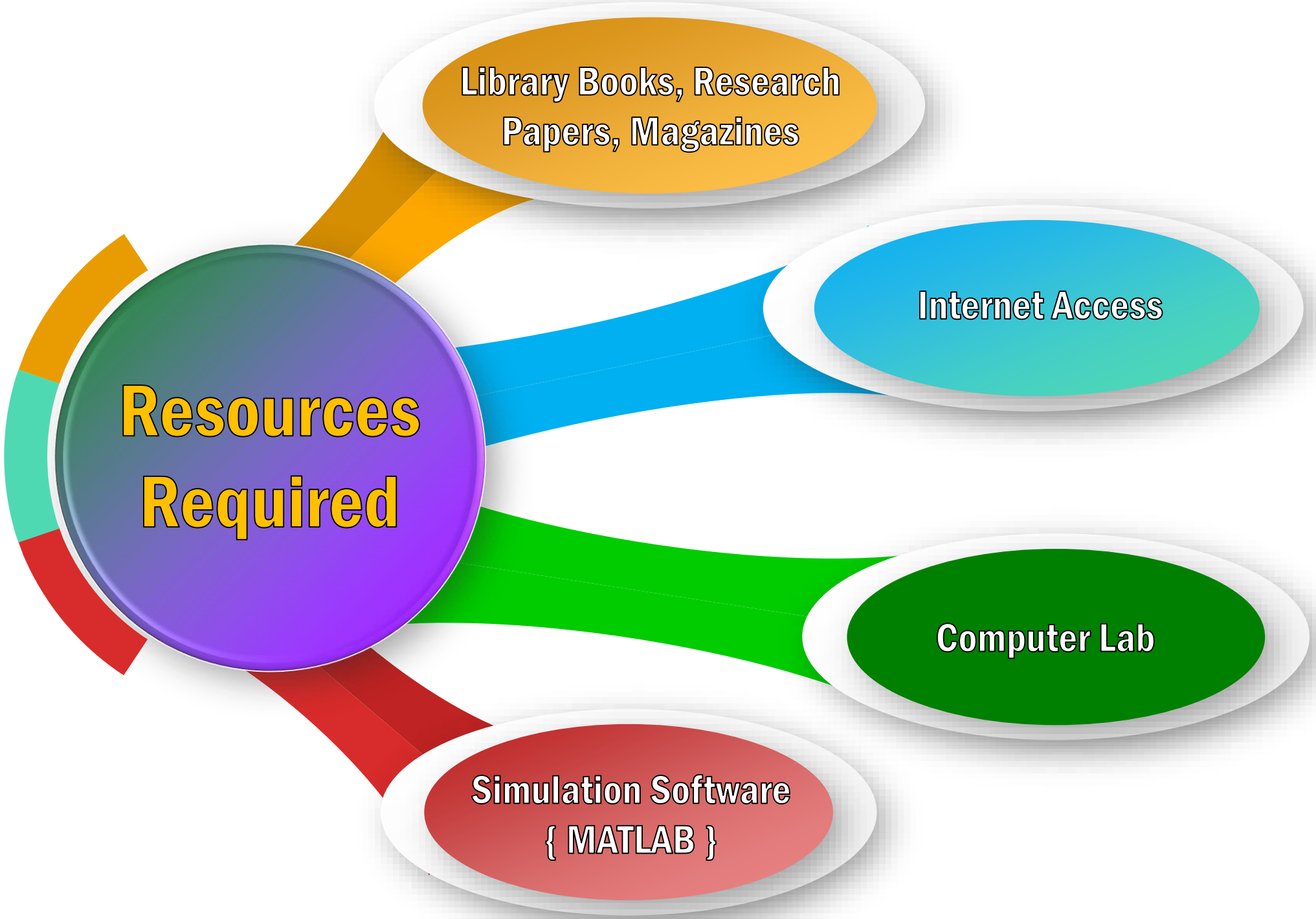


1. Improved Interleaved High Step-up Converter with High Efficiency for Renewable Energy Applications
2. Double-Frequency Buck Converter
3. Isolated Bidirectional Full-Bridge DC–DC Converter With a Flyback Snubber
4. Full-Range Soft-Switching Buck-Boost
5. Analysis of Modulation Strategy for the Minimization of Leakage Current in the PV
6. Three Level DC-DC Boost Converter Closed loop
7. Improved MPPT method for rapidly changing Environmental conditions

Projects based on Power Electronics

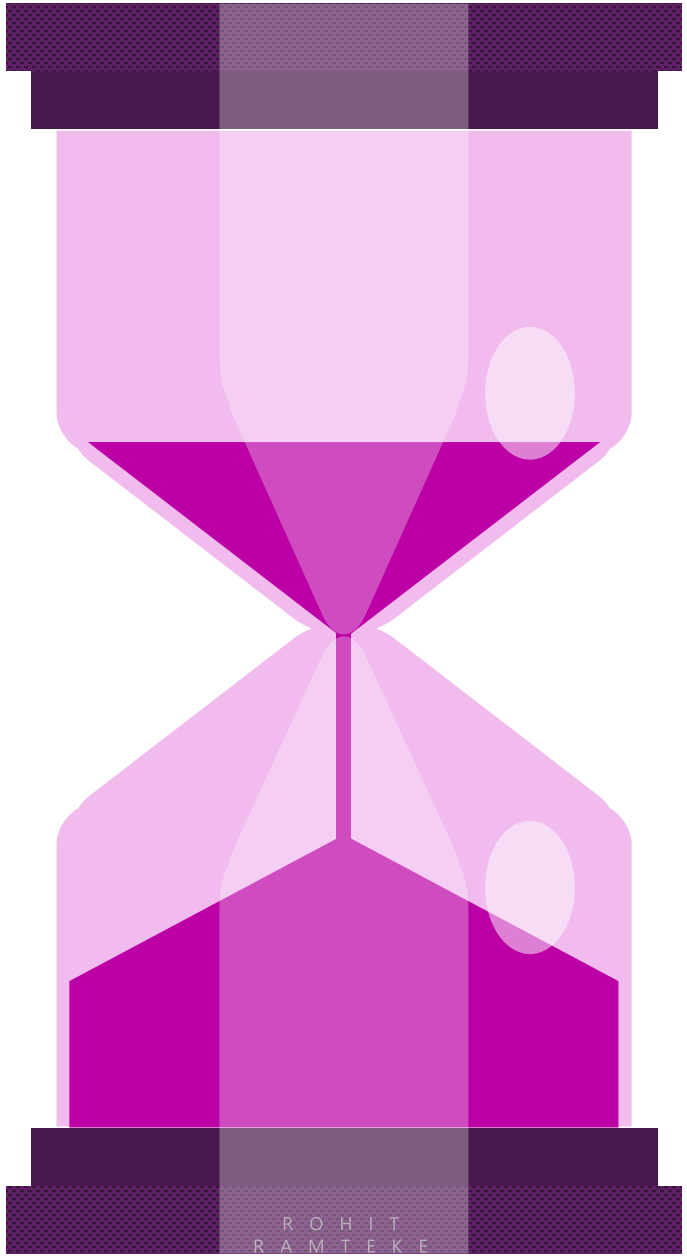


8. A Robust Adaptive Controller for a DFIG Wind Turbine with Grid Voltage & Frequency Support
9. Isolated High Step-Up DC–DC Converter With Low Voltage Stress
10. An Improved Interleaved High Power Flyback Inverter for Photo voltaic Application
11. High-Gain Single-Stage Boosting Inverter for Photovoltaic Applications
12. Design and Analysis of Solar Power Switched Inductor and Switched Capacitor for DC Distribution
13. Implementation of PI controller for fourth order Resonant Power Converter with capacitive output filter
14. Simulation and Implementation of Multilevel Inverter Based BLDC Motor Drive


Resources Required
Library Books, Research Papers, Magazines
Internet Access
Computer Lab
Simulation Software { MATLAB }

Time Management

6 Hours / Week



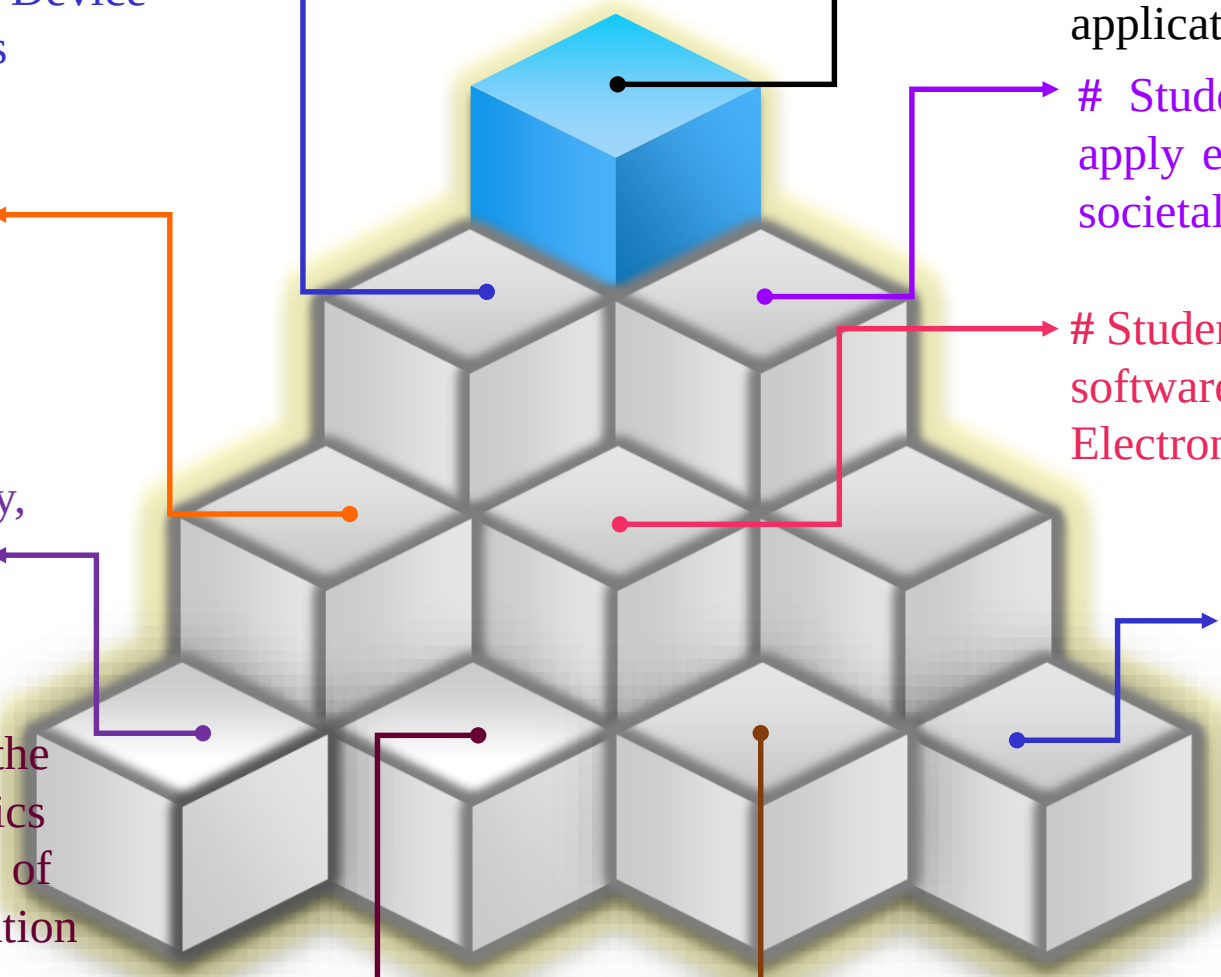
Mapping with PO's and Skills

Students will be able to differentiate various Power Electronics based Device as per Power Quality Constraints

Students will be able to design/ Sketch / Layout of Electrical Power System from application point of view

Students will be able to Identify, Formulate and Solve Electrical Engineering Problems

Students will be able to Apply the basic concepts of power electronics to design the circuits in the fields of AC and DC drives, power generation and energy conversion, industrial applications, extraction of energy from renewable sources



Students will able to select and design power electronic converter topologies for a broad range of energy conversion applications

Students will have the confidence to apply engineering solutions in global and societal contexts

Students will get command over software while designing various Power Electronics based Converters

Students will be able to function effectively in disciplinary or multidisciplinary teams

Students will be able to analyse and simulate the performance of power electronic conversion systems

Thank You