



Degree, Semester & Branch: VI Semester B.E. EEE

Course Code & Title: EE3035 Grid Integrating Techniques and Challenges

Name of the Faculty member (s): Dr. S. Jeyanthi

Innovative Practice Description

- **Unit / Topic:** Unit I / Power Plants India

- **Course Outcome:** CO 1

- **Topic Learning Outcome:** 1e

- **Activity Chosen:** One minute paper

- **Justification:**

India's power plants include a diverse mix of energy sources such as coal, natural gas, hydroelectric, nuclear, and renewable sources like solar and wind. This energy infrastructure is crucial for supporting the country's rapidly growing economy and expanding population. A one-minute paper is used for this concept because it prompts students to quickly summarize key points and reflect on their understanding of India's power plants. This technique helps in identifying any areas of confusion and reinforces learning by encouraging concise and focused thinking.

Time Allotted for the Activity: 5 minutes

- **Details of the Implementation:**

At the end of the class, students were asked to write about the topic discussed in the class. The students expressed the understood content and the content which were not clear in that particular topic. This activity shows whether the students can able to understand the specific topic and their involvement the particular class.

- **CO – PO / PSO mapping:**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	-	-	-	-	-	-	-	-	1	-	1

(1 – Low 2 – Moderate 3 – High)

- **PO / PSO mapped:**

Innovative practice	PO9
	1
Justification for correlation	The students can Function effectively as an individual

• Images / Screenshot of the practice:

Innovative Teaching Method Execution	
Power Plants India – One minute paper	
<div style="text-align: right; font-size: small; margin-bottom: 10px;">M. Nuthu Lingeswari 953622105025</div> <p style="text-align: center;"><u>Majors Power Plants in India</u></p> <p><u>Thermal power plant</u> :</p> <ul style="list-style-type: none"> * Vindhyachal thermal power plant – Madhya Pradesh – 4,760 * Mundra Ultra mega power plant – Gujarat – 4,620 <p><u>Gas-Based power generation</u> :</p> <ul style="list-style-type: none"> * Samalkot power plant – Andhra Pradesh – 2,430 * Dabhol power plant – Maharashtra – 2,184 <p><u>Nuclear power plants</u> :</p> <ul style="list-style-type: none"> * Kudankulam Nuclear power plant – Tamil Nadu – 2,000 * Tehri Dam – Uttarakhand – 2,400 <p><u>Hydropower generation</u> :</p> <ul style="list-style-type: none"> * Sardar Sarovar Dam – Gujarat – 1,750 * Bhakra Dam – Himachal Pradesh – 1,320 <p><u>Pumped storage plants</u> :</p> <ul style="list-style-type: none"> * Srisailem Dam – Andhra Pradesh – 1,670 * Edukki Dam – Kerala – 780 	

• **Reflective Critique:**

❖ **Feedback of practice from students and other stakeholders:**

- ✓ Students understood the concept which was reflected from their answers for the questions I have asked during discussion session.

❖ **Benefit of the practice:**

- ✓ Students can able to attend the question even in the questions are in indirect form.
- ✓ Students can able to explain the concepts in examination without any confusion.

❖ **Challenges faced in implementation:**

- ✓ Time utilization for conducting activity.

References:

1. Integration of Renewable Energy Sources with Smart Grid, M. Kathiresh, A. Mahaboob Subahani, and G.R. Kanaga chidambaresan, Scrivener & Wiley, 2021, 1st Edition.
2. Control and Operation of Grid-Connected Wind Energy Systems, Ali M. Eltamaly, Almoataz Y. Abdelaziz, Ahmed G. Abo-Khalil, Springer 2021, 1st Edition.

Signature of Faculty Member

HOD



Degree, Semester & Branch: VI Semester B.E. EEE

Course Code & Title: EE3035 Grid Integrating Techniques and Challenges

Name of the Faculty member (s): Dr. S. Jeyanthi

Innovative Practice Description

- **Unit / Topic:** Unit II / Transformers in Electric Grid
- **Course Outcome:** CO 2
- **Topic Learning Outcome:** 2d
- **Activity Chosen:** Think pair share
- **Justification:**
 - ✓ It helps students to think individually about a topic or answer to a question.
 - ✓ It teaches students to share ideas with classmates and builds oral communication skills.
 - ✓ It helps focus attention and engage students in comprehending the reading material.
- **Time Allotted for the Activity:** 10 minutes
- **Details of the Implementation:**

Think-Pair-Share innovative practice conducted for VI year ECE students, after explained the concept of Transformers in Electric Grid. First, I asked each student to think about the role of transformers in the electric grid for 2 minutes. They should consider their types, working principles, and significance in power distribution. Then I make them as a pair up to discuss their thoughts and answers. Encourage them to compare their ideas and clarify any misunderstandings. 3 minutes. Finally I invited the pairs to share their insights with the larger group or the whole class for 10 minutes.

- **CO – PO / PSO mapping:**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 2	3	3	2	2	3	-	-	-	-	1	-	1

(1 – Low 2 – Moderate 3 – High)

- **PO / PSO mapped:**

Innovative practice	PO9
	1
Justification for correlation	The students can Function effectively as a team

• **Images / Screenshot of the practice:**

Innovative Teaching Method Execution	
Transformers in Electric Grid – Think Pair Share	
<p style="text-align: right;">C. Pavithra 953622105033 T. Kaviya Sreesahana 953622105020</p> <p style="text-align: center;">Transformer in electric grid</p> <ul style="list-style-type: none"> • Transformers regulate voltage levels in the electric grid by stepping up or stepdown • Which operates on the principle based on electromagnetic induction, transferring energy between primary and secondary coil. <p>They reduces power loss and ensure safe electrical supply.</p> <p><u>problems:</u></p> <ul style="list-style-type: none"> * Some energy is lost as heat * Old transformer can fail * They can be damaged by fault. <p><u>Types:</u></p> <ul style="list-style-type: none"> * power transformer * Distribution transformer * Auto transformer * Instrument transformer * Isolation transformer 	

• **Reflective Critique:**

❖ **Feedback of practice from students and other stakeholders:**

- ✓ Students understood the concept which was reflected from their answers for the questions I have asked during discussion session.

❖ **Benefit of the practice:**

Think-pair-sharing forces all students to attempt an initial response to the question, which they can then clarify and expand as they collaborate. It also gives them a chance to validate their ideas in a small group before mentioning them to the large group, which may help shy students feel more confident participating.

❖ **Challenges faced in implementation:**

I planned the activity for 10 minutes. But in Class room it takes 15 minutes.

References:

1. Integration of Renewable Energy Sources with Smart Grid, M. Kathiresh, A. Mahaboob Subahani, and G.R. Kanaga chidambaresan, Scrivener & Wiley, 2021, 1st Edition.
2. Control and Operation of Grid-Connected Wind Energy Systems, Ali M. Eltamaly, Almoataz Y. Abdelaziz, Ahmed G. Abo-Khalil, Springer 2021, 1st Edition.

Signature of Faculty Member

HOD



RAMCO INSTITUTE OF TECHNOLOGY

Approved by AICTE, New Delhi & Affiliated to Anna University

NAAC Accredited with 'A+' Grade & An ISO 9001: 2015 Certified Institution

NBA Accredited UG Programs: CSE, EEE, ECE and MECH

Department of Electrical and Electronics Engineering

Academic Year 2024 – 2025 (Even Semester)

Degree, Semester & Branch: VI Semester B.E. EEE

Course Code & Title: EE3035 Grid Integrating Techniques and Challenges

Name of the Faculty member (s): Dr. S. Jeyanthi

Innovative Practice Description

- **Unit / Topic:** Unit III / The Sizing of DC/DC Converters for Micro grid
- **Course Outcome:** CO 3
- **Topic Learning Outcome:** 3e
- **Activity Chosen:** Strip sequence
- **Justification:**

The sizing of DC/DC converters for a microgrid with strip sequence involves determining the appropriate specifications and configurations of these converters to ensure efficient power conversion and distribution within the microgrid. This activity helps students apply what they have learned through reading or didactic teaching. This approach can strengthen students' logical thinking processes and test their mental model of a process. The activity can be done in pairs or groups.

- **Time Allotted for the Activity:** 10 minutes

- **Details of the Implementation:**

Strip Sequence activities require students to actively engage in their learning, often by connecting their prior knowledge to new information. When creating a Strip Sequence, a student frequently interacts with a textbook, notes from class, an instructor, classmate, or study group. In my subject Mini map was conducted for the Sizing of DC/DC converters for Micro grid. The students are actively participated in this event.

CO – PO / PSO mapping:

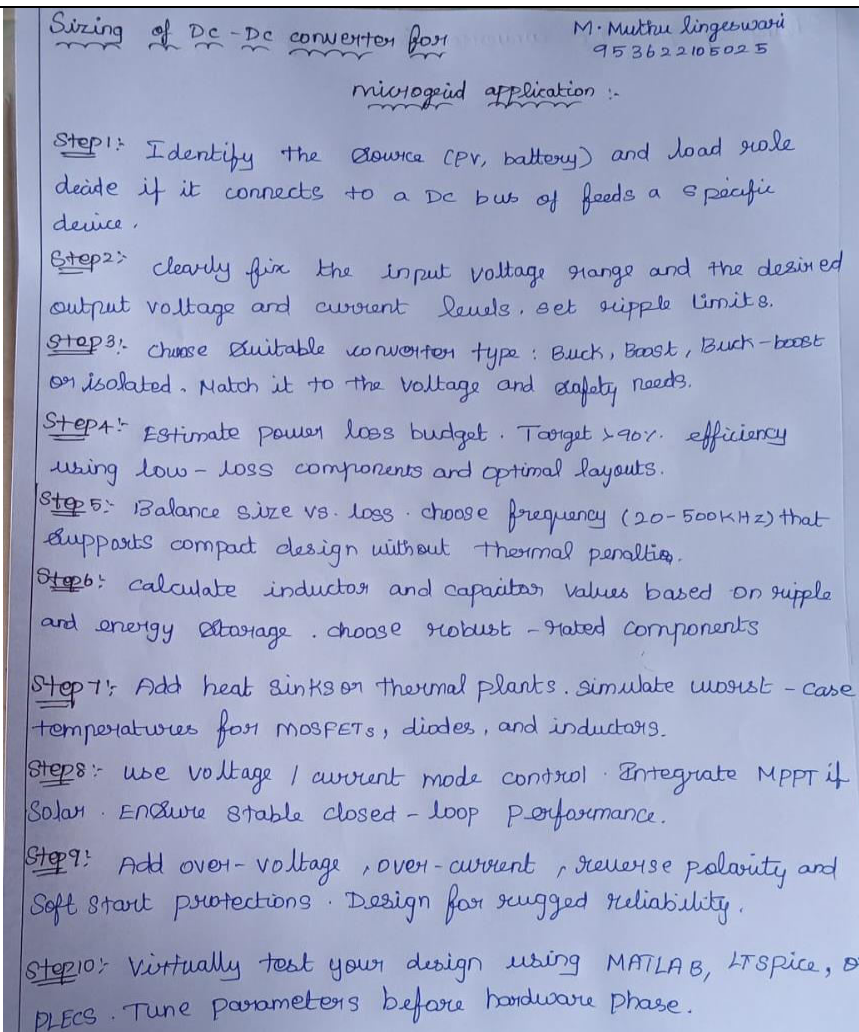
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 5	3	3	3	2	3	-	-	-	-	1	-	1

(1 – Low 2 – Moderate 3 – High)

- **PO / PSO mapped:**

Innovative practice	PO9
	1
Justification for correlation	The students can Function effectively as a team

- **Images / Screenshot of the practice:**

Innovative Teaching Method Execution	
The Sizing of DC/DC Converters for Micro grid – Types methodology / Strip Sequence	
	 <p style="text-align: right; font-size: small;">M. Mukta Lingewari 953622105025</p> <p style="text-align: center;"><u>Sizing of DC-DC converter for microgrid application:</u></p> <p><u>Step 1:</u> Identify the source (PV, battery) and load role decide if it connects to a DC bus or feeds a specific device.</p> <p><u>Step 2:</u> clearly fix the input voltage range and the desired output voltage and current levels, set ripple limits.</p> <p><u>Step 3:</u> choose suitable converter type: Buck, Boost, Buck-boost or isolated. Match it to the voltage and safety needs.</p> <p><u>Step 4:</u> Estimate power loss budget. Target > 90% efficiency using low-loss components and optimal layouts.</p> <p><u>Step 5:</u> Balance size vs. loss. choose frequency (20-500kHz) that supports compact design without thermal penalties.</p> <p><u>Step 6:</u> calculate inductor and capacitor values based on ripple and energy storage. choose robust-rated components</p> <p><u>Step 7:</u> Add heat sinks or thermal plants. simulate worst-case temperatures for MOSFETs, diodes, and inductors.</p> <p><u>Step 8:</u> use voltage / current mode control. Integrate MPPT if Solar. Ensure stable closed-loop performance.</p> <p><u>Step 9:</u> Add over-voltage, over-current, reverse polarity and soft start protections. Design for rugged reliability.</p> <p><u>Step 10:</u> Virtually test your design using MATLAB, LTSpice, or PLECS. Tune parameters before hardware phase.</p>

- **Reflective Critique:**

- ❖ **Feedback of practice from students and other stakeholders:**
- ❖ Students understood the concept which was reflected from their answers for the questions I have asked during discussion session.
- ❖ **Benefit of the practice:** (E.g.: Outcome attainment would have increased due to innovative practice over conventional practice)

The benefits of Strip Sequence are a great way for students to make notes on all of the information they receive. It made the students the general steps involved in the process and make the students to implement the procedure for the particular topic.

❖ *Challenges faced in implementation:*

Normally teachers will give longer explanations in the notes section of the topic. The students are made into groups and to arrange the strip of process for the topic of Energy Audit. I planned the activity for 10 minutes only. But in real scenario it takes 15 minutes.

References:

1. Integration of Renewable Energy Sources with Smart Grid, M. Kathiresh, A. Mahaboob Subahani, and G.R. Kanaga chidambaresan, Scrivener & Wiley, 2021, 1st Edition.
2. Control and Operation of Grid-Connected Wind Energy Systems, Ali M. Eltamaly, Almoataz Y. Abdelaziz, Ahmed G. Abo-Khalil, Springer 2021, 1st Edition.

Signature of Faculty Member

HOD



RAMCO INSTITUTE OF TECHNOLOGY

Approved by AICTE, New Delhi & Affiliated to Anna University

NAAC Accredited with 'A+' Grade & An ISO 9001: 2015 Certified Institution

NBA Accredited UG Programs: CSE, EEE, ECE and MECH

Department of Electrical and Electronics Engineering

Academic Year 2024 – 2025 (Even Semester)

Degree, Semester & Branch: VI Semester B.E. EEE

Course Code & Title: EE3035 Grid Integrating Techniques and Challenges

Name of the Faculty member (s): Mrs. S. Jeyanthi

Innovative Practice Description

- **Unit / Topic:** Unit IV / Importance of Custom Power Devices- Power Quality Point of View
- **Course Outcome:** CO 4
- **Topic Learning Outcome:** 4d
- **Activity Chosen:** Mini map
- **Justification:**

Mini mapping is a creative way to set goals, solve problems and design action plans. It quickly records ideas in a free-form way. When groups use mini mapping, the thoughts of each participant easily trigger ideas in others. This dynamic group interaction encourages breaking free of old patterns to uncover new and innovative approaches. For this topic, there are different types of magnetic material and its characteristics can be brought in to single map for better understanding.

- **Time Allotted for the Activity:** 10 minutes
- **Details of the Implementation:**

Mini mapping activities require students to actively engage in their learning, often by connecting their prior knowledge to new information. When creating a mini map, a student frequently interacts with a textbook, notes from class, an instructor, classmate, or study group.

In my subject Mini map was conducted for the topic Importance of Custom Power Devices- Power Quality Point of View. The students are voluntarily drawn the map.

- **CO – PO / PSO mapping:**

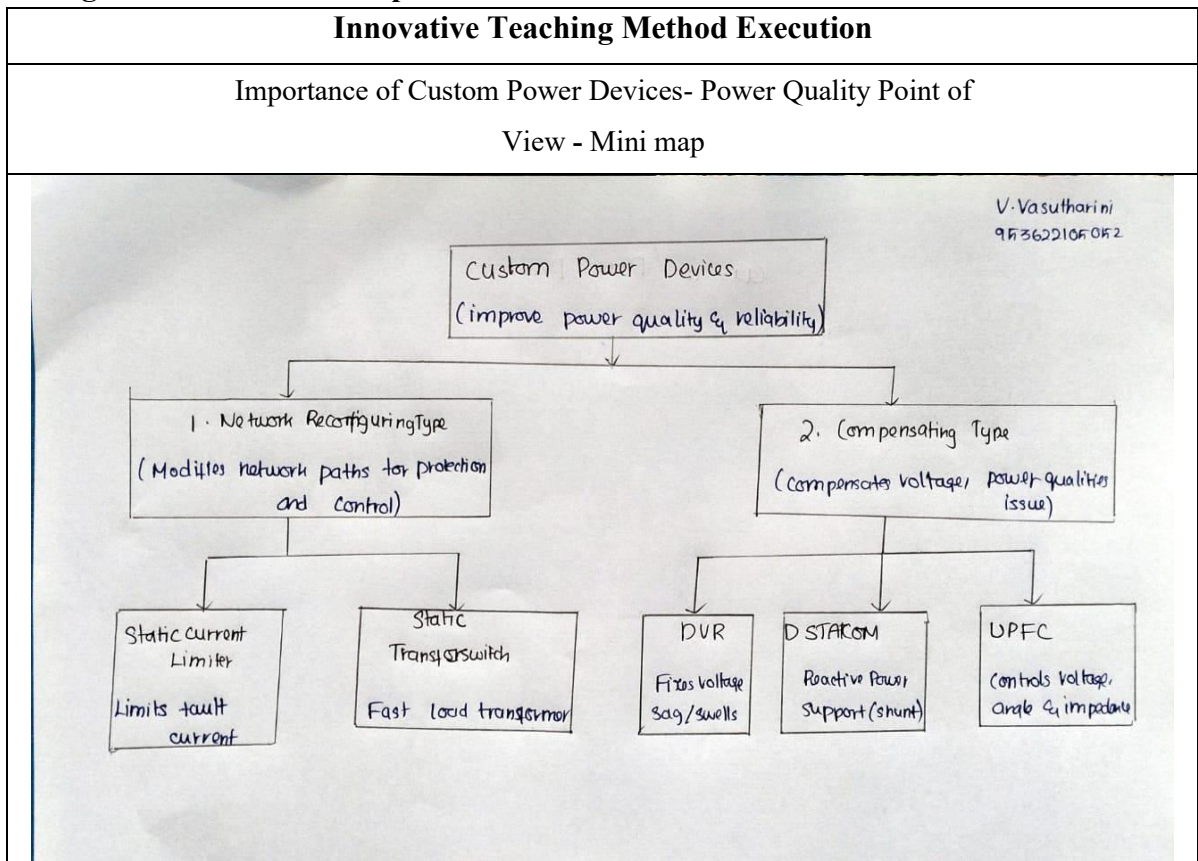
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO4	3	3	1	2	3	-	-	-	-	1	-	1

(1 – Low 2 – Moderate 3 – High)

- **PO / PSO mapped:**

Innovative practice	PO9
	1
Justification for correlation	The students can Function effectively as a team

- **Images / Screenshot of the practice:**



- **Reflective Critique:**

- ❖ **Feedback of practice from students and other stakeholders:**

Students understood the concept which was reflected from their answers for the questions I have asked during discussion session.

- ❖ **Benefit of the practice:**

The benefits of Mini Maps are a great way for students to make notes on all of the information they receive. It helps the students to note down only the most important information using key words, and then make connections between facts and ideas visually – keeping all of your topic thoughts together on one sheet. It made key note making easier to students, as it reduces pages of notes into one single side of paper. Also mini map made slow learners to remember the information more quickly.

- ❖ **Challenges faced in implementation:**

Normally teachers will give longer explanations in the notes section of the topic. The students are made into groups and to draw the map to indicate relationships between the topics in biomass conversion process. I planned the activity for 10 minutes only. But in real scenario it takes 15 minutes to complete this activity.

References:

1. Integration of Renewable Energy Sources with Smart Grid, M. Kathiresh, A. Mahaboob Subahani, and G.R. Kanaga chidambaresan, Scrivener & Wiley, 2021, 1st Edition.
2. Control and Operation of Grid-Connected Wind Energy Systems, Ali M. Eltamaly, Almoataz Y. Abdelaziz, Ahmed G. Abo-Khalil, Springer 2021, 1st Edition.

Signature of Faculty Member

HOD



RAMCO INSTITUTE OF TECHNOLOGY

Approved by AICTE, New Delhi & Affiliated to Anna University

NAAC Accredited with 'A+' Grade & An ISO 9001: 2015 Certified Institution

NBA Accredited UG Programs: CSE, EEE, ECE and MECH

Department of Electrical and Electronics Engineering

Academic Year 2024 – 2025 (Even Semester)

Degree, Semester & Branch: VI Semester B.E. EEE

Course Code & Title: EE3035 Grid Integrating Techniques and Challenges

Name of the Faculty member (s): Dr. S. Jeyanthi

Innovative Practice Description

- **Unit / Topic:** Unit V / Grid integration of WECS - Challenges in the Integration of WECS
- **Course Outcome:** CO5
- **Topic Learning Outcome:** 5b
- **Activity Chosen:** Flipped Classroom

- **Justification:**

This topic is chosen, since it can be easily understood by students. Students can improve their understanding on this topic by this activity. More time for discussion is given the class unlike traditional learning. This activity greatly helps the student to know the concept much deeper.

- **Time Allotted for the Activity:** 25 Minutes

- **Details of the Implementation:**

Each team was asked to do literature survey about the given topic. They should include at least 5 Reference material about the given topic for which the material is already shared. Students in a team were asked to present their topics. Queries will be asked by the students to the presenting team

- **CO – PO / PSO mapping:**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	2	2	3	-	-	-	-	1	-	1

(1 – Low 2 – Moderate 3 – High)

- **PO / PSO mapped:**

Innovative practice	PO9
	1
Justification for correlation	The students can Function effectively as an individual

- **Images / Screenshot of the practice:**



- **Reflective Critique:**

- ❖ **Feedback of practice from students and other stakeholders:**

The students enjoyed this Flipped classroom Activity. After the class many students requested me to insist other Course faculty members to conduct this activity. I have taken this feedback to by Head of the Department

- ❖ **Benefit of the practice:** (E.g.: Outcome attainment would have increased due to innovative practice over conventional practice)

The students actively participated in the flipped classroom activity. As a teacher I could know the real students feeling, their understanding level from this activity. This greatly helped me to clear all the student doubt and make them more involved in the learning process

- ❖ **Challenges faced in implementation:**

Still few students were hesitant to convey their points and queries. Few students have not taken this activity seriously and remain quite in the class

References:

1. Design of smart power grid renewable energy systems, Third Edition, Ali Keyhani, Wiley 2019.
2. <https://www.wind-energy-the-facts.org/images/chapter2.pdf>

Signature of Faculty Member

HOD