

# Electrical Engineering Through Modern Tools: An OBE Approach

- **DATE :** 11 JULY 2017
- **Platform :** IUCEE
- Form of Delivery :** Webinar
- Target Audience :** Teachers Imparting  
Technical Education
  
- **Objective:**
  1. Create awareness towards national education goals among teachers
  2. Role & Necessity of OBE in Curriculum Development

**PRESENTER FROM  
JMIT, RADAUR**

**MITRABINDA SINGH (Asst. Prof, MBA)**

on

***Outcome-based Learning in  
Engineering Education***

# OUTLINE

## Section -1 :by MITRABINDA SINGH

- What is Outcome-based Education (OBE) ?
- Difference between OBE & Traditional Education
- When to implement OBE ?
- Importance of OBE in Technical Education

# POINT TO BE GIVEN SOME THOUGHT

*“The technology changes are fast arriving than education is preparing to cope up with. We therefore need to tackle this situation with new ideas and adapt the education to the changing needs.” (Reddy & Reddy, 2014)*



# “Outcome” explained by Spady, 1994

“ an outcome is not a collection or average of previous learning experiences, but a *manifestation of what learners can do once they have had and completed all of those experiences*”

# OBE

- “Starting with a clear picture of what is important for students to be able to do, then organizing the curriculum, delivery and assessment to make sure learning happens”

# OBE FRAMEWORK



Figure 1: OBE Framework (based on Spady, 1994:58)

# Principles of OBE Framework by MALAN (2000)

- *It is needs-driven*
- *Outcomes-driven*
- *With a design-down approach*
- *Specifies outcomes and levels of outcomes*
- *Focus shifts from Teaching to Learning*
- *It is holistic*



# Table 1: Difference between Traditional Education and OBE

<b>Traditional Education</b>	<b>OBE</b>
Teacher- centered	Learner-centered
Rote learning	Creativity/ promoting critical thinking
Scoring good grades at the end of semester as an outcome	Employable graduates as an outcome
Tutor as facilitator	Independent learners for acquisition of knowledge & problem solving
Individual task	Collaborative/team learning
Completion of syllabi	Skill development as per industrial requirement

# WHEN TO IMPLEMENT OBE ?

- AT THE TIME OF CURRICULUM MAPPING
- WHILE WRITING LEARNING OUTCOMES
- ASSESSMENT DESIGNING

# 1. CURRICULUM MAPPING

- the process by which you **determine where, when, and how learning outcomes are taught** and assessed within a degree program
- demonstrates in which courses learning outcomes are **taught and assessed** in the curriculum

## 2. WRITING LEARNING OUTCOMES

# Learning Outcome (KSA)

### Benefits

- Shared expectations from students and teachers
- Valid source to set learning goals
- Clear directions for teachers/educators

### Example (Chemistry)

-Students will develop an appreciation for the application of organic synthesis to the solution of modern day Technological & Social Challenges

### Levels of Learning

**BLOOM'S  
TAXONOMY**

# LEARNING OUTCOME (LO)

- “Learning outcomes are broad yet direct statements that describe the **knowledge, skills and attitudes** that students should reliably demonstrate as a result of undertaking an educational experience. They can be articulated at several levels, including lesson, course, program, degree, etc.”

# Students ask 3 questions

- **Do What (Verb) ?**
- **With What (Content)?**
- **For What ( What will you assess)?**

# 3. DESIGNING ASSESSMENTS

- **Design Down**

1. What will students learn?  
( learning outcomes)
2. How will outcomes be measured? (appropriate assessments)
3. What will students do to achieve these outcomes?  
(appropriate learning activities to develop the required knowledge, skills or attitudes)

- **Bloom's Taxonomy** requires a scale of level of expertise to achieve student outcomes, thus help in designing appropriate assessment and classroom techniques and to measure the goals.

# Bloom's Taxonomy – Action Verbs

<i>Bloom's levels</i>	<i>1 Knowledge</i>	<i>2 Comprehension</i>	<i>3 Application</i>	<i>4 Analysis</i>	<i>5 Synthesis</i>	<i>6 Evaluation</i>
<b>Bloom's Definition</b>	Remember previously learned information	Demonstrate an understanding of the facts	Apply knowledge to actual situations	Break down objects or ideas into simpler parts and find evidence to support generalizations	Compile component into a new whole or propose alternative solutions	Make and defend judgments based on internal evidence or external criteria
<b>Verbs</b>	arrange define describe	classify convert defend describe	apply change choose compute	analyze appraise break down calculate	arrange assemble categorize collect	Appraise argue Assess attach



# Importance of OBE in Technical Education

- In **2005, (NASSCOM) and McKinsey**, reported that 25% of engineering graduates are not employable by Multinational companies and this is due to the problematic Indian educational system
- Survey Collaboratively by **Government of India, World Bank and Federation of Indian Chambers of Commerce & Industry (FICCI) in 2009** has shown that 64 % employers are dissatisfied with the graduates' skills.
- Employers also reported graduates **lacking skills** of higher order/ critical thinking, problem solving, conducting experiments, creativity and application of modern tools.

# UNESCO report 2013

The report raised many critical issues that hamper imparting quality education. Few of them are as stated below

- engineering education Seems to be Boring to many students
- reputed to be difficult
- **no proper use of ICT & inquiry-based learning**
- engineering graduates should have multidisciplinary knowledge and work experience
- inefficient role of accrediting authorities in addressing desirable graduate attributes in engineering graduates etc...

# On the backdrop of these surveys...

- MHRD have changed the criteria for accreditation to become outcome-based (Shinde & Inamdar, 2013) to make our technical & engineering graduates ready for global employment

# Graduate Attributes

Graduate Attributes for undergraduate engineering programs for international recognition are;

- *Engineering knowledge*
- *Problem analysis*
- *Design and development of solutions*
- *Investigation of complex problem*
- *Modern tool usage*
- *Engineer & society*
- *Environment & sustainability*
- *Ethics*
- *Individual & team work*
- *Communication*
- *Lifelong learning and*
- *Project management & finance*

(NBA, 2013)

# INCULCATING GRADUATE ATTRIBUTES AMONG ENGINEERING STUDENTS

An example of implementation of OBE from the Electrical Engg. Discipline will be shown down here by Dr. Nidhika Birla

# References

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[http://www.queensu.ca/artsci/sites/default/files/learning\\_outcomes\\_curr\\_mapping.pdf](http://www.queensu.ca/artsci/sites/default/files/learning_outcomes_curr_mapping.pdf)
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- Reddy, T., A., J. & Reddy, P., S. (2014). Outcome Based Education—Some Initiatives. *Open Journal of Social Sciences*, 2, 7-s11.  
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# TIME TO REFLECT BACK...

## **KEY CONCEPTS**

- Learning Outcome
- What are graduate attributes (MBA)
- Bloom's Taxonomy
- Design down in OBE

**NEXT WEBINAR (12 July 2017) ...**

***DR. NIDHIKA BIRLA***  
***(Asso. Prof., Electrical)***

**On**

***MATLAB based Methodology***  
***for***  
***Teaching Technical Subjects***



# Outline

## **Section -2 :by DR.NIDHIKA BIRLA**

- Characteristics of 21<sup>st</sup> Century Teacher & Engineering Education
- Role of Modern Tools in Learning Electrical Engineering
- Examples from Subjects: “Control Systems” & Subject “Electrical Measurements and Measuring Instruments”
- Effect of using Modern Tools & Mapping them to Graduate Learning Attributes