

## WHAT STUDENTS SHOULD KNOW ABOUT OUTCOME-BASED EDUCATION (OBE)?

### 1. What is OBE?

*An educational process which is based on trying to achieve certain specified outcomes in terms of individual student learning. Thus, having decided what are the key things students should understand and be able to do or the qualities they should develop, both structures and curricula are designed to achieve those capabilities or qualities. Educational structures and curriculum are regarded as means not ends. If they do not do the job they are rethought'.*

*Methods of outcome-based education (OBE) are student-centered learning methods that focus on empirically measuring student performance (the "outcome"). In simple terms: What students are able to do after complete the program.*

### 2. How's different from 'conventional /traditional education system' (CE)?

*OBE is focus on what are students are able to do and traditional Education system is focus on what the lecturer is going to teach. At the end of course or program, the student is assessed to determine it ability or outcome as specified in the course outcome (CO) or program outcomes (PO)*

### 3. OBE implementation

*To achieve the outcomes, few teaching and learning methods are propose such as cooperative learning (CL), problem based learning (PBL), visit, demo etc. Student will be assess using Test, Presentation, peer evaluation etc*

### 4. What are PEO, PO & CO ? Briefly state differences

*Program Educational Objective (PEO) are specific goals describing expected achievements of graduates in their career and professional life after graduation (i.e 3-5 years after graduation). See question no 5*

*Programme Outcomes (PO) are statements describing what students are expected to know and be able to perform or attain by the time of graduation. These relate to the skills, knowledge, and behaviours that student acquire through the programme. See question no 5*

*Course Outcomes (CO) are statements describing what students are expected to know and be able to perform or attain by the end of the course*

### 5. Identify a few examples of PEO & PO of your programme

#### **BACHELOR OF ENGINEERING (CHEMICAL - BIOPROCESS)**

#### **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**PEO 1** Graduates perform competently in chemical and bioprocess industries and become important contributors to national development.

**PEO 2** Graduates become creative, innovative and adaptable engineers as leaders or team members in their organisations and society.

**PEO 3** Graduates contribute professionally towards the environmental well-being and sustainable development.

### **PROGRAMME OUTCOMES (PO)**

**PO1. Apply chemical and bioprocess engineering knowledge**

Ability to apply general knowledge, sciences, chemical - bioprocess engineering principles to solve complex chemical - bioprocess engineering problems

**PO2. Demonstrate research skills**

Ability to investigate, design and conduct experiments, analyze and interpret data, and apply the research skills to solve complex chemical - bioprocess engineering problems.

**PO3. Able to design a system**

Ability to design a system or process for solving complex chemical - bioprocess engineering problems to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

**PO4. Inculcate computational techniques**

Ability to inculcate modern computational techniques and skills to solve complex chemical - bioprocess engineering activities.

**PO5. Responsive to issues**

Ability to responsibly act as well as response to the societal health, safety, environment, legal and cultural issues that are relevant to the professional chemical – bioprocess engineering practice.

**PO6. Practice knowledge for sustainable development**

Ability to practice professional chemical - bioprocess engineering knowledge for sustainable development.

**PO7. Demonstrate problem-solving and thinking skills**

Ability to integrate the first principles of mathematics, natural sciences and chemical – bioprocess engineering for solving complex engineering problems through creative, innovative, lateral and critical thinking skills.

**PO8. Able to communicate effectively**

Ability to communicate effectively through written and oral modes to all levels of society.

**PO9. Possess leadership skills and confidence to work independently and in a team**

Ability to work independently, and as a member or a leader in a team to manage project in multi-disciplinary environment.

**PO10. Demonstrate high ethical standards**

Ability to work ethically according to the norms of chemical - bioprocess engineering practice.

**PO11. Display life-long learning skills**

Ability to acquire knowledge and engage in life-long learning.

**PO12. Acquire entrepreneurship skills**

Ability to acquire entrepreneurship skills and business insights.

## **BACHELOR OF ENGINEERING (CHEMICAL)**

### **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**PEO 1** Graduates perform competently in chemical industries and become important contributors to national development.

**PEO 2** Graduates become creative, innovative and adaptable engineers as leaders or team members in their organisations and society.

**PEO 3** Graduates contribute professionally towards the environmental well-being and sustainable development.

### **PROGRAMME OUTCOMES (PO)**

**PO1. Apply chemical engineering knowledge**

Ability to apply general knowledge, sciences, chemical engineering principles to solve complex chemical engineering problems

**PO2. Demonstrate research skills**

Ability to investigate, design and conduct experiments, analyze and interpret data, and apply the research skills to solve complex engineering problems.

**PO3. Able to design a system**

Ability to design a system or process for solving complex chemical engineering problems to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

**PO4. Inculcate computational techniques**

Ability to inculcate modern computational techniques and skills to solve complex chemical engineering activities.

**PO5. Responsive to issues**

Ability to responsibly act as well as response to the societal health, safety, environment, legal and cultural issues that are relevant to the professional chemical engineering practice.

**PO6. Practice knowledge for sustainable development**

Ability to practice professional chemical engineering knowledge for sustainable development

**PO7. Demonstrate problem-solving and thinking skills**

Ability to integrate the first principles of mathematics, natural sciences and chemical engineering for solving complex engineering problems through creative, innovative, lateral and critical thinking skills.

**PO8. Able to communicate effectively**

Ability to communicate effectively through written and oral modes to all levels of society.

**PO9. Possess leadership skills and confidence to work independently and in a team**

Ability to work independently, and as a member or a leader in a team to manage project in multi-disciplinary environment.

**PO10. Demonstrate high ethical standards**

Ability to work ethically according to the norms of chemical - engineering practice.

**PO11. Display life-long learning skills**

Ability to acquire knowledge and engage in life-long learning.

**PO12. Acquire entrepreneurship skills**

Ability to acquire entrepreneurship skills and business insights.

**BACHELOR OF ENGINEERING (CHEMICAL - POLYMER)**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**PEO 1** Graduates perform competently in chemical and polymer industries and become important contributors to national development.

**PEO 2** Graduates become creative, innovative and adaptable engineers as leaders or team members in their organisations and society.

**PEO 3** Graduates contribute professionally towards the environmental well-being and sustainable development.

**PROGRAMME OUTCOMES (PO)**

**PO1. Apply chemical and polymer engineering knowledge**

Ability to apply general knowledge, sciences, chemical - polymer engineering principles to solve complex chemical - polymer engineering problems

**PO2. Demonstrate research skills**

Ability to investigate, design and conduct experiments, analyze and interpret data, and apply the research skills to solve complex chemical - polymer engineering problems.

**PO3. Able to design a system**

Ability to design a system or process for solving complex chemical - polymer engineering problems to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

**PO4. Inculcate computational techniques**

Ability to inculcate modern computational techniques and skills to solve complex chemical - polymer engineering activities.

**PO5. Responsive to issues**

Ability to responsibly act as well as response to the societal health, safety, environment, legal and cultural issues that are relevant to the professional chemical - polymer engineering practice.

**PO6. Practice knowledge for sustainable development**

Ability to practice professional chemical - polymer engineering knowledge for sustainable development.

**PO7. Demonstrate problem-solving and thinking skills**

Ability to integrate the first principles of mathematics, natural sciences and chemical - polymer engineering for solving complex engineering problems through creative, innovative, lateral and critical thinking skills.

**PO8. Able to communicate effectively**

Ability to communicate effectively through written and oral modes to all levels of society.

**PO9. Possess leadership skills and confidence to work independently and in a team**

Ability to work independently, and as a member or a leader in a team to manage project in multi-disciplinary environment.

**PO10. Demonstrate high ethical standards**

Ability to work ethically according to the norms of chemical - polymer engineering practice.

**PO11. Display life-long learning skills**

Ability to acquire knowledge and engage in life-long learning.

**PO12. Acquire entrepreneurship skills**

Ability to acquire entrepreneurship skills and business insights.

## 6. Name / identify a few examples of CO in selected courses

*For Example in class SKKK1113*

*By the end of the course, students should be able to*

- i) identify and describe various processes, process variables and unit operations involved in chemical industry*
- ii) perform mass balance calculations on single or multiple process units with or without recycle, purge, or bypass streams for non-reactive processes and reactive processes*
- iii) perform mass balance calculations of single phase system or multiple component gas-liquid systems at equilibrium*
- iv) Ability to identify forms of energy, reference state conditions, state properties, conservative equations, and then formulate and solve the problems using first law of thermodynamics.*

## OTHER ISSUES STUDENTS SHOULD KNOW OR BE AWARE OF...

1. What is sustainability or sustainable development? How's incorporated in your programme? i.e. name a few courses or T&L activities to enhance understanding of sustainability concept

*SUSTAINABLE : relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged.*

*You learned in Introduction to engineering, Mass and energy balanced, Pollution control, design class and project, etc*

2. Lab work.... Level of safety awareness, safety briefing or related activities

*Student were given safety briefing before using the lab. Please recall few terms such PPE (personal protective Equipment), MSDS*

3. Student's contributions toward program /OBE improvement.

*Thru feedback to the lecturer by using e-lpvt or survey conducted by lecturer.*