



**J.B. Institute of Engineering & Technology**  
(UGC Autonomous)

Accredited by NAAC & NBA, approved by AICTE & Permanently Affiliated to JNTUH  
Department of Electronics & Communication Engineering

CIRCULAR

Date: 17-11-2023

It is here by informed to all the faculty and students of ECE Department that an Awareness program on OUTCOME BASED EDUCATION is organized by H&S Department on 18-11-202, all are instructed to attend the program.

*Towheed S*  
HOD ECE

HOD - ECE  
JB Institute of Engineering & Technology  
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*[Handwritten signatures and initials]*



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**J B INSTITUTE OF ENGINEERING & TECHNOLOGY**  
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**Department of Sciences and Humanities**  
**Organizes**

**An Awareness Programme**  
**on**

**OUTCOME BASED EDUCATION**  
(18 November 2023)

**ELCS Lab, First Year Block**

**Resource Person**

**Dr. D. S. Sai Prasad**

**Professor & Head, Department of Physics**  
**Vasavi College of Engineering**  
**Hyderabad**



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Dr. S Sai Prasad, Professor & head, Vasavi College of Engineering, Hyderabad presented the Talk on "Outcome based education". Discussed various aspects of it such as

### What is Outcome Based Education (OBE)?

Institutions adopting OBE try to bring changes to the curriculum by dynamically adapting to the requirements of the different stakeholders like Students, Parents, Industry Personnel and Recruiters.

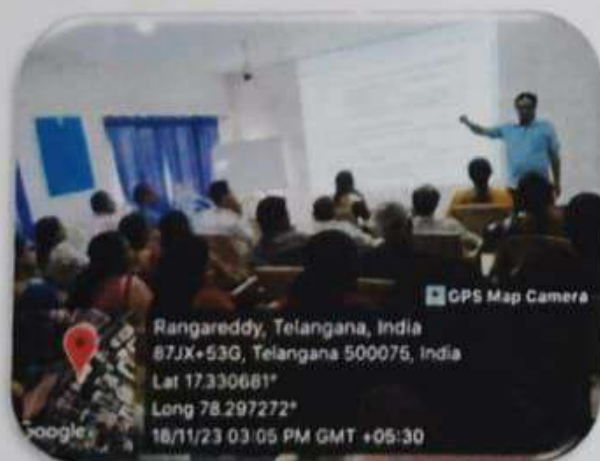
OBE is all about feedback and outcomes.

Four levels of outcomes from OBE are:

1. Program Outcomes (POs)
2. Course Outcomes (COs)
3. Program Educational Objectives (PEOs)
4. Program Specific Outcomes (PSOs)

### Why OBE?

1. International recognition and global employment opportunities.
2. More employable and innovative graduates with professional and soft skills, social responsibility and ethics.
3. Better visibility and reputation of the technical institution among stakeholders.
4. Improving the commitment and involvement of all the stakeholders.
5. Enabling graduates to excel in their profession and accomplish greater heights in their careers.
6. Preparing graduates for the leadership positions and challenging them and making them aware of the opportunities in the technology development.



### Benefits of OBE for Faculty Members

Faculty members are referred to as Change of Agents in OBE.

1. Teaching will become a far more creative and innovative career.

2. Faculty members will no longer feel the pressure of having to be the "source of all knowledge".

3. Faculty members shape the thinking and vision of students towards a course.



### Program Outcomes (POs)

POs describe what students should know and be able to do at the end of the programme. POs are to be in line with the graduate attributes as specified in the Washington Accord. POs are to be specific, measurable and achievable.

NBA has defined **12 POs** (see below) and you need not define those POs by yourself and it is common for all the institutions in India.

In the syllabus book given to students, there should be clear mention of course objectives and course outcomes along with CO-PO course articulation matrix for all the courses.

### Course Outcomes (COs)

Course outcomes are the statements of what a student should know, understand and/or be able to demonstrate after completion of a course. While writing COs for a course, please remember the following points.

1. The COs must state the major skills, knowledge, attitude or ability that students will acquire.
2. COs should be expressed in terms of measurable and/or observable behaviors.
3. COs should be agreed upon by the faculty in a program and should drive program outcomes.
4. All the courses in the department should have a uniform number of COs.
5. The COs should be written by Professors who have demonstrated considerable expertise in that course and then identify the textbook for the course.
6. The syllabus book should have course articulation matrix for CO-PO mapping of all the courses.
7. There should be a minimum of 6 COs according to the NBA.
8. Course outcomes should begin with an action verb from Bloom's taxonomy.

Here is a sample list of COs written for Maths subject was Explained



### Program Educational Objectives (PEOs)

Program Educational Objectives (PEOs) should be defined by the Department HEAD in consultation with the faculty members. PEOs are an promise by the Department HEAD to the aspiring students about what they will achieve once they join the programme. PEO assessment is not compulsory in India as it is quite difficult to measure in Indian context. NBA Assessors usually do not ask for PEO assessment. PEOs are about professional and career accomplishment after 4 to 5 years of graduation. PEOs can be written from different perspectives like Career, Technical Competency and Behavior. While writing the PEOs do not use the technical terms as it will be read by prospective students who wants to join the programme. Three to five PEOs are recommended.



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### Program Specific Outcomes (PSOs)

Program Specific Outcomes (PSOs) are statements that describe what the graduates of a specific engineering program should be able to do. A list of PSOs written for the department of Computer Science and Engineering at Dr. Ambedkar Institute of Technology, Bengaluru is given below.

**PSO1:** To apply the knowledge obtained through rigorous analysis of algorithms for advancing the broad area of computer science and engineering.

**PSO2:** To bring forth the creative zeal and work efficiently in designing the solution to various software and hardware problems by using state of the art tools.

**PSO3:** To assimilate professional ethics, managerial skills and to officiate effectively as a leader in a team to manage diverse projects.

### Blooms Taxonomy

Bloom's taxonomy is considered as the global language for education. Bloom's Taxonomy is frequently used by teachers in writing the course outcomes as it provides a readymade structure and list of action verbs. Here is the revised Bloom's document with action verbs, which we frequently refer to while writing COs for our courses.

### CO-PO Course Articulation Matrix Mapping

Course Articulation Matrix shows the educational relationship (Level of Learning achieved) between Course Outcomes and Program Outcomes for a Course. This matrix strongly indicates whether the students are able to achieve the course learning objectives. The matrix can be used for any course and is a good way to evaluate a course syllabus.

The below table gives information about the action verbs used in the POs and the nature of POs, stating whether the POs are technical or non-technical. You need to understand the intention of each POs and the Bloom's level to which each of these action verbs in the POs correlates to. Once you have understood the POs then you can write the COs for a course and see to what extent each of those COs correlate with the POs.

Process for mapping the values for CO-PO Matrix was explained

### NOTE:

1. The first five POs are purely of technical in nature, while the other POs are non-technical.
2. For the theory courses, while writing the COs, you need to restrict yourself between Blooms Level 1 to Level 4. Again, if it is a programming course, restrict yourself between Blooms Level 1 to Level 3 but for the other courses, you can go up to Blooms Level 4.
3. For the laboratory courses, while composing COs, you need to restrict yourself between Blooms Level 1 to Level 5.
4. Only for Mini-project and Main project, you may extend up to Blooms Level 6 while composing COs.





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5. For a given course, the course in-charge has to involve all the other Professors who teach that course and ask them to come up with the CO-PO mapping. The course in-charge has to take the average value of all of these CO-PO mappings and finalize the values or the course in-charge can go with what the majority of the faculty members prefer for. Ensure that none of the Professors who are handling the particular course discuss with each other while marking the CO-PO values.
6. If you want to match your COs with non-technical POs, then correlate the action verbs used in the course COs with the thumb rule given in the table and map the values. *(Applies only for mapping COs to non-technical POs).*

### Tips for Assigning the values while mapping COs to POs.

1. Select action verbs for a CO from different Bloom's levels based on the importance of the particular CO for the given course.
2. Stick on to single action verbs while composing COs but you may go for multiple action verbs if the need arises.
3. You need to justify for marking of the values in CO-PO articulation matrix. Use a combination of words found in the COs, POs and your course syllabus for writing the justification. Restrict yourself to one or two lines.
4. Values to CO-PO (technical POs in particular) matrix can be assigned by
  - Judging the importance of the particular CO in relation to the POs. If the CO matches strongly with a particular PO criterion then assign 3, if it matches moderately then assign 2 or if the match is low then assign 1 else mark with "-" symbol.
  - If an action verb used in a CO is repeated at multiple Bloom's levels, then you need to judge which Bloom's level is the best fit for that action verb.

### What is Rubrics?

We strongly recommend all the institutions to adopt Rubrics. Rubrics is a scoring guide that is used to evaluate the quality of students' constructed responses. Usually Rubrics is designed for laboratory, projects and seminar courses. In Indian universities, there is a trend of allocating the marks based on face value of the students and there is no appropriate breakup of the marks for the course. Usually, a faculty sees a student and allocates marks based on his opinion about the student. This tends to have negative effect on the student as there is no transparency in allocation of marks. We can overcome these kind of problems by adopting and designing Rubrics. More about Rubrics can be found

### Advantages:

- 1) Sets focus on the stated objectives.
  - 2) Sets a common framework and language for assessment.
  - 3) Grading consistency among the students and faculty members.
  - 4) Enables peer review among the students themselves.
  - 5) Clear Instructions to students on the intended outcomes.
  - 6) Diagnosing specific Strengths and Weaknesses among students.
- Faculty members should always distribute the Rubrics designed for a course to the students so that they do understand how they are accessed.



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**Few Clarifications**

**Course:** A semester consists of 5 to 6 theory courses and 2 to 3 laboratory courses. A course is a unit of teaching. We Indians tend to use the term **Subject** instead of **Course**. Please avoid the use of the term "Subject". Use the term Course instead of subject. The term Programme is different from the Department.

**Programme:** An programme is a cohesive arrangement of courses, co-curricular and extra-curricular activities to accomplish predetermined objectives leading to the award of individual degrees like B.E., B. Tech, M. Tech and Ph.D. from a department. A department can offer different programmes.

**Degree:** Academic award conferred upon a student upon successful completion of a programme. For example, B.E. Degree Programme, B.Tech Degree Programme, M.E. Degree Programme and M.Tech Degree Programme.

**Output and Outcome:** These two terms can be explained easily with an example. If you produce Ph.D students then it is **Output**. If the Ph.D students are able to get funds and publish papers then it is **Outcome**.

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