



# Introduction to Outcome Based Education



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## PREAMBLE

Department of Electronics and Telecommunication in its pursuit of imparting quality technical education has got accredited by external agencies viz. British Standards Institution (BSI) and National Board of Accreditation (NBA) for ISO 9001:2008 since 2006 and accreditation from 2009 to 2012. Recently, department has adapted new Outcome Based Education (OBE) system recommended by National Board of Accreditation (NBA).

We have modified our academic processes, teaching methodologies, assessment and evaluation systems to align with outcome based approach. We started redefining our systems in 2012 and went through evolution phases. This report epitomizes the evaluation results of assessment of learning outcomes measured in the academic year 2013-14. The suggestions given by our committee in this report will be useful to the members of Department Advisory Board in redefining Program Educational Objectives (PEOs) or Program Outcomes (POs).

## PAC Committee

Dr P D Khandekar, Head E&TC as UG Coordinator

Mr A V Chitre, Module Coordinator-Core Courses

Mr S V Kulkarni, Module Coordinator-Elective Courses

Mrs A P Navghane, Module Coordinator-Engineering Science and HSS Courses

Mr M S Patil, Module Coordinator-Computing Courses

Mr P G Gawande and Mrs A V Bang, Module Coordinator-Breadth Courses

Mr V Ambhore, Training and Placement Coordinator

Mrs G V Ghule, Industry Institute Interaction Cell Coordinator

Mrs A A Kulkarni, In-charge Co-curricular Activities (IEEE Student Branch Counselor)

Mrs R S Sonagi, Result Analysis Coordinator



## DEFINITION OF KEY STATEMENTS FOR OBE

### Vision:

Excellence in Electronics and Communication Engineering Education.

### Mission:

- Provide excellent blend of theory and practical knowledge.
- Establish centre of excellence in post graduate studies and research.
- Prepare engineering professionals with highest ethical values and a sense of responsible citizenship.

### Stake Holders:

Stake holders and their relevance

1. **Students:** Educational activity is student centric and the 'end product' of any program is the "STUDENT" who is graduating.
2. **Parents:** They pay the fees, entrust their wards in the hands of the institute and in turn want their wards to get the best education and learning during their wards' stay in the program.
3. **Institute:** Provides the brand, infrastructure and means to launch, nurture and sustain the education and learning process.
4. **Institute Staff:** The teaching faculty trains the students for theory as well as practical courses of the program and in addition imparts well rounding skills. They help to make the student (end product) employable. In Indian scenario teacher is "Guru" who not only guides the student in their course but in his life as well. The non teaching staff directly or indirectly assists in the learning process by providing the required support mechanisms.
5. **University:** The agency that certifies the 'end product'. It provides the platform, template, norms and measures for students, institute, institute staff



and the management to conform to standards and expectations so that the incoming candidate evolves into the 'end product'.

6. **Industry:** The entity that eventually uses the 'end product'. 'end product'
7. **Society:** The 'end product' is also expected to measure up to the expectations of the society. The 'end product' has to contribute and work towards the betterment of the society and to improve living and existence.
8. **Management:** Manages all the facilities for transforming the incoming candidate into the 'end product' that is employable by the industry in particular and measures up to the expectations of the society at large.
9. **Vendors:** Wherever/whenever necessary, they compliment as well as supplement the institute, management and the institute staff in providing the means to fill the voids and gaps in functioning and eventual realization of the 'end product'.
10. **Alumni:** The legacy 'end product' that is sensitive to the performance of each stake holder in preserving, sustaining and enhancing the performance and status of their Alma Mater.



### Program Educational Objectives (PEOs):

The vision of the institute articulated through the mission statement is accomplished through the defined PEOs. The educational objectives of a programme are the statements that describe the expected achievements of graduates within first few years of their graduation from the programme. The programme objectives are guided by global and local needs, vision of the institution, long term goals etc. The program objectives are expected to continuously evolve in agreement with local employers, industry, R & D advisors, and the alumni.

Following PEOs have been defined.

#### **Program Educational Objectives:** *Graduate of the program will*

1. become competent *electronic* engineers suitable for industry.
2. apply the mathematical and analytical abilities gained through *core* courses of *Electronics and Communication Engineering*.
3. apply problem solving skills to *develop hardware and/or software*.
4. become responsible citizen.

PEOs are published on the website of the institute and are displayed at prominent places in each department. These are disseminated to the stakeholders through interactions such as, student-class teacher meeting, parent meeting, industry meeting.



### Program Outcomes (POs):

Program Outcomes or POs are abilities that a graduating engineer of Electronics and Telecommunication program should have after successful completion of the program. Following POs have been defined.

#### ***A graduate will have***

- a) an ability to apply knowledge of mathematics, science, and *electronic* engineering,
- b) an ability to design and conduct experiments, as well as to analyze and interpret data,
- c) an ability to design *an electronic* system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical, health and safety, and manufacturability
- d) an ability to function on multidisciplinary teams,
- e) an ability to identify, formulate, and solve engineering problems,
- f) an understanding of professional and ethical responsibility,
- g) an ability to communicate effectively,
- h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context,
- i) an ability to engage in life-long learning,
- j) a knowledge of contemporary issues *in technologies related to electronics and communication engineering*,
- k) an ability to use the techniques, skills, and modern engineering tools necessary for *electronic* engineering practice and
- l) an ability to develop firmware.



### Graduate Attributes (GAs):

**Reference:** “Graduate Attributes and Professional Competencies” by International Engineering Alliance, Version 2 - 18 June 2009

POs alignment with Graduate Attributes (GAs) is shown in the table below;

**Table 1. Mapping of POs with GAs.**

Sr. No.	Graduate Attributes	POs
1	Engineering Knowledge	a, j
2	Problem Analysis	a, b
3	Design/Development Solutions	c, h, k, l
4	Investigation	b, e
5	Modern Tool Usage	j, k, l
6	The engineer and society	c, e, f, h
7	Environment and sustainability	c
8	Ethics	c, f
9	Individual and team work	d
10	Communication	d, g
11	Project management and finance	c
12	Life Long learning	i, k



### Course Outcomes (COs):

Course outcomes are defined in the following manner;

- Like courses which help in attaining common POs are identified. It is observed that courses related to a particular category are strongly correlated to a set of POs. For e.g. Mathematics courses are strongly correlated to 'a', 'b' and 'e'.
- Courses have been grouped in **eight** categories of like courses which contribute to common POs.
- Senior faculty members are appointed as coordinators of each category (of courses) and Course coordinators are appointed for each course. Course Outcome (CO) committees are formed for each category of courses.
- CO committees define COs for each course under its category by referring strongly related POs and contents of the respective courses.
- Course Outcomes of Computer Network course are given below;
  - An ability to design and/or configure selected protocols from TCP-IP protocol suite to meet demands of application,
  - An ability to install and configure hardware and software components required for data communication,
  - An ability to gain a knowledge of contemporary issues *related to Data Communication Network*,
  - An ability to use the techniques, skills, and modern engineering tools necessary for installing, configuring and monitoring computer networks.

### Correlation between PEOs, GAs, POs and COs:

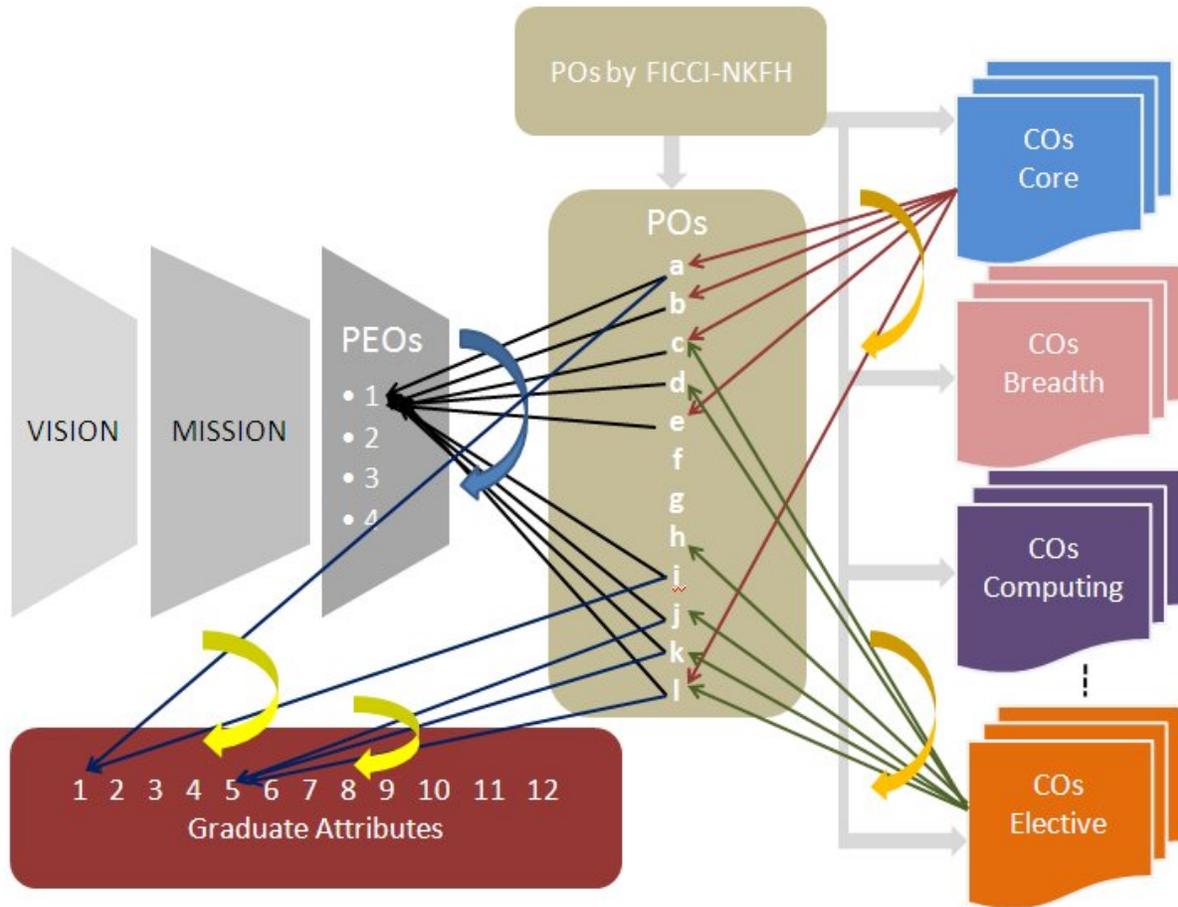


Figure 1. Correlation between PEOs, POs, GAs and COs (Sample only).

PEOs are defined based on the inputs taken from stake holders, Vision and Mission statements of the department. POs are defined based on PEOs, GAs and POs given by FICCI (Federation of Indian Chamber of Commerce and Industries) – NKFH (National Knowledge Functional Hub). The correlation between COs and POs, POs and PEOs help in evaluation of attainment of POs and PEOs respectively. Whereas the correlation between POs and GAs ensures that all the attributes specified in ABET documents are adequately covered while defining the POs of Electronics and Telecommunication program.