

**Dept. of Electronics and Communication Engineering, RIT Kottayam**  
**OBE framework and key constituents-Reference Manual for Students**

**Vision and Mission Statements**

Vision is a futuristic statement that the institute/department would like to achieve over a long period of time and mission is the means by which it proposes to move toward the stated vision.

	<b>Vision Statement</b>	<b>Mission Statement</b>
<b>Institute (Rajiv Gandhi Institute of Technology)</b>	Be a centre of technological excellence for the betterment of society	To impart professional education to students from all sectors of the society to mould them to be competent, committed, research oriented and socially responsible citizens capable of deploying technology for the goodwill of society
<b>Department (Electronics and Communication Engineering)</b>	Be a centre of excellence in electronics engineering education for the benefit of mankind	To impart knowledge in the field of electronics and its related areas with a focus on developing the required competencies and virtues to meet the requirements of society

**Programme Educational Objectives (PEOs)**

PEOs are broad statements that describe the career and professional accomplishments that the programme is preparing the graduates to achieve. These statements describe what the graduates are expected to attain within a few years after graduation.

<b>PEOs of UG programme in Electronics and Communication Engineering</b>	
<b>PEO designation number</b>	<b>PEO description</b>
<b>ECE/PEO-I</b>	To produce graduates with a solid foundation in electronics and communication engineering
<b>ECE/PEO-II</b>	To produce technically competent graduates with ability to analyze, design, develop, optimize and implement electronic systems
<b>ECE/PEO-III</b>	To produce graduates with sufficient breadth in electronics and its related fields so as to enable them solve general engineering problems
<b>ECE/PEO-IV</b>	To produce graduates with a professional outlook who can communicate effectively and interact responsibly with colleagues, clients, employers and the society
<b>ECE/PEO-V</b>	To produce graduates who will pursue lifelong learning and professional development including post graduate education

## Programme Outcomes (POs) or Student Outcomes

Programme Outcomes are narrower statements that describe what the students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviors that students acquire as they progress through the programme.

<b>POs of the undergraduate programme in Electronics and Communication Engineering</b>	
<b>PO designation number</b>	<b>Programme Outcome (PO) Description</b>
<b>ECE/PO-1</b>	an ability to apply knowledge of mathematics, science, and engineering
<b>ECE/PO-2</b>	an ability to design and conduct experiments, as well as to analyze and interpret data
<b>ECE/PO-3</b>	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
<b>ECE/PO-4</b>	an ability to function on multidisciplinary teams
<b>ECE/PO-5</b>	an ability to identify, formulate, and solve engineering problems
<b>ECE/PO-6</b>	an understanding of professional and ethical responsibility
<b>ECE/PO-7</b>	an ability to communicate effectively
<b>ECE/PO-8</b>	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
<b>ECE/PO-9</b>	a recognition of the need for, and an ability to engage in life-long learning
<b>ECE/PO-10</b>	a knowledge of contemporary issues
<b>ECE/PO-11</b>	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
<b>ECE/PO-12</b>	an ability to initiate interdisciplinary projects
<b>ECE/PO-13</b>	an ability to generate ideas leading to research
<b>ECE/PO-14</b>	an ability to adapt to changing technological scenarios

## Graduate Attribute (GAs)

Graduate Attributes (GAs) form a set of individually assessable outcomes that are the components, indicative of the graduate's potential to acquire competence to practice at appropriate level. The GAs are exemplars of the attributes expected of a graduate of an accredited UG engineering programme.

<b>Graduate Attributes Prescribed by NBA</b>		
<b>Designation</b>	<b>Attribute</b>	<b>Attribute Description</b>
<b>GA-a</b>	Engineering Knowledge	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
<b>GA-b</b>	Problem Analysis	Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
<b>GA-c</b>	Design and Development of Solutions	Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, and cultural, societal and environmental considerations.
<b>GA-d</b>	Conduct Investigations of Complex Problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.
<b>GA-e</b>	Modern Tool Usage	Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
<b>GA-f</b>	The Engineer and Society	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
<b>GA-g</b>	Environment and Sustainability	Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
<b>GA-h</b>	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>GA-i</b>	Individual and Team work	Function effectively as an individual, and as a member or leader in diverse teams and in multi disciplinary settings.
<b>GA-j</b>	Communication	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
<b>GA-k</b>	Project Management and Finance	Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
<b>GA-l</b>	Life-long Learning	Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**Note:-**

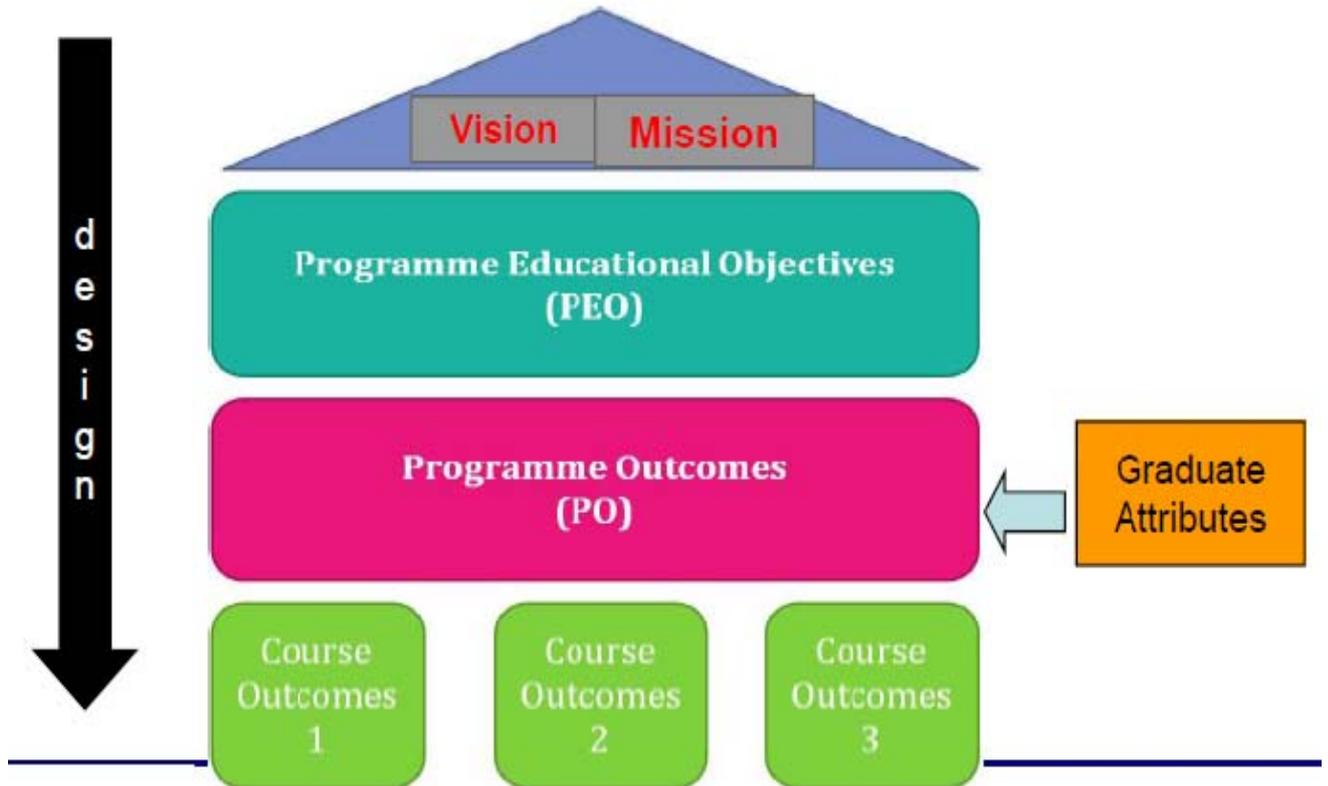
**As per the guidelines given by NBA in the June 2015 version of the SAR (Self Assessment Report), these 12 graduate attributes are the mandatory programme outcomes for a UG engineering programme.**

## Course Outcomes (COs)

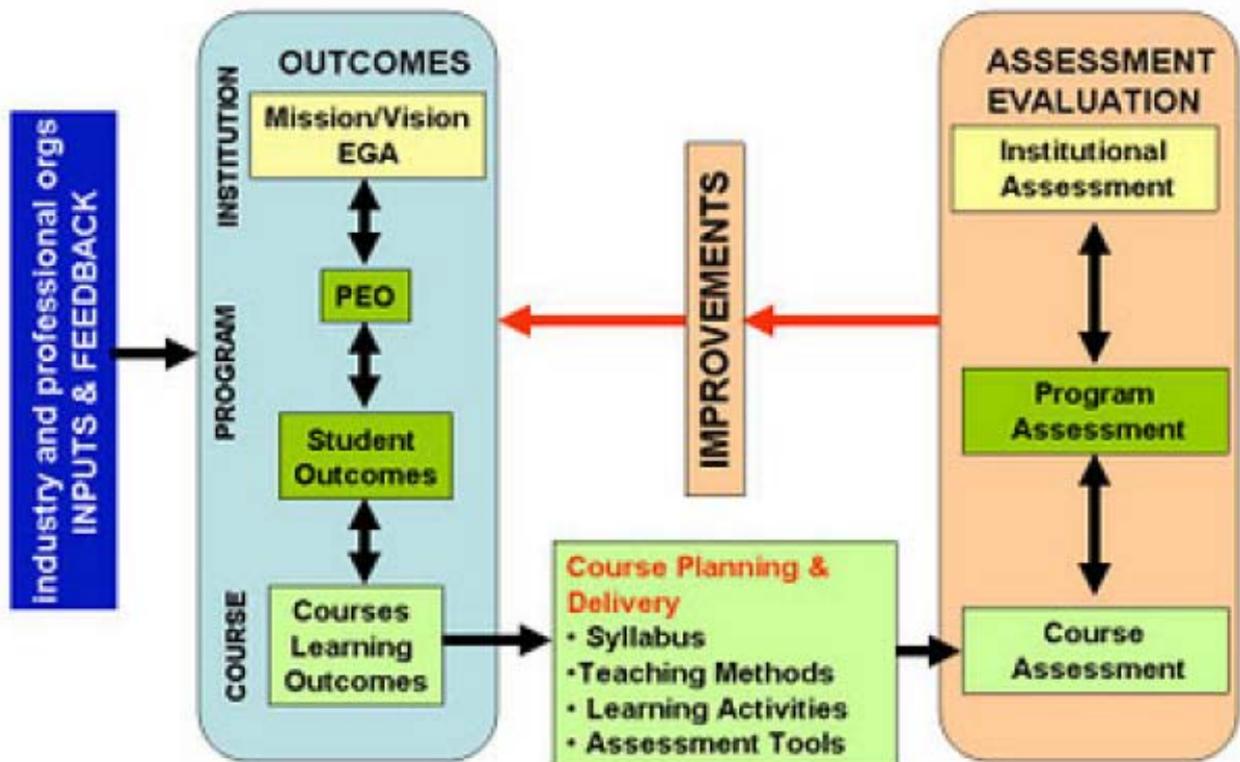
- Course outcome is a formal statement of what students are expected to learn in a course (*synonyms for “expected learning outcome” include learning outcome, learning outcome statement, and student learning outcome*).  
[Course means any specific subject/ lab the student studies during the programme. Eg-Solid State Devices, Digital Electronics Lab, Project, etc]
- Course outcome statements refer to specific knowledge, practical skills, areas of professional development, attitudes, higher-order thinking skills, etc. that faculty members expect students to develop, learn, or master during a course.
- Course Outcomes are narrower statements that describe what students are expected to know, and be able to do at the end of each course. These relate to the skills, knowledge, and behaviour that students acquire in their matriculation through the course.
- **Differences between Objectives and Outcomes:-**  
A course objective describes what a faculty member will cover in a course. They are generally broader than course outcomes. Objectives are intended results or consequences of instruction, curricula, programs, or activities. Outcomes are achieved results or consequences of what was learned; i.e., evidence that learning took place. Objectives are focused on specific types of performances that students are expected to demonstrate at the end of instruction. Objectives are often written more in terms of teaching intentions and typically indicate the subject content that the teacher(s) intends to cover. Learning outcomes, on the other hand, are more student-centered and describe what it is that the learner should learn.

<b>Example: COs of EC010 505 (Applied Electromagnetic Theory)</b>	
<b>Course Outcome Designation</b>	<b>Course Outcome (CO) Description</b>
EC010 505/CO 1	Explain the basic scalar and vector field quantities and the fundamental relationships in electromagnetics.
EC010 505/CO 2	Select the most appropriate laws, theorems and solution techniques for solving basic problems in electrostatics and magnetostatics.
EC010 505/CO 3	Analyze electromagnetic phenomena related to TE, TM and TEM guided waves and to calculate field quantities and various characteristic parameters.
EC010 505/CO 4	Solve field equations to determine field quantities and characteristic parameters of waves in circular waveguides and microwave cavities.
EC010 505/CO 5	Apply Maxwells equations in phasor form to solve basic transmission line problems.

## Key Constituents of OBE (Outcome Based Education)



## The OBE (Outcome Based Education) Framework



### **Outcomes Based Education (OBE):-**

Outcomes are clear learning results that learners have to demonstrate at the end of significant learning experiences: what learners can actually do with what they know and have learned. Outcomes are actions/ performances that embody and reflect learner competence in using content, information, ideas and tools successfully.

Outcome based education (OBE) is a process that involves the restructuring of curriculum, assessment and reporting practices in education to reflect the achievement of high order learning and mastery rather than the accumulation of course credits. It is an educational theory that bases each part of an educational system around goals (outcomes). By the end of the educational experience each student should have achieved the goal.

### **Expected Graduate Attribute (EGA):-**

The expected graduate attributes (EGA) are the characteristics or qualities of students of an institute upon graduation, which were identified based on the institute vision and mission.

### **Assessment:-**

Assessment is one or more processes that identify, collect, and prepare data to evaluate the attainment of student outcomes. Effective assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the outcome being measured. Appropriate sampling methods may be used as part of an assessment process.

### **Evaluation:-**

Evaluation is one or more processes for interpreting the data and evidence accumulated through assessment processes. Evaluation determines the extent to which student outcomes are being attained. Evaluation results in decisions and actions regarding programme improvement.

### **Accreditation:-**

Educational accreditation is a type of quality assurance process under which services and operations of educational institutions or programs are evaluated by an external body to determine if applicable standards are met. If standards are met, accredited status is granted by the appropriate agency.

National Board of Accreditation (NBA) [<http://www.nbaind.org>] is an autonomous body in India which was established with the objective of Assurance of Quality and Relevance of Education, especially of the programmes in professional and technical disciplines, i.e., Engineering and Technology, Management, Architecture, Pharmacy and Hospitality, through the mechanism of accreditation of programs offered by technical institutions.