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2.6.2: Attainment of Programme outcomes and course outcomes evaluated by the institution.

CO – PO / PSO ATTAINMENT PROCESS

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VISION OF THE INSTITUTE:

To be a Centre of Excellence in technical education with research orientation and to develop Human resources to serve the society and nation building.

MISSION OF THE INSTITUTE:

M1**:T**o provide comprehensive technical education programmes in various disciplines and to contribute effectively to the profession and the society.

M2: Establishing Centers of Excellence in- inter disciplinary areas which are important and relevant to Industry and Employment with scope for research

M3: To inculcate human values and ethical practices to the graduates through co- curricular and Extra-curricular activities.

Electrical and Electronics Engineering Department:

VISION OF THE DEPARTMENT:

To contribute to the country through excellence technical education, with Research orientation and to develop Human Resources in Electrical and Electronics Engineering.

MISSION OF THE DEPARTMENT:

MD1:To provide broad based education in Electrical and Electronics   Engineering

MD2: To keep the curriculum industry friendly

MD3: To undertake development activity and provide consultancy services in   industrial, educational and society relevant areas in Electrical and Electronics Engineering

MD4: To promote ethical and moral values among the students so as to make them   emerge as responsible professionals

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Program Outcomes:

PO 1: Engineering knowledge: Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO 3: Design/Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, social and environmental considerations.

PO 4: Conduct investigations of complex problems: Use research based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.

PO 5: 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.

PO 6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess social, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of and the need for sustainable development.

PO 8: Ethics: Apply ethical principle and to commit to the professional ethics and responsibilities and norms of the engineering practice.

PO 9: Individual and team Work: Function effectively as individual and as a member or leader in diverse teams and in multi disciplinary settings.

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PO 10: 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.

PO 11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member
or leader in a team, to manage projects and in multi disciplinary environments.

PO 12: Life-long learning: Recognize the need for and have the preparation and ability to engage in independent lifelong learning in the broadest context of technological change.

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Program Specific Outcomes:

PSO 1: Work in industry and user departments with the knowledge of mathematics, science and electric engineering.

PSO 2: Shoulder responsibilities in planning and utilization of electrical energy by analyzing the processes critically.

PSO 3: Analyze and model the Electrical and Electronics systems and hence effectively contribute towards research.

PSO 4: Cope up with the state-of-art in Electrical and Electronics Engineering in tune with modern engineering tools

Program Educational Objectives:

PEO 1: To enhance the student's capacity with strong foundation of Mathematics, Science and Engineering to become successful professionals in Electrical and Electronics Engineering

PEO 2: To provide awareness on excellence, leadership and create an academic arena and intellectual capabilities for lifelong learning process

PEO 3: To meet the needs of society and industry, we increase the competence in students to identify, formulate and solve engineering problems with practical experience

PEO 4: To produce the graduates having ethical, administrative acumen and ability to handle critical situations with high professional competence for employability in both public and private sectors

PEO 5: To mould the students with recent techniques of core subjects to design and interpret effectively using multidisciplinary concepts for Research and Development by participating in professional activities.

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COURSE OUTCOMES

Academic Year :2020—2021   Year/ Semester : **III/II**

Name of the Program: **B.Tech**Section: **A/B/C**

Course/Subject: Power Semiconductor **Drives**   Course Code: EE612PE

Name of the Faculty: Dept.: **EEE**

Designation:

The expected outcomes of the Course/Subject are:

CO322	Power Semiconductor **Drives**
CO322.1	Indentify the drawbacks of speed control of motor by conventional methods.
CO322.2	Differentiate Phase controlled and chopper controlled DC drives speed-torque characteristics merits and demerits
CO322.3	Understand Induction motor drive speed–torque characteristics using different control strategies its merits and demerits
CO322.4	Describe Slip power recovery schemes
CO322.5	Understand Synchronous motor drive using different control strategies i

Signature of HOD   Signature of faculty
Date: Date:

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6.Sample CO-PO,PSO mapping

Subject: Power Semiconductor Drives:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3	PSO4
CO322.1	3	2	3	2	2	-	-	-	-	-	1	2	2	1	2	2
CO322.2	2	3	2	3	2	-	-	-	-	-	2	2	3	2	2	2
CO322.3	3	2	2	3	1	-	-	-	-	-	2	1	2	2	1	2
CO322.4	3	3	3	2	2	-	-	-	-	-	2	2	2	3	2	3
CO322.5	2	2	3	3	3	-	-	-	-	-	1	1	3	2	3	2
Avg.	2.6	2.4	2.6	2.6	2	-	-	-	-	-	1.6	1.6	2.4	2	2	2.2

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7. Attainment of Course Outcomes

In the Outcome Based Education (OBE), assessment is done through one or more than one process that identify, collect, and prepare data to evaluate the achievement of course outcomes (COs). Assessment tools are categorized into two methods to assess the course outcomes: Direct and Indirect methods.

Direct methods display the student's knowledge and skills from their performance in the continuous internal assessment tests, semester examinations, seminars, assignments etc. These methods provide a sampling of what students know and/or can do and provide strong evidence of student learning.

Indirect methods such as surveys and feedbacks ask the stakeholders to reflect on student's learning. Course outcome feedback forms aid the student in assessing their own knowledge or skills.The list of assessment methods used and their details are mentioned in below Table

Attainment level is measured in terms of student performance in internal assessments with respect to the Course Outcomes of a course in addition to the performance in the University examination.

Program shall have set Course Outcome attainment levels for all courses. The attainment levels shall be set considering average performance levels in the university examination or any higher value set as target for the assessment years. Attainment level is to be measured in terms of student performance in internal assessments with respect to the Course Outcomes of a course in addition to the performance in the University examination

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List of direct and indirect assessment methods

S.No.	Direct Assessment Methods	Description
1	Internal assessment examination	It is a metric to continuously assess the attainment of course outcomes, student's learning domains and thus improve the teaching –learning process. The Internal Assessment marks in a theory paper shall be based on two tests generally conducted at the end of 8 and 16 weeks of each semester. Each test has a descriptive part of 10 marks and an objective part of 10 marks. Assignment carries 5 marks making a total of 25 marks. Average of the marks obtained from the two tests shall be the Internal Assessment Marks for the relevant subject.
2	Lab assessment test	Lab Assessment is a metric to mainly assess student's practical knowledge with their designing capabilities. The internal assessment marks is based on the laboratory record, day to day performance and practical test and viva voce.
3	External examination	Semester theory examinations are the metric to assess whether all the course outcomes are attained. Semester Examination is focused on attainment of course outcomes and uses a descriptive exam. The examination is for 75 marks. Practical semester examination focuses on conduction of experiments and viva-voce. The practical examination is conducted for 50 marks.
4	Assignments	Assignment is a metric to assess the student's level of understanding in the course, knowledge, skills and attitude.
5	Major/Mini project	The internal assessment marks in the case of mini projects, major projects and seminars in the final year shall be based on the evaluation by a committee consisting of the Head of the Department and two senior faculty members of the Department, one of whom shall be the project / seminar guide.
6	Seminars	
7	Comprehensive viva voce	
8	Major project viva voce	Viva-voce examination in project work shall be conducted batch-wise by an external examiner.
	Indirect Assessment	**Description**
9	Course Exit Survey	Collect information from the students to assess the learning outcomes of the course at the end of the semester.
10	Student Exit survey	Toevaluatethesuccess of the program inprovidingstudents with opportunities to achievethe program outcomes.

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11	Alumni survey	Collection of a wide variety of information about program satisfaction, how well students are prepared for their careers, what types of jobs or graduate degrees they have obtained, and the skills that are needed to succeed in the job market or in graduate study.
12	Employer survey	Provides information about the relevance of the curriculum, on-the-job field specific information about the application and value of the skills that the program offers. It helps to determine if the graduates have the necessary job skills and if there are other skills that employers particularly value that graduates are not acquiring in the program.
13	Parent survey	Collect variety of information about program satisfaction and college from parents/guardians.

Measuring Course Outcomes attained through University Examinations:

Target may be stated in terms of percentage of students getting more than the university average marks or more as selected by the program in the final examination. For cases where the university does not provide useful indicators like average or median marks etc., the program may choose an attainment level on its own with justification.

Example related to attainment levels Vs. targets:

Attainment Level 1: 40% students scoring more than University average percentage

marks or set attainment level in the final examination.

Attainment Level 2: 50% students scoring more than University average percentage

marks or set attainment level in the final examination.

Attainment Level 3: 60% students scoring more than University average percentage

marks or set attainment level in the final examination.

• Attainment is measured in terms of actual percentage of students getting set

percentage of marks.

• If targets are achieved then all the course outcomes are attained for that year.

Program is expected to set higher targets for the subsequent years as a part of

continuous improvement.

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• If targets are not achieved the program should put in place an action plan to attain the

target in subsequent years.

<u>Measuring CO attainment through Internal Assessments:</u>

Target may be stated in terms of percentage of students getting more than class average marks or set by the program in each of the associated COs in the assessment instruments (midterm tests, assignments, mini and major projects, reports and presentations etc. as mapped with the COs)

<u>Examples related to attainment levels Vs. targets:</u>

Attainment Level 1: 50% students scoring more than 50% marks out of the

relevant maximum marks.

Attainment Level 2: 60% students scoring more than 50% marks out of the

relevant maximum marks.

Attainment Level 3: 70% students scoring more than 50% marks out of the

relevant maximum marks.

• Attainment is measured in terms of actual percentage of students getting set

Percentage of marks.

• If targets are achieved then the COs are attained for that year. Program is expected to set higher targets for the subsequent years as a part of continuous improvement.

• If targets are not achieved, the program should put in place an action plan to attain the

target in subsequent years. Similar targets and achievement are stated for the other

midterm tests/internal assessment instruments

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Course Outcome Attainment:

For example:

Attainment through University Examination: Substantial i.e. Level 3

Attainment through Internal Assessment: Moderate i.e. Level 2

Assuming 75% weightage to University examination and 25% weightage to Internal assessment, the attainment calculations will be (75% of University level) + (25% of Internal level) i.e. 75% of 3 + 25% of 2 = 2.4 + 0.4 = 2.8

External target level - 40%

Internal target level - 50%

The course outcome attainment for all courses as per the above mentioned procedure for the courses from each semester of I year, II Year, III Year and IV Year of the program for 2017 – 2021 .

Attainment of Program Outcomes and Program Specific Outcomes

PO Assessment Tools

Assessment tools are categorized into Direct and Indirect methods to assess the program outcomes and program specific outcomes. Direct methods display the student's knowledge and skills from their performance in the internal assessment tests, end–semester examinations, presentations classroom assignments etc. These methods provide a sampling of what students know and/or can do and provide strong evidence of student learning. Indirect methods such as surveys and interviews ask the stakeholders to reflect on student's learning. They assess opinions or thoughts about the graduates knowledge or skills and are valued by different stakeholders.

Use of Rubrics for Evaluation and Assessment of POs

The Course/Program outcomes are difficult to measure such as assessing critical thinking, creativity, analytical skills, and problem solving etc. Hence the department has adopted Criterion Referenced Rubrics to assess the POs and COs wherever appropriate. The Rubric criteria are either developed by department faculty or sometimes even with consultation with students and distributed before an assignment, project or test. Rubrics are used for both formative and summative assessment of students. Same rubric is used for assessing an outcome so that the faculty is able to assess student progress and maintain the record of the same for each student. The rubrics are shared with students before being evaluated so that they are aware of the performance criteria and their weightage.

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8.Indirect Assessment Tools

Indirect assessment is done through course exit survey, alumni survey and employer survey

ALUMNI FEEDBACK

Dear Alumni,
Greetings,

We are happy that you have spent your valuable years pursuing higher education in this Institution. To enhance the performance of the future graduates, We are conducting feedback survey. We shall be thankful if you can spare some of your valuable time to fill up this alumni feedback form and give us your valuable suggestions. Your opinions and suggestions will help us continuously improve the quality of our academic programs, and we appreciate your time in filling out this survey.

Name of the Alumni:		Email:	
H.T.No:		Contact No:	
Branch:		Year of Passing:	

	Rating Scale: 5-Excellent, 4-VeryGood, 3-Good, 2-Satifactory, 1.Not Satisfactory	
S. No.	**Parameters**	**Grade**
1	The extent to which syllabus and curriculum augment the technical skill set and communication skills.	
2	The extent to which syllabus and curriculum meet the current job requirements	
3	The extent to which syllabus and curriculum augments for higher education	
4	The extent to which syllabus and curriculum enhances problem solving skills and modern tools used for real time engineering	
5	The extent to which syllabus and curriculum augment managerial skills and finance handing capability	
6	Curriculum fulfillment in attaining real time industry requirement	
7	Curriculum effectiveness in improving planning and organizational skills.	
8	Curriculum effectiveness in building leadership qualities and team spirit	

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9	Curriculum support in enhancing communication skills	
10	The extent to which the syllabus meets the expected learning values, life skills, human values with societal responsibilities	
	Average Grading:	

Present Position:

Company/University/Entrepreneur	Designation/Degree/License	Address

Suggestions if Any:

Signature of the Alumni

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EMPLOYERS FEEDBACK

Dear Employer,

Greetings.

We greatly acknowledge you, for showing continuous interest in recruiting our graduates in your esteemed organization. Hoping that our graduates are performing up to your expected level. To enhance the performance of future graduates, we have been conducting stakeholder survey yearly. As you are one of our esteemed stakeholders, we request you to spend your valuable time in the process.

Your opinions and suggestions will help us for the continuous improvement of the quality of our academic programs, and we appreciate your time in filling out this survey.

Name of the Employee   :

Designation   :

Branch of Engineering/PG   :

Rating Scale : 5-Excellent, 4-Very Good, 3-Good, 2-Satifactory, 1. Not Satisfactory						
S.No	How satisfied are you with the employee/s (Our student/s) work performance and the academic system in these areas.	5	4	3	2	1
1.	Extent of the Curriculum fulfillment in attaining the Industrial Needs.					
2.	Extent of the Curriculum in supporting the Usage of the Modern Tools.					
3.	Extent of the Curriculum enhancement in the Managerial and Financial handling capabilities.					
4.	Extent of the Curriculum support for the creative and practical solutions to work place Challenges.					
5.	Curriculum effectiveness in building leadership qualities and team spirit.					
6.	Extent to which Curriculum supports in enhancing communication skills					
7.	Extent of the Curriculum support in the fulfillment of R & D activities of the Industry.					
8.	Curriculum effectiveness to work in Multi-Disciplinary Teams.					
9.	Extent to which Curriculum has good balance between theory and application to bridge the Industry-Academia gap.					

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10.	Curriculum effectiveness in offering ample range of optional /electives /value-added courses					

On a scale of 1 to 10, how do you rate your overall satisfaction with our alumni and the curriculum?									
1	2	3	4	5	6	7	8	9	10

Suggestions for the program/s improvement, if any.

Contact information for future correspondence.

Email.ID:

Phone:

Name: _____ Designation: _____

Company/Organization: _____

Date: _____ Signature: _____

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