AMITY UNIVERSITY

Outcome Assessment Plan

Domain:	Engineering & Technology
Institution:	Amity School of Engineering & Technology
Date:	11 th June 2018

#		TITLE	PAGE NO.
1	Introdu	action of Domain	13
2	Introdu	action of Outcome Assessment Plan	19
3	Domain Mission and Broad-Based Goals		22
	3.1	Mission Statement	24
	3.2	Broad-Based Educational Goals	25
	3.3	Broad-Based Operational Goals	26
4	Institut	ion Mission and Broad-Based Goals	27
	4.1	Mission Statement	28
	4.2	Broad-Based Educational Goals	29
	4.3	Broad-Based Operational Goals	30
5		Programme Mission, PEO's, PLO's and Assessment Plan for each Programme	31
	5.1	Programme- B.Tech. Computer Science & Engineering, Computer Science & Engineering (3C)	32
	5.1.1	Programme Mission	32
	5.1.2	Programme Educational Objectives	32
	5.1.3	Programme Operational Objectives	33
	5.1.4	Programme Learning Outcomes	34

5.1.5	Programme Operational Outcomes	35
5.1.6	PEOs – PLOs Mapping	36
5.1.7	Programme Educational Outcome Assessment Plan	38
5.2	Programme- M.Tech.(Computer Science & Engineering)	48
5.2.1	Programme Mission	48
5.2.2	Programme Educational Objectives	48
5.2.3	Programme Operational Objectives	49
5.2.4	Programme Learning Outcomes	50
5.2.5	Programme Operational Outcomes	51
5.2.6	PEOs – PLOs Mapping	52
5.2.7	Programme Educational Outcome Assessment Plan	54
5.3	Programme- B.Tech.(Information Technology)	62
5.3.1	Programme Mission	62
5.3.2	Programme Educational Objectives	62
5.3.3	Programme Operational Objectives	63
5.3.4	Programme Learning Outcomes	64
5.3.5	Programme Operational Outcomes	65
5.3.6	PEOs – PLOs Mapping	66

5.3.7	Programme Educational Outcome Assessment Plan	68
5.4	Programme- M.Tech.(Computer Networks & Information Security)	78
5.4.1	Programme Mission	79
5.4.2	Programme Educational Objectives	79
5.4.3	Programme Operational Objectives	80
5.4.4	Programme Learning Outcomes	81
5.4.5	Programme Operational Outcomes	82
5.4.6	PEOs – PLOs Mapping	83
5.4.7	Programme Educational Outcome Assessment Plan	86
5.5		
	Programme- B.Tech.(Civil Engineering, Civil Engineering- 3C)	94
5.5.1	Programme Mission	94
5.5.2	Programme Educational Objectives	94
5.5.3	Programme Operational Objectives	95
5.5.4	Programme Learning Outcomes	95
5.5.5	Programme Operational Outcomes	98
5.5.6	PEOs – PLOs Mapping	99
5.5.7	Programme Educational Outcome Assessment Plan	102

5.6	Programme- B.Tech.(Electronics & Communication Engineering), B.Tech.(Electronics & Communication	
	Engineering) – 3C,	109
5.6.1	Programme Mission	109
5.6.2	Programme Educational Objectives	109
5.6.3	Programme Operational Objectives	110
5.6.4	Programme Learning Outcomes	111
5.6.5	Programme Operational Outcomes	113
5.6.6	PEOs – PLOs Mapping	114
5.6.7	Programme Educational Outcome Assessment Plan	116
5.7	Programme- M.Tech (Structural Engineering)	127
5.7.1	Programme Mission	127
5.7.2	Programme Educational Objectives	127
5.7.3	Programme Operational Objectives	127
5.7.4	Programme Learning Outcomes	128
5.7.5	Programme Operational Outcomes	129
5.7.6	PEOs – PLOs Mapping	131
5.7.7	Programme Educational Outcome Assessment Plan	133
5.8	Programme- M.Tech.(Environmental Engineering)	140
		1.40

5.8.2	Programme Educational Objectives	141
582	Programma Operational Objectives	142
5.8.5	Programme Operational Objectives	142
5.8.4	Programme Learning Outcomes	143
5.8.5	Programme Operational Outcomes	144
5.8.6	PEOs – PLOs Mapping	145
5.8.7	Programme Educational Outcome Assessment Plan	147
5.9	Programme- B.Tech Mechanical & Automation Engineering, Mechanical Engineering, Automobile	
	Engineering	154
5.9.1	Programme Mission	154
5.9.2	Programme Educational Objectives	154
5.9.3	Programme Operational Objectives	155
5.9.4	Programme Learning Outcomes	156
5.9.5	Programme Operational Outcomes	157
5.9.6	PEOs – PLOs Mapping	158
5.9.7	Programme Educational Outcome Assessment Plan	160
5.10	Programme- M.Tech.(Autommobile Engineering), B.Tech + M.Tech (Automobile Engineering) Integrated	169
5.10.1	Programme Mission	169
5.10.2	Programme Educational Objectives	170
5 10 2	Programma Operational Objectives	171
5.10.3		1/1

		1
5.10.4	Programme Learning Outcomes	172
5.10.5	Programme Operational Outcomes	173
5.10.6	PEOs – PLOs Mapping	174
5.10.7	Programme Educational Outcome Assessment Plan	176
5.11	Programme- M.Tech.(Industrial & Production Engineering)	184
5.11.1	Programme Mission	184
5.11.2	Programme Educational Objectives	184
5.11.3	Programme Operational Objectives	185
5.11.4	Programme Learning Outcomes	186
5.11.5	Programme Operational Outcomes	187
5.11.6	PEOs – PLOs Mapping	188
5.11.7	Programme Educational Outcome Assessment Plan	190
5.12	Programme- M.Tech.(Mechatronics Engineering)	198
5.12.1	Programme Mission	198
5.12.2	Programme Educational Objectives	198
5.12.3	Programme Operational Objectives	199
5.12.4	Programme Learning Outcomes	200
5.12.5	Programme Operational Outcomes	201
5.12.6	PEOs – PLOs Mapping	202

5.12.7	Programme Educational Outcome Assessment Plan	204
5.13	Programme- M.Tech.(Thermal and fluid Sciences)	212
5.13.1	Programme Mission	212
5.13.2	Programme Educational Objectives	212
5.13.3	Programme Operational Objectives	213
5.13.4	Programme Learning Outcomes	214
5.13.5	Programme Operational Outcomes	215
5.13.6	PEOs – PLOs Mapping	216
5.13.7	Programme Educational Outcome Assessment Plan	218
5.14	Programme- M.Tech.(Electronics & Communication Engineering)	226
5.14.1	Programme Mission	226
5.14.2	Programme Educational Objectives	226
5.14.3	Programme Operational Objectives	227
5.14.4	Programme Learning Outcomes	228
5.14.5	Programme Operational Outcomes	229
5.14.6	PEOs – PLOs Mapping	230
5.14.7	Programme Educational Outcome Assessment Plan	232
5.15	Programme- M.Tech.(Wireless Communication)	241
5.15.1	Programme Mission	241
		1

5.15.2	Programme Educational Objectives	242
5.15.3	Programme Operational Objectives	243
5.15.4	Programme Learning Outcomes	244
5.15.5	Programme Operational Outcomes	245
5.15.6	PEOs – PLOs Mapping	246
5.15.7	Programme Educational Outcome Assessment Plan	247
5.16	Programme- M.Tech.(VLSI)	256
5.16.1	Programme Mission	256
5.16.2	Programme Educational Objectives	256
5.16.3	Programme Operational Objectives	257
5.16.4	Programme Learning Outcomes	258
5.16.5	Programme Operational Outcomes	259
5.16.6	PEOs – PLOs Mapping	260
5.16.7	Programme Educational Outcome Assessment Plan	262
5.17	Programme- B.Tech.(Electrical & Electronics Engineering)	271
5.17.1	Programme Mission	271
5.17.2	Programme Educational Objectives	272
5.17.3	Programme Operational Objectives	273
5.17.4	Programme Learning Outcomes	274

5.17.5	Programme Operational Outcomes	275
5.17.6	PEOs – PLOs Mapping	276
5.17.7	Programme Educational Outcome Assessment Plan	278
5.18	Programme- B.Tech.(Electronics & Instrumentation Engineering)	286
5.18.1	Programme Mission	286
5.18.2	Programme Educational Objectives	286
5.18.3	Programme Operational Objectives	287
5.18.4	Programme Learning Outcomes	288
5.18.5	Programme Operational Outcomes	289
5.18.6	PEOs – PLOs Mapping	290
5.18.7	Programme Educational Outcome Assessment Plan	293
5.19	Programme- M.Tech.(Power System)	301
5.19.1	Programme Mission	301
5.19.2	Programme Educational Objectives	301
5.19.3	Programme Operational Objectives	303
5.19.4	Programme Learning Outcomes	304
5.19.5	Programme Operational Outcomes	306
5.19.6	PEOs – PLOs Mapping	307
5.19.7	Programme Educational Outcome Assessment Plan	309

	5.20	Programme- M.Tech.(Control System)	318
	5.20.1	Programme Mission	318
	5.20.2	Programme Educational Objectives	319
	5.20.3	Programme Operational Objectives	320
	5.20.4	Programme Learning Outcomes	321
	5.20.5	Programme Operational Outcomes	322
	5.20.6	PEOs – PLOs Mapping	324
	5.20.7	Programme Educational Outcome Assessment Plan	326
6		Domain Operational Outcomes & Operational Outcome Assessment Plan	334
7		Linkage of Outcomes Assessment with Strategic Planning	342
8		Appendices	344
	8.1	Format of Assessment Tools	345
	8.1.1	Rubrics forForeign Business language – PG	345
	8.1.2	Rubrics for Foreign Business language – UG	348
	8.2	Rubrics forBehavioral Sciences	353
	8.2.1	Rubrics for Behavioral Science UG	252
			353
	8.2.2	Rubrics for Behavioral Science PG	358
	8.3	Rubrics for Assessment of Human Values Amongst Students	364

	8.4	Rubrics for Assessment of Participation in Club and Committee Activities	365
	8.5	Rubrics for Business Communication	367
	8.5.1	Rubrics for Business Communication for PG Programme	367
	8.5.2	Rubrics for Business Communication for UG Programme	371
	8.6	Rubrics for Major Project	375
	8.7	Rubrics for Dissertation	378
	8.8	Guidelines for Comprehensive Examination	382
	8.9	Exit Surveys	394
	8.10	Alumni Survey	430
	8.11	Feedback from Industry Guide (UG & PG)	450
9	Program	mme Review and Outcome Assessment Committee	454

SECTION I

INTRODUCTION TO DOMAIN

The Science and engineering education system in India has witnessed rapid progress in recent years to become one of largest in the world. Considering the wide diversities in the system and the need to enhance its *quality, standard and relevance* so that the *Science, Engineering* & *Technology* graduates passing out from the system can meet the global challenges of 21st century ahead of them.

There are a number of challenges being faced by science and engineering professionals in the on-going 21st century, recognized as the *Knowledge Age*, like:

1) Rapidly changing technological scene worldwide, with a shrinking time scale for new developments and for obsolescence of old practices, leading to:

- □ Increase in investment on R&D in industry and other sectors;
- Demand for innovative products and services, based on contemporary technologies; and,
- Growing need for enhancement of abilities to manage change, so frequent, now a days;
- 2) Globalization and liberalization of Indian industry, leading to:
- □ Comprehensive restructuring of industry sector for enhancing efficiency;
- □ Increase in world-wide mobility of *Science*, *Engineering* & *Technology* professionals; and,
- \Box Growth of competitive environment globally and also in the country;
- 3) Emergence of new career opportunities for Science, Engineering & Technology professionals, leading to:

- Demand for broad-based, flexible education in multi/inter- disciplinary subjects;
- Emphasis on PG courses, research training and institute-industry interaction; and,
- Advances in learner-centric programmes and life-long learning opportunities;
- 4) Penetration of IT in all sectors of the Science, Engineering & Technology profession, leading to:
- □ Increased demand for IT-based solutions to industrial and societal problems;
- □ Expertise in emerging IT developments to solve complex, *Science, Engineering & Technology* problems; and,
- □ Improved access to worldwide information/data bases and *knowledge* centers.
- 5) Increased social/environmental concerns in the Science, Engineering & Technology context, leading to:
- Effective means for protection of endangered environment and depleting energy sources;
- Seeking environment- and energy- friendly solutions to *Science, Engineering & Technology* problems; and.
- □ Wealth generation using environmentally benign and energy efficient techniques;

These challenges require appropriate orientation of *Science, Engineering & Technology* education and research in the country at all levels, particularly at PG. Further the industrial needs are changing while the global environment of Science & Engineering education around the world is witnessing huge changes in education. In the era of globalization, national boundaries are vanishing. The Science & Engineering institutions need to benchmark their curriculum with the best institutions in the world and seek accreditation from National and International accreditations for recognition and mobility of students. Consequently, the All India Council of Technical Education (AICTE), University Grants Commission (UGC), NAAC, NBA and Knowledge Commission have been continuously rethinking on the modifications / improvements in the curriculum

structure of various programmes of higher education at large. UGC has formulated Choice Based Credit System (CBCS) for higher education in 2009, which has been adopted by many of the Universities /institution in the country.

Amity University is continuously striving for excellence in education. It is therefore, important to review and upgrade the curriculum of Bachelors Programmes in Science Engineering & Technology in line with the norms of UGC, National and International Accreditation bodies such as NAAC, ABET, IET, WASC, Global Benchmarking, industry and other stakeholders' feedbacks. After a series of discussions and deliberations with concerned groups, model framework/Programme structure and implementation guidelines for Bachelor's programme in Science, Engineering and Technology domain have been evolved in line with the requirements of UGC / AICTE, National & international Accreditation bodies and industry requirements. *Model Framework /Programme Structure and Scheme of Instructions* would be of help to the institutions offering Bachelor's programme in Science, Engineering & Technology domain *to* finalize the FETailed programme structure, syllabus and CBCS of various programmes of study.

Approach to Curriculum:

As a major objective of Bachelor's programme in Science, Engineering and Technology domain is to lay special emphasis on educating/preparing the students well for being able to demonstrate the following abilities:

- (a) Effective application of *knowledge* of mathematics, science and technical subjects;
- (b) Planning and design to conduct scientific and technical experiments;
- (c) Analysis and interpretation of scientific, technical and economic data collected;
- (d) Design of parts, subsystems, systems and/or processes to meet specific needs;
- (e) Identification, formulation and solving of problems using simulation or otherwise;

- (f) Use of techniques/tools including software in all disciplines, as may be required;
- (g) Effective communication skills and leadership/participation in team work;
- (h) Fulfillment of professional, social and ethical responsibilities;
- (i) Sensitivity to environmental and energy issues and concerns;
- (j) Planning, development and implementation of strategies for life-long learning.

These requirements call for the following objectives to the *Approach to Curriculum* relating to *Bachelor's programme in Science, Engineering and Technology Degree* in the country:

1) *Preparation:* To prepare the students to excel in various educational programmes or to succeed in industry / technical profession through further education/training;

2) *Core Competence:* To provide the students with a solid foundation in mathematical, Science, Engineering & Technology fundamentals required to solve Science, Engineering and Technology related problems;

3) *Breadth:* To train the students with a breadth of Science, Engineering and Technology knowledge to comprehend, analyze, design & create novel products and solutions for real life problems;

4) *Professionalism:* To inculcate in the students professional/ethical attitude, effective team work skills, multidisciplinary approach and to relate Science, Engineering and Technology issues to a broader context;

5) *Learning Environment:* To provide the students with academic environment of excellence, leadership, ethical guidelines and life-long learning needed for a long/productive career.

Amity University is continuously striving for excellence in education. It is therefore, important to review and upgrade the curriculum of Programmes in line with the ever changing requirements of industry /profession based on stakeholders' feedbacks. Amity University Offers Outcome Based Education (OBE) with Flexi Choice Based Credit System (CBCS) by benchmarking its programmes with best universities globally. UGC has formulated Choice Based Credit System (CBCS) for higher education in 2009, which have been further modified in 2014 to be adopted by the Universities /institution in the country.

SECTION II

INTRODUCTION OF OUTCOME ASSESSMENT PLAN

Outcomes Assessment

Outcomes assessment is a systematic, evaluative process that is implemented to secure learning experiences that are congruent with original goals and objectives; thereby providing a basis for the effectiveness and continuous quality improvement of the academic unit.

- The annual outcome assessment process is more qualitative and focuses on improving teaching by analyzing student learning outcomes.
- 2) The programme **review process** is more **quantitative** and focuses on the programme/discipline as a whole, how effective it is, and that our students are learning.
- 3) To achieve the above, some aspect of each programmes goals and objectives needs to be assessed on an annual basis.
- 4) All programme and general education goals shall be evaluated annually

The outcome assessment plan includes:

1. Mission - The Mission is defined for the domain which flows down to the Institution level and finally to the programme level. The mission at the institution and programme level is aligned with the domain mission

- 2. Broad Based Goals: The broad based are defined under the following categories:
- **2.1 Educational Goals:** The Educational Goals are defined at Domain, Institution and Programme level. The Educational Goals at the institution and programme level are aligned with the domain mission.
- **2.2 Operational Goals:** The Operational Goals are defined at Domain, Institution and Programme level. The Operational Goals at the institution and programme level are aligned with the domain mission.
- 3. Outcomes: The Outcomes are defined under the following categories:
- **3.1 Operational Outcomes:** The operational outcomes are defined for the domain and assessed at the domain level
- **3.2 Educational Goals The** Learning outcomes are defined for each programme and each learning outcome is assessed to identify that the established learning objectives are achieved.
- 4. Mapping of PEOs and PLOs The relationship of PEOs and PLOs are clearly indicated through the mapping of learning outcomes with the established Objective. Each outcome addresses some objective and achievement of outcome indicates the attainment of Objective
- 5. Assessment of Learning and Operational Outcomes Each learning outcome is assessed by at least one direct and one indirect method. Similarly Operational outcomes are also assessed using the operational assessment tools. It also ensures that outcomes achieved are consistent with the mission. The results of the annual assessments and other data are used to FETermine the effectiveness of the programme during the programme review process.

6. Programme Review: Through the review of our programmes we seek to demonstrate that:

- Students are **learning** the knowledge, skills, and habits necessary to achieve the programme/discipline goals and objectives
- The **programme/discipline goals** are derived from and support the college mission
- The **curriculum** is coherent, current and consistent
- The **instruction** is effective in enabling student
- The **resources** are adequate for the production of student learning.
- The academic **support services** are adequate to facilitate student learning.

SECTION III

DOMAIN MISSION AND BROAD-BASED GOALS /OBJECTIVES

Faculty of Engineering & Technology (FET)

Section I: Mission and Broad-Based Goals

3.1 Mission Statement

Mission Statement:

"To provide education at all levels in all disciplines of Engineering and Technology and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

3.2. Broad-Based Educational Goals

Broad-Based Student Educational Goals:		
1.	Students shall be able to illustrate knowledge of theory and concepts of Engineering & Technology in a professional work setting	
2.	Students shall be able to interpret, examine, formulate, design and create novel products and solutions for real life problems	
3.	Students shall be able to relate Engineering issues to the broader social, legal, cultural and environmental contexts	
4.	Students shall be able to demonstrate effective performance by leveraging Information and Technological competencies in the professional/entrepreneurial careers	
5.	Students shall be able todemonstrate professional attitudes, effective communication and behavioral skills that support and improve individual's performance	
6.	Students shall be able tocreate technical competence for successful and productive careers or advance studies/research in the field of Engineering & Technology	
7.	Students shall be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams and in managing projects.	
8.	Students will be able to critically examine and utilize learning throughout their career	

3.3 Broad-Based Operational Goals

S.No	Operational Goals
1	FET will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	FET will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	FET will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	FET will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	FET will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	FET will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	FET will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	FET will create opportunities for international exposure for its students and faculty.

Amity School of Engineering & Technology (ASET)

SECTION IV

INSTITUTION MISSION AND BROAD-BASED GOALS /OBJECTIVES

Name of the Institution: AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY

4.1 Mission Statement

Mission of Institution

"To provide education at all levels in various disciplines of Engineering and Technology and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action".

4.2 Broad-Based Goals / Objectives at Institution Level

Broad-Based Student Learning Goals at Institutional Level:	
1.	Students shall be able to illustrate knowledge of theory and concepts of Engineering & Technology in a professional work setting
2.	Students shall be able to interpret, examine, formulate, design and create novel products and solutions for real life problems
3.	Students shall be able to relate Engineering issues to the broader social, legal, cultural and environmental contexts
4.	Students shall be able to demonstrate effective performance by leveraging Information and Technological competencies in the professional/entrepreneurial careers
5.	Students shall be able to demonstrate professional attitudes, effective communication and behavioral skills that support and improve individual's performance
6.	Students shall be able to create technical competence for successful and productive careers or advance studies/research in the field of Engineering & Technology
7.	Students shall be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams and in managing projects.
8.	Students will be able to critically examine and utilize learning throughout their career

4.3 Broad-Based Operational Goals (Resources Required) At Institution level

S.No	Operational Goals
1	ASET will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	ASET will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	ASET will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	ASET will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	ASET will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	ASET will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	ASET will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	ASET will create opportunities for international exposure for its students and faculty.

Section V

Programme Mission, PEO's, PLO's and Assessment Plan for each Programme

5. 1 Bachelor's-Level Programme -

B.Tech.(Computer Science & Engineering), B.Tech (Computer Science & Engineering – 3C) B.Tech (Computer Science & Engineering – Evening)

5.1.1 Mission Statement

Programme Mission

"To provide education in all areas of Computer Science & Engineering and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

5.1.2 Programme Educational Objectives (PEOs)

Programme Educational Objectives

- 1. The students shall have the ability to apply knowledge of science, engineering and technology for research and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.
- 2. The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.
- 3. The students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams.
- 4. Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers.
- 5. The student will have the ability to support and practice independent and life-long learning for professional development.

5.1.3 Programme Operational Objectives

S.No	Operational Goals
1	The Programme will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	The Programme will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	The Programme will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	The Programme will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	The Programme will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	The Programme will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	The Programme will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	The Programme will create opportunities for international exposure for its students and faculty.

5.1.4 Programme Learning Outcomes

Learning Outcomes
The student will apply knowledge of mathematics, sciences and engineering to solve problems using concepts of computer science & engineering.
The student will identify, formulate research literature and analyze computer science & engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
The student will create solutions for computer science & engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, economical, cultural, societal, and environmental considerations.
The student will carry out investigations of problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions
The student will create, select and apply appropriate techniques, resources and modern engineering and IT tools, necessary for computing practice with an understanding of the limitations.
The student will apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and consequent responsibilities relevant to the professional engineering practice.
The student will recognize the impact of the professional engineering solutions in political, economic, global, societal and environmental contexts and demonstrate the knowledge if and need for the sustainable development.
The student will apply ethical principles and practice professional ethics and responsibilities and norms of the engineering practice.
The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a common goal in multidisciplinary settings.
The student will use effective communication to cater to both technical and non-technical audiences.
The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments.
The student will recognise the need for, and will engage in independent and life-long learning in the broadest context of technological change and contemporary issues

5.1.5 Programme Operational Outcomes

Ope	Operational Outcomes		
1	The faculty will use appropriate methodology and pedagogical tools for teaching, learning and development.		
2	The curriculum will be contemporary and relevant to meet industry requirements and benchmarked on global standards by incorporating feedback from all the stakeholders.		
3	The student will graduate in timely manner.		
4	The student and faculty shall have academic facilities, technological resources for teaching and learning.		
5	The student will earn achievements in inter-university Extra Curricular activities.		
6	The faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to the existing Body of Knowledge.		
7	The faculty and students will integrate ethics and values in teaching and Learning, in theory and practice.		
8	The faculty will facilitate cultivation of cross cultural humanitarian values.		
9	The faculty will facilitate joint research collaborations, invite international delegates and speakers for seminars and conferences and various other opportunities for global exposure		
10	The faculty will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious accreditations from various national, international bodies and ranking bodies.		
11	The faculty shall develop and maintain strong relationship with corporate and maintain lifelong alumni network and keep the curriculum responsive to industry needs.		
12	The faculty will support all the students for quality placements or join family business or start their own venture.		
5.1.6 PEO's – PLO mapping

Broad-Based Student Learning PEO PEO PEO PEO Goals (PEOs) PEO 5 2 3 4 1 Programme Learning Outcome (PLOs) BACHELOR'S LEVEL PROGRAMS B.TECH Learning Outcome 1 $\sqrt{}$ Learning Outcome 2 $\sqrt{}$ Learning Outcome 3 $\sqrt{}$ Learning Outcome 4 $\sqrt{}$ Learning Outcome 5 $\sqrt{}$ Learning Outcome 6 $\sqrt{}$ Learning Outcome 7 $\sqrt{}$ Learning Outcome 8 $\sqrt{}$ Learning Outcome 9 $\sqrt{}$ Learning Outcome 10 $\sqrt{}$

Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs). The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summarizes of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note: $\sqrt{$ in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):

Broad-Based Student Learning Goals (PEOs) Programme Learning Outcome (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5
Learning Outcome 11				2	
				•	
Learning Outcome 12					
Learning Outcome 13	\checkmark				
Learning Outcome 14	\checkmark				

5.1.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	The student will apply knowledge of mathematics, sciences and engineering to solve problems	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		using concepts of computer science & engineering	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
2	Investigation	The student will identify, formulate research literature and analyze computer	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		science & engineering problems reaching substantiated	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or

		conclusions						above
		using first						
		principles of						
		mathematics,						
		natural sciences,						
		and engineering						
		sciences						
3	Design/Development	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	of Solutions	create solutions	Examination		the students			of the
		for computer			shall obtain			students shall
		science &			grade 'A'			give a
		engineering			(>=75-100%)			grade'A'
		problems and						(>=75-100%)
		design system	Mala Davis (D. 1.)		A (1) (400/ C	To 1 of a Tata and 's		A (1) (400/
		components or	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		processes that			the students			of the
		meet the			shall obtain a			students shall
		specified needs			grade 'A' or			obtain a
		with appropriate			above			grade 'A' or
		consideration for						above
		the public health						
		and safety,						
		cultural,						
		societal, and						
		environmental						
		considerations						
				1				

4	Problem Analysis	The student will carry out investigations of problems using research-based knowledge and research methods	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	-		of the students shall obtain a grade 'A' or above
5	Modern Tool Usage	The student will create, select and apply appropriate techniques, resources and modern	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		engineering and IT tools, necessary for computing practice with an understanding of the limitations	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above

6	The Engineer &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Society	apply reasoning	Examination		the students			of the
		informed by			shall obtain			students shall
		contextual			grade 'A'			give a
		knowledge to			(>=75-100%)			grade'A'
		assess societal,						(>=75-100%)
		health, safety,						
		legal and	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		cultural issues			the students			of the
		and consequent			shall obtain a			students shall
		responsibilities			grade 'A' or			obtain a
		relevant to the			above			grade 'A' or
		professional			100% of the			above
		engineering			students shall			100% of the
		practice			students shan			students shall
					responsibility			pursue their
					towards			responsibility
					environment			towards
					society ethics			environment
					health safety			society
					legal and			ethics health
					cultural issues			safety legal
								and cultural
								issues
								100000

7	Environment &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Sustainability	recognize the	Examination		the students			of the
		impact of the			shall obtain			students shall
		professional			grade 'A'			give a
		engineering			(>=75-100%)			grade'A'
		solutions in						(>=75-100%)
		societal and						
		environmental	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		contexts and			the students			of the
		demonstrate the			shall obtain a			students shall
		knowledge if and			grade 'A' or			obtain a
		need for the			above			grade 'A' or
		sustainable			1000/ afthe			above
		development			100% of the			1000/264hz
					students shall			100% of the
					pursue their			students shall
					tempolisionity			pursue meir
					towards			towards
					environment,			towards
					society, ethics,			environment,
					legal and			society,
					aultural issues			baalth
					cultural issues			nearth,
								safety, legal
								155005

8	Ethics	The student will apply ethical principles and practice professional ethics and responsibilities	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		and norms of the engineering practice	Comprehensive Exam	UG/PLO/D/CE Framework	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			
			Behavioural Science Rubrics	UG/PLO9/D/BS	Atleast 85% of the students shall qualify the exam	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
9	Individual and Team Work	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to	Foreign Business Language Rubrics	UG/PLO9/D/F BL	Atleast 85% of the students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		undertake a common goal in multidisciplinary				Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall

		settings	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			obtain a grade 'A' or above
			Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above			
10	Communication	The student will use effective communication to cater to both technical and non-technical audiences	Business Communication Rubrics	UG/PLO10/D/ BC	Atleast 85% of the students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above
			Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			

11	Project Management	The student will	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	& Finance	demonstrate			the students			of the
		knowledge and			shall obtain			students shall
		understanding of			grade 'A'			give a
		the engineering			(>=75-100%)			grade'A'
		and management						(>=75-100%)
		principles and						
		apply these to	Major Project Rubrics	UG/PLO/D/P2		Industry Internship	UG/PLO/ID/II	Atleast 40%
		one's own work,			Atleast 40% of			of the
		as a member and			the students			students shall
		leader in a team			shall obtain a			obtain a
		as well as to			grade 'A' or			grade 'A' or
		manage projects			above			above
		in						
		multidisciplinary						
		environments						
12	Lifelong Learning	The student will	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		recognise the			the students			of the
		need for, and			shall obtain			students shall
		will engage in			grade 'A'			give a
		independent and			(>=75-100%)			grade'A'
		life-long learning						(>=75-100%)
		in the broadest	Major Project Pubrice			Industry Internation		Atlaast 4004
		context of	Major Project Rublics	UG/FLU/D/F2	Atleast 40% of	mousu'y memsnip	UG/FLU/ID/II	Alleast 40%
		technological			the students			of the
		change			shall obtain a			students shall
					grade 'A' or			optaill a
					above			grade A or
								above
			Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/II	Atleast 40%

			the students shall obtain a grade 'A' or above			of the students shall obtain a grade 'A' or above
	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above

5.2.1 Mission Statement

Programme Mission

"To provide education in all areas of Computer Science & Engineering and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

5.2.2 Programme Educational Objectives (PEOs)

Programme Educational Objectives

- 1. The students shall have the ability to apply knowledge of science, engineering and technology for research and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.
- 2. The students shall have the ability to apply research knowledge and methods to solve engineering problems
- 3. The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.
- 4. Students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/leader in diverse teams
- 5. The student will have the ability to support and practice independent and life-long learning for professional development.
- 6. Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers

5.2.3 Programme Operational Objectives

S.No	Operational Goals
1	The Programme of B.Tech CSE will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	The Programme will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	The Programme will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	The Programme will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	The Programme will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	The Programme will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	The Programme will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	The Programme will create opportunities for international exposure for its students and faculty.

5.2.4 Programme Learning Outcomes

1.	The student will apply knowledge of mathematics, sciences and engineering to solve problems using concepts of computer science engineering.
2.	The student will identify, formulate research literature and analyze computer science & engineering problems reaching substantiat conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3.	The student will create solutions for computer science & engineering problems and design system components or processes that me the specified needs with appropriate consideration for the public health and safety, economical, cultural, societal, and environment considerations.
4.	The student will carry out investigations of problems using research-based knowledge and research methods including design experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions
5.	The student will create, select and apply appropriate techniques, resources and modern engineering and IT tools, necessary a computing practice with an understanding of the limitations.
6.	The student will apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues a consequent responsibilities relevant to the professional engineering practice.
7.	The student will recognize the impact of the professional engineering solutions in political, economic, global, societal a environmental contexts and demonstrate the knowledge if and need for the sustainable development.
8.	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the engineering practice.
9.	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a comm goal in multidisciplinary settings.
10	. The student will use effective communication to cater to both technical and non-technical audiences.
11	. The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to on own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments.
12	. The student will recognise the need for, and will engage in independent and life-long learning in the broadest context technological change and contemporary issues

5.2.5 Programme Operational Outcomes

Ope	erational Outcomes
1	The faculty will use appropriate methodology and pedagogical tools for teaching, learning and development.
2	The curriculum will be contemporary and relevant to meet industry requirements and benchmarked on global standards by incorporating feedback from all the stakeholders.
3	The student will graduate in timely manner.
4	The student and faculty shall have academic facilities, technological resources for teaching and learning.
5	The student will earn achievements in inter-university Extra Curricular activities.
6	The faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to the existing Body of Knowledge.
7	The faculty and students will integrate ethics and values in teaching and Learning, in theory and practice.
8	The faculty will facilitate cultivation of cross cultural humanitarian values.
9	The faculty will facilitate joint research collaborations, invite international delegates and speakers for seminars and conferences and various other opportunities for global exposure
10	The faculty will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious accreditations from various national, international bodies and ranking bodies.
11	The faculty shall develop and maintain strong relationship with corporate and maintain lifelong alumni network and keep the curriculum responsive to industry needs.
12	The faculty will support all the students for quality placements or join family business or start their own venture.

5.2.6 PEO's – PLO mapping

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
MASTER'S LEVEL PROGRAM	1S					
Name of the programme						
Learning Outcome 1		\checkmark				
Learning Outcome 2		\checkmark				
Learning Outcome 3		\checkmark				
Learning Outcome 4		\checkmark				
Learning Outcome 5		\checkmark				
Learning Outcome 6						
Learning Outcome 7			\checkmark			

Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs). The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summarizes of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note: $\sqrt{$ in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
Learning Outcome 8						
Learning Outcome 9						
Learning Outcome 10						
Learning Outcome 11						
Learning Outcome 12						

5.2.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	The student will apply knowledge of mathematics, sciences and engineering to solve problems	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		using concepts of computer science & engineering	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked "Satisfactory"	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
2	Investigation	The student will identify, formulate research literature and analyze computer	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		science & engineering problems reaching substantiated	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked "Satisfactory"	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or

		conclusions						above
		using first						
		principles of						
		mathematics,						
		natural sciences,						
		and engineering						
		sciences						
3	Design/Development	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	of Solutions	create solutions	Examination		the students			of the
		for computer			shall obtain			students shall
		science &			grade 'A'			give a
		engineering			(>=75-100%)			grade'A'
		problems and						(>=75-100%)
		design system	D'accetation D I aire		A (1)	C		A (1) (400/
		components or	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Summer Internship	UG/PLO/ID/ II	Atleast 40%
		processes that			the students			of the
		meet the			shall be			students shall
		specified needs			marked			obtain a
		with appropriate			"Satisfactory"			grade 'A' or
		consideration for						above
		the public health						
		and safety,						
		cultural,						
		societal, and						
		environmental						
		considerations						

4	Problem Analysis	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		carry out	Examination		the students			of the
		investigations of			shall obtain			students shall
		problems using			grade 'A'			give a
		research-based			(>=75-100%)			grade'A'
		knowledge and						(>=75-100%)
		research						
		methods				Industry Internship	UG/PLO/ID/ II	Atleast 40%
		including design			A (1) 000() C	-		of the
		of experiments,	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of			students shall
		analysis and			the students			obtain a
		interpretation of			snall be			grade 'A' or
		data and			marked			above
		synthesis of			Satisfactory			
		information to						
		provide valid						
		conclusions						
5	Modern Tool Usage	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		create, select	Examination		the students			of the
		and apply			shall obtain			students shall
		appropriate			grade 'A'			give a
		techniques,			(>=/5-100%)			grade A
		resources and						(>=/5-100%)
		modern	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Industry Internshin	LIG/PLO/ID/ II	Atleast 40%
		Engineering and	Dissertation Rabites		the students	medistry merniship		of the
		11 tools,			shall be			students shall
		accessary for			marked			obtain a
		prostice with an			"Satisfactory"			grade 'A' or
		understanding of			Zationactory			above
		the limitations						
		the minitations						

6	The Engineer &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Society	apply reasoning	Examination		the students			of the
		informed by			shall obtain			students shall
		contextual			grade 'A'			give a
		knowledge to			(>=75-100%)			grade'A'
		assess societal,						(>=75-100%)
		health, safety,						
		legal and	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		cultural issues			the students			of the
		and consequent			shall be			students shall
		responsibilities			marked			obtain a
		relevant to the			'satisfactory'			grade 'A' or
		professional			1000/ of the			above
		engineering			100% of the			1000/ of the
		practice			students shan			100% of the
					pursue their			students shan
					tesponsionity			pursue their
					towards			temponsionity
					environment,			lowards
					society, ethics,			
					logal and			society,
					cultural issues			safaty logal
					Cultural issues			and cultural
								issues
								155005

7	Environment &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Sustainability	recognize the	Examination		the students			of the
		impact of the			shall obtain			students shall
		professional			grade 'A'			give a
		engineering			(>=75-100%)			grade'A'
		solutions in						(>=75-100%)
		societal and						
		environmental	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		contexts and			the students			of the
		demonstrate the			shall be			students shall
		knowledge if			marked			obtain a
		and need for the			'Satisfactory'			grade 'A' or
		sustainable			1000/ of the			above
		development			100% of the			1000/254hz
					students shall			100% of the
					pursue their			students shall
					responsibility			pursue their
					towards			responsibility
					environment,			towards
					society, ethics,			environment,
					health, safety,			society,
					legal and			etnics, nealth,
					cultural issues			safety, legal
								and cultural
								issues

8	Ethics	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked 'Satisfactory'	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		engineering practice	Comprehensive Exam	UG/PLO/D/CE Framework	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)			
			Behavioural Science Rubrics	UG/PLO9/D/BS	Atleast 85% of the students shall qualify the exams	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
9	Individual and Team Work	The student will demonstrate effectiveness as	Foreign Business Language Rubrics	UG/PLO9/D/F BL	Atleast 85% of the students shall pass the	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall
		an individual and as a member or leader of team assembled to			exam			give a grade'A' (>=75-100%)
		undertake a common goal in multidisciplinary				Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall

		settings	Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)			obtain a grade 'A' or above
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked "Satisfactory"			
10	Communication	The student will use effective communication to cater to both technical and non-technical audiences	Business Communication Rubrics	UG/PLO10/D/ BC	Atleast 85% of the students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked "Satisfactory"	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above
			Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)			

11	Project Management	The student will	Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	& Finance	demonstrate			the students			of the
		knowledge and			shall obtain			students shall
		understanding of			grade 'A'			give a
		the engineering			(>=75-100%)			grade'A'
		and management						(>=75-100%)
		principles and						
		apply these to	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Industry Internship	UG/PLO/ID/II	Atleast 40%
		one's own work,			the students			of the
		as a member and			shall be			students shall
		leader in a team			marked			obtain a
		as well as to			"Satisfactory"			grade 'A' or
		manage projects						above
		in						
		multidisciplinary						
		environments						
10	X · 0 · 1 · 1							
12	Lifelong Learning	The student will	Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		recognise the			the students			of the
		need for, and			shall obtain			students shall
		will engage in			grade 'A'			give a
		independent and			(>=/5-100%)			grade'A
		life-long						(>=/5-100%)
		learning in the	Dissertation Rubrics	LIG/PLO/D/DN	Atleast 80% of	Industry Internship	LIG/PLO/ID/II	Atleast 40%
		broadest context	Distriction Rubites	00/120/0/01	the students	industry internship	00/120/12/11	of the
		of technological			shall be			students shall
		cnange			marked			obtain a
					"Satisfactory"			grade 'A' or
					Sutistactory			above

B.Tech.(Information Technology)

5.3.1 Mission Statement

Programme Mission

"To provide education in all areas of Information Technology and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

5.3.2 Programme Educational Objectives (PEOs)

Programme	e Educational Objectives
1.	The students shall have the ability to apply knowledge of science, engineering and technology for research and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.
2.	The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.
3.	The students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams.
4.	Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers.
5.	The student will have the ability to support and practice independent and life-long learning for professional development.

5.3.3 Programme Operational Objectives

Operational Goals
1. The Programme intends to facilitate academically conducive environment and infrastructure to achieve excellence in teaching, learning and research.
2. The Programme will provide ample opportunities to its students to participate in curricular, co-curricular and extra-curricular activities for their holistic development.
3. The Programme will facilitate environment for innovation and research excellence for the intellectual growth of students and faculties.
4. The Programme will inculcate core values and ethical conduct amongst students, faculty and staff.
5. The Programme will encourage cultural diversity and a sense of social and environmental responsibility.
6. The Programme will provide ample opportunities for international exposure to faculty and students.
7. The Programme will be involved in continual improvement of processes and systems with aim to attain national/ international accreditations and university rankings.
8. The Programme will build a strong industry interaction by way of alumni networks and empanelment of expertise from industry.
9. The Programme will facilitate employment opportunities and also support students to start their own ventures.
10. The Programme will facilitate good governance in discharge of responsibilities and execution of policies and programs.

5.3.4 Programme Learning Outcomes

Program	nme Learning Outcomes
1.	The student will apply knowledge of mathematics, sciences and engineering to solve problems using concepts of Computer Science & Information Technology
2.	The student will identify, formulate research literature and analyse Computer Science & Information Technology problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3.	The student will create solutions for computing problems and design and administer system components or processes that meet the specified needs with appropriate consideration for the public health and safety, economical, cultural, societal, and environmental considerations.
4.	The student will carry out investigations of problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions
5.	The student will create, select and apply appropriate techniques, resources and modern engineering and IT tools, necessary for computing practice with an understanding of the limitations.
6.	The student will apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and consequent responsibilities relevant to the professional engineering practice.
7.	The student will recognize the impact of the professional engineering solutions in political, global, economic, societal and environmental contexts to demonstrate the knowledge and the need for the sustainable development.
8.	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the engineering practice.
9.	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a common goal in multidisciplinary settings.
10.	The student will use effective communication to cater to both technical and non-technical audiences.
11.	The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects effectively in multidisciplinary environments.
12.	The student will recognise the need to engage in independent and life-long learning in the broadest context of technological change and contemporary issues.

5.3.5 Programme Operational Outcomes

Operational C	Dutcomes
1.	The Programme will facilitate academically conducive environment and infrastructure to achieve excellence in teaching, learning
	and research.
2.	The Programme will provide ample opportunities to its students to participate in curricular, co-curricular and extracurricular
	activities for their holistic development.
3.	The Programme will facilitate environment for innovation and research excellence for the intellectual growth of students and
	faculty.
4.	The Programme will inculcate core values and ethical conduct amongst students, faculty and staff.
5.	The Programme will encourage cultural diversity and a sense of social and environmental responsibility.
6.	The Programme will provide ample opportunities for international exposure to faculty and students.
7.	The Programme will be involved in continual improvement of processes and systems with aim to attain national and international
	accreditations and university rankings.
8.	The Programme will build a strong industry interaction by way of alumni networks and empanelment of expertise from industry.
9.	The Programme will facilitate employment opportunities and also support students to start their own ventures.
10	. The Programme will facilitate good governance in discharge of responsibilities and execution of policies and programs.

5.3.6 PEO's – PLO mapping

Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs)

The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summaries of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note: $\sqrt{}$ in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):

Broad-Based Student Learning Goals (PEOs) Intended Programme Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5
BACHELOR'S LEVEL PROGRAM					
Name of the programme: B.Tech (Info	rmation I	Technolog	gy)		
Learning Outcome 1					
Learning Outcome 2					
Learning Outcome 3					
Learning Outcome 4					
Learning Outcome 5					

Broad-Based Student Learning Goals (PEOs) Intended Programme Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5
Learning Outcome 6					
Learning Outcome 7		\checkmark			
Learning Outcome 8			\checkmark		
Learning Outcome 9				V	
Learning Outcome 10				V	
Learning Outcome 11					
Learning Outcome 12					
Learning Outcome 13					
Learning Outcome 14					

5.3.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	The student will apply knowledge of mathematics, sciences and engineering to solve problems	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		using concepts of Computer Science & Information Technology	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
2	Investigation	The student will identify, formulate research literature and analyse Computer	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		Science & Information Technology problems reaching	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or

		substantiated						above
		conclusions						
		using first						
		principles of						
		mathematics,						
		natural sciences,						
		and engineering						
		sciences						
3	Design/Development	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	of Solutions	create solutions	Examination		the students			of the
		for computing			shall obtain			students shall
		problems and			grade 'A'			give a
		design and			(>=75-100%)			grade'A'
		administer						(>=75-100%)
		system				x 1 . x . 11		4.1
		components or	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		processes that			the students			of the
		meet the			shall obtain a			students shall
		specified needs			grade 'A' or			obtain a
		with appropriate			above			grade 'A' or
		consideration for						above
		the public health						
		and safety,						
		economical,						
		cultural,						
		societal, and						
		environmental						
		considerations						
		1						

4	Problem Analysis	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		carry out	Examination		the students			of the
		investigations of			shall obtain			students shall
		problems using			grade 'A'			give a
		research-based			(>=75-100%)			grade'A'
		knowledge and						(>=75-100%)
		research						
		methods				Industry Internship	UG/PLO/ID/ II	Atleast 40%
		including design						of the
		of experiments,	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of			students shall
		analysis and			the students			obtain a
		interpretation of			shall obtain a			grade 'A' or
		data and			grade 'A' or			above
		synthesis of			above			
		information to						
		provide valid						
		conclusions						
5	Modern Tool Usage	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		create, select	Examination		the students			of the
		and apply			shall obtain			students shall
		appropriate			grade 'A'			give a
		techniques,			(>=/5-100%)			grade'A'
		resources and						(>=/5-100%)
		modern	Major Project Rubrics	LIG/PLO/D/P2	Atleast 40% of	Industry Internship	LIG/PLO/ID/ II	Atleast 40%
		engineering and	Major Project Rubries	00/120/0/12	the students	industry internship		of the
		11 tools,			shall obtain a			students shall
		necessary for			grade 'A' or			obtain a
		computing			above			grade 'A' or
		practice with an			40070			above
		the limitations						40010
		the miniations.						

6	The Engineer &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Society	apply reasoning	Examination		the students			of the
		informed by			shall obtain			students shall
		contextual			grade 'A'			give a
		knowledge to			(>=75-100%)			grade'A'
		assess societal,						(>=75-100%)
		health, safety,						
		legal and	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		cultural issues			the students			of the
		and consequent			shall obtain a			students shall
		responsibilities			grade 'A' or			obtain a
		relevant to the			above			grade 'A' or
		professional			1000/2564bz			above
		engineering			100% of the			1000/
		practice.			students shall			100% of the
					pursue their			students shall
					responsibility			pursue their
					towards			responsibility
					environment,			towards
					society, etnics,			environment,
					health, safety,			society,
					legal and			ethics, health,
					cultural issues			safety, legal
								and cultural
								issues
I						1		1

7	Environment &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Sustainability	recognize the	Examination		the students			of the
		impact of the			shall obtain			students shall
		professional			grade 'A'			give a
		engineering			(>=75-100%)			grade'A'
		solutions in						(>=75-100%)
		political, global,						
		economic,	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		societal and			the students			of the
		environmental			shall obtain a			students shall
		contexts to			grade 'A' or			obtain a
		demonstrate the			above			grade 'A' or
		knowledge and			100% of the			above
		the need for the			students shell			100% of the
		sustainable			students shan			100% of the
		development.			responsibility			students shan
					towards			responsibility
					onvironment			towards
					environment,			anvironmont
					boolth sofoty			society
					logal and			society,
					cultural issues			safaty logal
					cultural issues			and cultural
								ing cultural
								155005
8	Ethics	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
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		engineering practice.	Comprehensive Exam	UG/PLO/D/CE Framework	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			
			Behavioural Science Rubrics	UG/PLO9/D/BS	Atleast 85% students shall qualify the exam	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
9	Individual and Team	The student will	Foreign Business	UG/PLO9/D/F	Atleast 85%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Work	demonstrate	Language Rubrics	BL	students shall			of the
		effectiveness as			qualify the			students shall
		an individual			exam			give a grade' A'
		or leader of team						(>=75-100%)
		assembled to						
		undertake a				Industry Internship	UG/PLO/ID/ II	Atleast 40%
		common goal in						of the students shall
i		munualscipinary						

		settings	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			obtain a grade 'A' or above
			Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above			
10	Communication	The student will use effective communication to cater to both technical and non-technical audiences.	Business Communication Rubrics	UG/PLO10/D/ BC	Atleast 85% students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above
			Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			

11	Project Management	The student will	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	& Finance	demonstrate			the students			of the
		knowledge and			shall obtain			students shall
		understanding of			grade 'A'			give a
		the engineering			(>=75-100%)			grade'A'
		and management						(>=75-100%)
		principles and						
		apply these to	Major Project Rubrics	UG/PLO/D/P2		Industry Internship	UG/PLO/ID/II	Atleast 40%
		one's own work,			Atleast 40% of			of the
		as a member and			the students			students shall
		leader in a team			shall obtain a			obtain a
		as well as to			grade 'A' or			grade 'A' or
		manage projects			above			above
		effectively in						
		multidisciplinary						
		environments.						
12	Lifelong Learning	The student will	Comprehensive Exem		Atlaast 200% of	Student Exit Survey		Atlaast 850/
12		recognise the	Comprehensive Exam	UU/FLU/D/CE	the students	Student Exit Survey	00/110/10/15	of the
		need to engage			shall obtain			students shall
		in independent			grade 'A'			give a
		and life-long			(>-75-100%)			give a
		learning in the			(>=75-10070)			(>-75-100%)
		broadest context						(>=75 10070)
		of technological	Major Project Rubrics	UG/PLO/D/P2		Industry Internship	UG/PLO/ID/II	Atleast 40%
		change and			Atlanst 10% of			of the
		contemporary			the students			students shall
		issues.			shall obtain a			obtain a
					grade 'A' or			grade 'A' or
					above			above

	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
			the students			of the
			shall obtain a			students shall
			grade 'A' or			obtain a
			above			grade 'A' or
						above

5. 4 Master's-Level Programme - M.Tech.(Computer Network & Information Security)

5.4.1 Mission Statement

Programme Mission

"To provide education in all areas of Computer Network & Information Security and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action" 5.4.2 Programme Educational Objectives (PEOs)

Programme Educational Objectives

1. The students shall have the ability to apply knowledge of science, engineering and technology for research and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.

2. The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.

3. Students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams

4. The student will have the ability to support and practice independent and life-long learning for professional development.

5. Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers

5.4.3 Programme Operational Objectives

Operational Goals same
1. The Programme intends to facilitate academically conducive environment and infrastructure to achieve excellence in teaching, learning and research.
2. The Programme will provide ample opportunities to its students to participate in curricular, co-curricular and extra-curricular activities for their holistic development.
3. The Programme will facilitate environment for innovation and research excellence for the intellectual growth of students and faculties.
4. The Programme will inculcate core values and ethical conduct amongst students, faculty and staff.
5. The Programme will encourage cultural diversity and a sense of social and environmental responsibility.
6. The Programme will provide ample opportunities for international exposure to faculty and students.
7. The Programme will be involved in continual improvement of processes and systems with aim to attain national/ international accreditations and university rankings.
8. The Programme will build a strong industry interaction by way of alumni networks and empanelment of expertise from industry.
9. The Programme will facilitate employment opportunities and also support students to start their own ventures.
10. The Programme will facilitate good governance in discharge of responsibilities and execution of policies and programs.

5.4.4 Programme Learning Outcomes

Intended Learning Outcomes

- 1. Student will effectively apply knowledge of mathematics, applied sciences and engineering to solve complex problems.
- 2. Student will identify, analyze research literature and formulate **Computer Network & Information Security** problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Student will create solutions for complex **Computer Network & Information Security** problems and design system components or processes that meet the specifications with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Student will carry out investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Student will create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to different computer science & engineering activities with an understanding of the limitations
- 6. Student will apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Student will recognize the impact of the professional **Computer Network & Information Security** solutions in societal and environmental contexts and demonstrate the knowledge of and need for the sustainable development.
- 8. Student will apply ethical principles and demonstrate professional ethics, responsibilities and norms of the engineering practice.
- 9. Student will demonstrate effectiveness as an individual and as a member or leader in teams and in multidisciplinary settings.
- 10. Student will use effective communication to cater to both technical and non-technical audiences.
- 11. Student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments.
- 12. Student will recognise the need for and will engage in independent and life-long learning in the broadest context of technological change.

5.4.5 **Programme Operational Outcomes**

Operational Outcomes
1. The Programme will facilitate academically conducive environment and infrastructure to achieve excellence in teaching,
learning and research.
2. The Programme will provide ample opportunities to its students to participate in curricular, co-curricular and
extracurricular activities for their holistic development.
3. The Programme will facilitate environment for innovation and research excellence for the intellectual growth of students
and faculty.
4. The Programme will inculcate core values and ethical conduct amongst students, faculty and staff.
5. The Programme will encourage cultural diversity and a sense of social and environmental responsibility.
6. The Programme will provide ample opportunities for international exposure to faculty and students.
7. The Programme will be involved in continual improvement of processes and systems with aim to attain national and
international accreditations and university rankings.
8. The Programme will build a strong industry interaction by way of alumni networks and empanelment of expertise from
industry.
9. The Programme will facilitate employment opportunities and also support students to start their own ventures.
10. The Programme will facilitate good governance in discharge of responsibilities and execution of policies and programs.

5.4.6 PEO's – PLO mapping

Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs)

The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summaries of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note: $\sqrt{}$ in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):

Broad-Based Student Learning Goals (PEQs) Intended Programme Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
MASTER'S LEVEL PROGRAMS						
Name of the programme						

Broad-Based Student Learning Goals (PEQs) Intended Programme Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
Learning Outcome 1	\checkmark	\checkmark				
Learning Outcome 2	\checkmark					
Learning Outcome 3						
Learning Outcome 4						
Learning Outcome 5						
Learning Outcome 6						
Learning Outcome 7						
Learning Outcome 8				\checkmark		
Learning Outcome 9					V	
Learning Outcome 10						

Broad-Based Student Learning Goals (PEQs) Intended Programme Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
Learning Outcome 11						
Learning Outcome 12						

5.4.7 Student Learning Assessment for <u>M.Tech.(Computer Network & Information Security)</u>

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	Student will effectively apply knowledge of mathematics, applied sciences and engineering to solve complex problems.	Comprehensive Examination Dissertation Rubrics	UG/PLO/D/CE UG/PLO/D/DN	Atleast 40% of the students shall obtain grade 'A' (>=75-100%) Atleast 80% of the students shall be marked satisfactory	Student Exit Survey Summer Internship	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
2	Investigation	The student will identify, analyze research literature and formulate Computer Network & Information Security problems reaching	Comprehensive Examination Dissertation Rubrics	UG/PLO/D/CE UG/PLO/D/DN	Atleast 40% of the students shall obtain grade 'A' (>=75-100%) Atleast 80% of the students shall be	Student Exit Survey	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or

		substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.			marked satisfactory			above
3	Design/Development of Solutions	The student will create solutions for complex Computer Network & Information Security problems and design	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		system components or processes that meet the specifications with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked satisfactory	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
4	Problem Analysis	The student will carry out investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey Industry Internship	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40%

		data, and synthesis of the information to provide valid conclusions.	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked satisfactory			of the students shall obtain a grade 'A' or above
5	Modern Tool Usage	The student will create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to different computer science & engineering activities with an understanding of the limitations	Comprehensive Examination Dissertation Rubrics	UG/PLO/D/CE UG/PLO/D/DN	Atleast 40% of the students shall obtain grade 'A' (>=75-100%) Atleast 80% of the students shall be marked satisfactory	Student Exit Survey Industry Internship	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
6	The Engineer & Society	The student will apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the	Comprehensive Examination Dissertation Rubrics	UG/PLO/D/CE UG/PLO/D/DN	Atleast 40% of the students shall obtain grade 'A' (>=75-100%) Atleast 80% of the students shall be marked	Student Exit Survey Industry Internship	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or

-			1					
		professional			satisfactory or			above
		engineering practice.			above			100% of the
					100% of the			students shall
					students shall			pursue their
					pursue their			responsibility
					rosponsibility			towards
					towards			onvironment
					environment			society
					chvironnent,			othics health
					society,			safety legal
					safety legal			and cultural
					and cultural			issues
					issues			155005
					155005			
7	Environment &	Student will	Comprehensive	UG/PLO/D/CE	Atleast 40%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Sustainability	recognize the impact	Examination		of the students			of the students
		Computer Network &			shall obtain			shall give a
		Information Security			grade 'A'			grade'A'
		solutions in societal			(>=75-100%)			(>=75-100%)
		and environmental						
		demonstrate the	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80%	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		knowledge of and			of the students			of the students
		need for the			shall be			shall obtain a
		development			marked			grade A or
		developmenti			satisfactory or			above
					above			100% of the
					100% of the			students shall
					students shall			pursue their
					pursue their			responsibility
					rosponsibility			towards
1								lowalus
					towards			environment,

					society, ethics, health, safety, legal and cultural issues			ethics, health, safety, legal and cultural issues
8	Ethics	The student will apply ethical principles and demonstrate professional ethics, responsibilities and norms of the engineering practice.	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked satisfactory or above	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Comprehensive Exam	UG/PLO/D/CE Framework	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)			
			Behavioural Science Rubrics	UG/PLO9/D/BS	Atleast 85% students shall qualify the exam	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
9	Individual and Team Work	The student will demonstrate effectiveness as an individual and as a member or leader in	Foreign Business Language Rubrics	UG/PLO9/D/F BL	Atleast 85% students shall qualify the	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A'

		teams and in multidisciplinary			exam			(>=75-100%)
		settings.						
						Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a
			Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)			grade 'A' or above
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked satisfactory			
10	Communication	The student will use effective communication to cater to both technical and non-technical	Business Communication Rubrics	UG/PLO10/D/ BC	Atleast 85% students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		audiences.	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or

					marked satisfactory			above
			Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)			
11	Project Management & Finance	The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments.	Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
12	Lifelong Learning	The student will recognise the need for and will engage in independent and life-long learning	Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)

	in the broadest	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80%	Industry Internship	UG/PLO/ID/II	Atleast 40%
	context of			of the			of the students
	technological			students			shall obtain a
	change.			shall be			grade 'A' or
				marked			above
				satisfactory			
				success			

5. 5 Bachelor's-Level Programme - B.Tech.(Civil Engineering), B.Tech Civil Engineering - 3 Continent

5.5.1 Mission Statement

Programme Mission

"To provide education in all areas of Civil Engineering and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

5.5.2 Programme Educational Objectives (PEOs)

Programme	Educational Objectives
1.	The students shall have the ability to apply knowledge of science, engineering and technology for research and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.
2.	The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.
3.	The students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/leader in diverse teams.
4. 5.	Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers. The student will have the ability to support and practice independent and life-long learning for professional development.

5.5.3 Programme Operational Objectives

Operational Goals same
1. The Programme intends to facilitate academically conducive environment and infrastructure to achieve excellence in teaching, learning and research.
2. The Programme will provide ample opportunities to its students to participate in curricular, co-curricular and extra-curricular activities for their holistic development.
3. The Programme will facilitate environment for innovation and research excellence for the intellectual growth of students and faculties.
4. The Programme will inculcate core values and ethical conduct amongst students, faculty and staff.
5. The Programme will encourage cultural diversity and a sense of social and environmental responsibility.
6. The Programme will provide ample opportunities for international exposure to faculty and students.
7. The Programme will be involved in continual improvement of processes and systems with aim to attain national/ international accreditations and university rankings.
8. The Programme will build a strong industry interaction by way of alumni networks and empanelment of expertise from industry.
9. The Programme will facilitate employment opportunities and also support students to start their own ventures.
10. The Programme will facilitate good governance in discharge of responsibilities and execution of policies and programs.

5.5.4 Programme Learning Outcomes

Intended Learning Outcomes
1. The student will apply knowledge of mathematics, sciences and engineering to solve problems using concepts of Civil Engineering
 The student will identify, formulate research literature and analyse Civil Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. The student will create solutions for engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, economical, cultural, societal, and environmental considerations.
4. The student will carry out investigations of problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions
5. The student will create, select and apply appropriate techniques, resources and modern engineering and Civil Engineering tools, necessary for computing practice with an understanding of the limitations.
6. The student will apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and consequent responsibilities relevant to the professional engineering practice.
7. The student will recognize the impact of the professional engineering solutions in political, global, economic, societal and environmental contexts and demonstrate the knowledge if and need for the sustainable development.
8. The student will apply ethical principles and practice professional ethics and responsibilities and norms of the engineering practice.
9. The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a common goal in multidisciplinary settings.
10. The student will use effective communication to cater to both technical and non-technical audiences.
11. The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments.
12. The student will recognise the need for, and will engage in independent and life-long learning in the broadest contex of technological change and contemporary issues

5.5.5 **Programme Operational Outcomes**

Operational Out	comes
1. Т	The Programme will facilitate academically conducive environment and infrastructure to achieve excellence in teaching,
10	earning and research.
2. T	The Programme will provide ample opportunities to its students to participate in curricular, co-curricular and extracurricular
a	activities for their holistic development.
3. Т	The Programme will facilitate environment for innovation and research excellence for the intellectual growth of students and
fa	aculty.
4. T	The Programme will inculcate core values and ethical conduct amongst students, faculty and staff.
5. T	The Programme will encourage cultural diversity and a sense of social and environmental responsibility.
6. T	The Programme will provide ample opportunities for international exposure to faculty and students.
7. Т	The Programme will be involved in continual improvement of processes and systems with aim to attain national and
iı	nternational accreditations and university rankings.
8. T	The Programme will build a strong industry interaction by way of alumni networks and empanelment of expertise from
iı	ndustry.
9. 1	The Programme will facilitate employment opportunities and also support students to start their own ventures.
10. T	The Programme will facilitate good governance in discharge of responsibilities and execution of policies and programs.

5.5.6 PEO's – PLO mapping

Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs)

The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summaries of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note: $\sqrt{}$ in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):

Broad-Based Program Learning Goals (PEQs) Intended Program Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5
BACHELOR'S LEVEL PROGR	AMS				
Name of the programme: B.Tech					
Learning Outcome 1	V				
Learning Outcome 2	V				
Learning Outcome 3					

Broad-Based Program Learning Goals (PEQs) Intended Program Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5
Learning Outcome 4	\checkmark				
Learning Outcome 5	\checkmark				
Learning Outcome 6		\checkmark			
Learning Outcome 7		\checkmark			
Learning Outcome 8					
Learning Outcome 9					
Learning Outcome 10					
Learning Outcome 11					
Learning Outcome 12					

5.5.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Ensinessine	DI O1	Community Examination		A the set 200/	Student Enit Summer		A +1 = = = + 950/
1	Engineering	PLOI	Comprehensive Examination	UG/PLO/D/CE	Atleast 20%	Student Exit Survey	UG/PLU/ID/ ES	Atleast 85%
	Knowledge				of the			of the
					students shall			students shall
					obtain grade			give a grade
					$A^{*} (\geq /5 - 1000 ())$			$A^{*} (\geq /5 - 1000)$
					100%)			100%)
			Major Project rubrics	UG/PLO/D/P2	Atleast 40%	Industry Internship	UG/PLO/ID/ II	40% of the
					of the			students shall
					students shall			obtain a
					obtain a			grade 'A' or
					grade 'A' or			above.
					above			
								•
	- · ·							
2	Investigation	PLO2	Comprehensive Examination	UG/PLO/D/CE	Atleast 20%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
					of the			of the
					students shall			students shall
					obtain grade			give a grade
					'A' (>= 75-			'A' (>= 75-
					100%)			100%)
1								

			Major Project rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or	Industry Internship	UG/PLO/ID/ II	40% of the students shall obtain a grade 'A' or above.
					above			
3	Design/Development of Solutions	PLO3	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>= 75- 100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade 'A' (>= 75- 100%)
			Major Project rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	40% of the students shall obtain a grade 'A' or above.

4	Problem Analysis	PLO4	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>= 75- 100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade 'A' (>= 75- 100%)
			Major Project rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	40% of the students shall obtain a grade 'A' or above.
5	Modern Tool Usage	PLO5	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>= 75- 100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade 'A' (>= 75- 100%)

			Major Project rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	40% of the students shall obtain a grade 'A' or above.
6	The Engineer & Society	PLO6	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>= 75- 100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade 'A' (>= 75- 100%)
			Major Project rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	40% of the students shall obtain a grade 'A' or above.
7	Environment & Sustainbility	PLO7	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>= 75- 100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade 'A' (>= 75- 100%)
			Major Project rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or	Industry Internship	UG/PLO/ID/ II	40% of the students shall obtain a grade 'A' or

					above			above.
0	D 41	DL OO			1000/			<u> </u>
8	Ethics	PLO8	Plagiarism		100%	Feedback of	UG/PLO/ID/ II	60% students
			Checking of NTCC Report		Students are	Industry Internship		are rated
					checked for	Guide		between 4-5
					plagiarism in			range on the
					NTCC report			Likert Scale
					submissions			in the
					and are			feedback by
					allowed to			Industry
					appear for			guides.
					vivavoce			
					upon			
					obtaining			
					plagiarism %			
					below 15%.			
					A (1) (200)			A (1) 0 50/
			Comprehensive Examination	UG/PLO/D/CE	Atleast 20%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
					of the			of the
					students shall			students shall
					obtain grade			give a grade
					·A' (>= //5-			·A' (>= //5-
					100%)			100%)

9	Individual and Team	PLO9	Behavioural Science Rubrics	UG/PLO9/D/BS	Atleast 80%	Student Exit Survey	UG/PLO/ID/ ES	70% students
	Work				of the	-		response
					students shall			range
					pass the			between 4-5
					exam			on the Likert
								Scale in the
								Student Exit
								Survey.
						Alumni Survey	UG/PLO/ID/ AS	70% students
								response
								range
								between 4-5
								on the Likert
								Scale in the
								Alumni
								Survey.
				1	1	1	1	

			Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>= 75- 100%)	Student Exit Survey Industry Internship	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade 'A' (>= 75- 100%)
			Major Project rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above			40% of the students shall obtain a grade 'A' or above.
10	Communication	PLO10	Business Communication Rubrics	UG/PLO10/D/ BC	Atleast 80% of the students shall pass the exam	Student Exit Survey	UG/PLO/ID/ ES	70% students response range between 4-5 on the Likert Scale in the Student Exit Survey.
						Alumni Survey	UG/PLO/ID/ AS	70% students response range between 4-5 on the Likert Scale in the Alumni Survey.

			Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>= 75- 100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade 'A' (>= 75- 100%)
			Major Project rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	40% of the students shall obtain a grade 'A' or above.
11	Project Management & Finance	nagement PLO11 ance	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>= 75- 100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade 'A' (>= 75- 100%)
			Major Project rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	40% of the students shall obtain a grade 'A' or above.

12	Lifelong Learning	PLO12	Comprehensive Examination	UG/PLO/D/CE	Atleast 20%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
					of the			of the
					students shall			students shall
					obtain grade			give a grade
					'A' (>= 75-			'A' (>= 75-
					100%)			100%)

5.6. BACHELOR'S-Level Programme -

B.Tech Electronics & Communication Engineering B.Tech Electronics & Communication Engineering (3C) B.Tech Electronics & Communication Engineering Evening

5.6.1 Mission Statement

Programme Mission

"To provide education at UG levels in Electronics and Communication Engineering and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

5.6.2 Programme Educational Objectives (PEOs)

Programme Educational Objectives

- 1. The students shall have the ability to apply knowledge of science, engineering and technology for research and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.
- 2. The student shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.
- 3. The student will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams.
- **4.** The student will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers.
- 5. The student will have the ability to support and practice independent and life-long learning for professional development.
5.6.3 Programme Operational Objectives

S.No	Operational Goals
1	The Programme of B.Tech ECE will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	The Programme will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	The Programme will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	The Programme will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	The Programme will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	The Programme will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	The Programme will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs.
8	The Programme will create opportunities for international exposure for its students and faculty.

5.6.4 Programme Learning Outcomes

Intended Learning Outcomes

- 1. The student will be able to apply the knowledge of mathematics, science, engineering fundamentals, and domain knowledge in Electronics and Communication Engineering to the solution of complex engineering problems.
- 2. The student will be able to identify, formulate research literature, and analyze complex engineering problems reaching substantiated conclusions using principles of mathematics, natural sciences, and engineering sciences with focus in Electronics and Communication Engineering.
- 3. The student will be able to 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.
- 4. The student will demonstrate an ability to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration public health and safety, economical, cultural, societal, and environmental considerations.
- 5. The student will be able to 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.
- 6. The student will be able to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 7. The student will be able to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 8. The student will follow ethical principles and commit to professional ethics and responsibilities and norms of the engineering

practice.

- 9. The student will be able to demonstrate knowledge and understanding of Engineering and Management Principles as an individual, and as a member or leader in diverse teams considering economical and financial factors. Also, The student will be able to participate and succeed in competitive examinations.
- 10. The student will understand the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological changes and contemporary issues.
- **11.** The student will be able to understand the impact of the professional engineering solutions in political, global, economic, societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **12.** The student will demonstrate the research-based knowledge and research methods including design and conduct of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5.6.5Programme Operational Outcomes

Operational Outcomes
1. The faculty will use appropriate methodology and pedagogical tools for teaching, learning and
development.
2. The curriculum will be contemporary and relevant to meet industry requirements and benchmarked on
global standards by incorporating feedback from all the stakeholders.
3. The student will graduate in timely manner.
4. The student and faculty shall have academic facilities, technological resources for teaching and learning.
5. The student will earn achievements in inter-university Extra Curricular activities.
6. The faculty will be engaged in scholarly and professional activities in order to enhance their competencies
and to contribute to the existing Body of Knowledge.
7. The faculty and students will integrate ethics and values in teaching and Learning, in theory and practice.
8 The feaulty will facilitate aultivation of areas cultural hymenitarian values
8. The faculty will facilitate cultivation of cross cultural numanitarian values.
9. The faculty will facilitate joint research collaborations, invite international delegates and speakers for
seminars and conferences and various other opportunities for global exposure
10. The faculty will be continuously engaged in developing/ reviewing processes, policies and systems to
achieve prestigious accreditations from various national, international bodies and ranking bodies.
11. The faculty shall develop and maintain strong relationship with corporate and maintain lifelong alumni
network and keep the curriculum responsive to industry needs.
12. The faculty will support all the students for quality placements or join family business or start their own
venture.

5.6.6 Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs)

The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summaries of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note: $\sqrt{}$ in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):

Broad-Based Student Learning							
Goals (PEQs)							
Intended	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5		
Student							
Learning Outcomes							
(SLOs)							
BACHELOR'S LEVEL PROGR	BACHELOR'S LEVEL PROGRAMS						
Name of the programme							
Learning Outcome 1							
Learning Outcome 2	\checkmark						
Learning Outcome 3	V						
Learning Outcome 4	\checkmark						

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5
Learning Outcome 5	\checkmark				
Learning Outcome 6					
Learning Outcome 7					
Learning Outcome 8					
Learning Outcome 9					
Learning Outcome 10					
Learning Outcome 11					
Learning Outcome 12					\checkmark

5.6.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	The student will demonstrate the knowledge of mathematics, science, engineering	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		fundamentals, and domain knowledge in Electronics and Communication Engineering to the solution of complex engineering problems.	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
2	Investigation	The student will demonstrate an ability to identify, formulate, research	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)

		literature, and	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		analyze			the students			of the
		complex			shall obtain a			students shall
		engineering			grade 'A' or			obtain a
		problems			above			grade 'A' or
		reaching						above
		substantiated						
		conclusions						
		using principles						
		of mathematics,						
		natural						
		sciences, and						
		engineering						
		sciences with						
		focus in						
		Electronics and						
		Communication						
		Engineering.						
		6 6						
3 D	Design/Development	The student	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit	UG/PLO/ID/	Atleast 85%
	of Solutions	will	Examination		the students	Survey	ES	of the
		demonstrate			shall obtain			students shall
		an ability to			grade A			give a
		1			(>=/3-100%)			grade A
1		deston						(-75, 1000)

	solutions for	• Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
	complex			the students			of the
	engineering			shall obtain a			students shall
	nrohloma and			grade 'A' or			obtain a
	problems and			above			grade 'A' or
	design system						above
	components or						
	processes that						
	meet the						
	specified						
	needs with						
	appropriate						
	consideration						
	public health						
	and safety						
	economical,						
	cultural,						
	societal, and						
	environmental						
	considerations						

4	Problem Analysis	The student	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		will	Examination		the students			of the
		demonstrate			shall obtain			students shall
		the research-			grade 'A'			give a
		based			(>=75-100%)			grade'A'
		knowledge and						(>=75-100%)
		research				Industry Internship	LIG/PLO/ID/ II	Atleast 40%
		methods				industry internship	00/11/0/11/11	of the
		including	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of			students shall
		design and			the students			obtain a
		conduct of			shall obtain a			grade 'A' or
		experiments			grade 'A' or			above
		analysis and			above			
		interpretation						
		of data and						
		or data, and						
		the information						
		the information						
		to provide						
		valid						
		conclusions.						
5	Modern Tool Usage	The student	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	6	will create.	Examination		the students			of the
		select and			shall obtain			students shall
		apply			grade 'A'			give a
		appropriate			(>=75-100%)			grade'A'
		techniques						(>=75-100%)
		teeninques,						

		resources, and	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		modern			the students			of the
		engineering			shall obtain a			students shall
		and IT tools			grade 'A' or			obtain a
		including			above			grade 'A' or
		prediction and						above
		modeling to						
		complex						
		engineering						
		activities with						
		an						
		understanding						
		of the						
		limitations.						
6	The Engineer &	The student	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Society	will be able to	Examination		the students			of the
		apply			shall obtain			students shall
		reasoning			(>-75, 100%)			give a
		informed by			(>=73-100%)			(>-75, 100%)
		the contextual						(>=75-100%)
		knowledge to	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		assess societal,			the students			of the
		health, safety,			shall obtain a			students shall
		legal and			grade 'A' or			obtain a
		cultural issues			above			grade 'A' or
		and the			100% of the			above
		consequent			students shall			100% of the
		responsibilities			pursue their			students shall
		relevant to the			responsibility			pursue their
		professional			towards			responsibility

engineering		environment,		towards
practice.		society, ethics,		environment,
		health, safety,		society,
		legal and		ethics, health,
		cultural issues		safety, legal
				and cultural
				issues

7	Environment &	The student	Comprehensive	UG/PLO/D/CE	Atleast 20%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Sustainability	will be able to	Examination		of the students			of the
		understand the			shall obtain			students shall
					grade 'A'			give a
		impact of the			(>=75-100%)			grade'A'
		professional						(>=75-
		engineering						100%)
		solutions in	Mala Dala d D 1 da		A (1	To 1 and a Tata and I'm		A (1) (400/
		political	Major Project Rubrics	UG/PLO/D/P2	Atleast 40%	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		global			of the students			of the
		giobai,			snall obtain a			students shall
		economic,			grade A or			obtain a
		societal and			above			shove
		environmental			100% of the			above
		contexts, and			students shall			100% of the
		demonstrate			pursue their			students shall
		the knowledge			responsibility			pursue their
		of and mod			towards			responsibility
		or, and need			environment,			towards
		for sustainable			society,			environment,
		development.			ethics, health,			society,
					safety, legal			ethics,
					and cultural			health,
	l				issues			safety, legal
	l							and cultural
	l							issues
	l							
	l							

8	Ethics	The student will demonstrate ethical principles and commit to professional ethics and responsibilities	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75- 100%)
		and norms of the engineering practice.	Comprehensive Exam	UG/PLO/D/CE Framework	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			
			Behavioural Science Rubrics	UG/PLO9/D/BS	Atleast 85% of the students shall qualify the exam.	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
9	Individual and Team Work	The student will be able to function effectively as an individual, and as a member or leader in diverse	Foreign Business Language Rubrics	UG/PLO9/D/F BL	Atleast 85% of the students shall qualify the exam.	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75- 100%)
		teams, and in multidisciplinary				Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall

		settings.	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			obtain a grade 'A' or above
10	Communication	The student will be able to communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and	Business Communication Rubrics Major Project Rubrics	UG/PLO10/D/ BC UG/PLO/D/P2	Atleast 85% of the students shall qualify the exam. Atleast 40% of the students shall obtain a grade 'A' or above	Student Exit Survey	UG/PLO/ID/ ES UG/PLO/ID/II	Atleast 85% of the students shall give a grade'A' (>=75- 100%) Atleast 40% of the students shall obtain a grade 'A' or above
		write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			

11	Project Management & Finance	The student will be able to demonstrate knowledge and understanding of	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A'
		Engineering and Management						(>=75- 100%)
		Principles as an individual, and as a member or leader in diverse teams considering economical and financial factors. Also, The student will be able to participate and succeed in competitive examinations.	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry feedback	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above
12	Lifelong Learning	The student will understand the need for, and have the preparation and ability to	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75- 100%)

	engage	in	Major Project Rubrics	UG/PLO/D/P2		Industry feedback	UG/PLO/ID/II	Atleast 40%
	independe	nt						of the
	independe and life learning in broadest context technologic changes contempor issues.	nt -long n the of al and rary			Atleast 40% of the students shall obtain a grade 'A' or above			of the students shall obtain a grade 'A' or above

5.7 Master's-Level Programme-

M.Tech.(Structural Engineering)

5.7.1 Mission Statement

Programme Mission

"To provide education in all areas of Structural Engineering and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

5.7.2 Programme Educational Objectives (PEOs)

Programme Educational Objectives

- 1. The students shall have the ability to apply knowledge of mathematics, science, computing and engineering for research, design and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.
- 2. The students shall have the ability to apply research knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusion
- 3. The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.
- 4. Students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams
- 5. The student will have the ability to support and practice independent and life-long learning for professional development.
- 6. Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers

5.7.3 Programme Operational Objectives

Operational Goals
1. The Programme intends to facilitate academically conducive environment and infrastructure to achieve excellence in teaching, learning and research.
2. The Programme will provide ample opportunities to its students to participate in curricular, co-curricular and extra-curricular activities for their holistic development.
3. The Programme will facilitate environment for innovation and research excellence for the intellectual growth of students and faculties.
4. The Programme will inculcate core values and ethical conduct amongst students, faculty and staff.
5. The Programme will encourage cultural diversity and a sense of social and environmental responsibility.
6. The Programme will provide ample opportunities for international exposure to faculty and students.
7. The Programme will be involved in continual improvement of processes and systems with aim to attain national/ international accreditations and university rankings.
8. The Programme will build a strong industry interaction by way of alumni networks and empanelment of expertise from industry.
9. The Programme will facilitate employment opportunities and also support students to start their own ventures.
10. The Programme will facilitate good governance in discharge of responsibilities and execution of policies and programs.

5.7.4 Programme Learning Outcomes

1. Th of	he student will effectively apply knowledge of mathematics, applied sciences and engineering to solve complex problems using concepts f Structural Engineering
2. Thus	he student will identify, analyze research literature and formulate Structural Engineering problems reaching substantiated conclusions sing first principles of mathematics, natural sciences, and engineering sciences.
3.	The student will create solutions for complex Structural Engineering problems and design system components or processes that meet the specifications with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4.	The student will carry out investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5.	The student will create, select, and apply appropriate techniques, resources, and modern engineering tools including prediction and modeling to different Structural Engineering activities with an understanding of the limitations
6.	The student will apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7.	The student will recognize the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of and need for the sustainable development.
8.	The student will apply ethical principles and demonstrate professional ethics, responsibilities and norms of the engineering practice.
9.	The student will demonstrate effectiveness as an individual and as a member or leader in teams and in multidisciplinary settings.
10.	The student will use effective communication to cater to both technical and non-technical audiences.
11.	The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments.
12.	The student will recognise the need for and will engage in independent and life-long learning in the broadest context of technological
	change.

5.7.5 Programme Operational Outcomes

Operational O	utcomes
1.	The Programme will facilitate academically conducive environment and infrastructure to achieve excellence in teaching, learning
	and research.
2.	The Programme will provide ample opportunities to its students to participate in curricular, co-curricular and extracurricular
	activities for their holistic development.
3.	The Programme will facilitate environment for innovation and research excellence for the intellectual growth of students and
	faculty.
4.	The Programme will inculcate core values and ethical conduct amongst students, faculty and staff.
5.	The Programme will encourage cultural diversity and a sense of social and environmental responsibility.
6.	The Programme will provide ample opportunities for international exposure to faculty and students.
7.	The Programme will be involved in continual improvement of processes and systems with aim to attain national and international
	accreditations and university rankings.
8.	The Programme will build a strong industry interaction by way of alumni networks and empanelment of expertise from industry.
9.	The Programme will facilitate employment opportunities and also support students to start their own ventures.
10	The Programme will facilitate good governance in discharge of responsibilities and execution of policies and programs.

5.7.6 PEO's – PLO mapping-Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs)

The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summaries of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note: $\sqrt{\text{ in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):$

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
MASTER'S LEVEL PROGRAM	IS					
M.Tech Structural Engineering						
Learning Outcome 1	\checkmark					
Learning Outcome 2		\checkmark				
Learning Outcome 3		\checkmark				
Learning Outcome 4	\checkmark					

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
Learning Outcome 5						
Learning Outcome 6						
Learning Outcome 7						
Learning Outcome 8						
Learning Outcome 9						
Learning Outcome 10						
Learning Outcome 11						
Learning Outcome 12						

5.7.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	Student will effectively apply knowledge of mathematics, applied sciences and engineering to solve complex	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		problems.	Dissertation Rublics		of the students shall be marked satisfactory	Summer mernsing	00/120/12/11	of the students shall obtain a grade 'A' or above
2		The student will identify, analyze research literature and formulate Computer	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
	Investigation	Network & Information Security problems reaching substantiated conclusions using first	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked satisfactory	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above

		principles of mathematics, natural sciences, and engineering sciences.						
3	3 Design/Development The stude of Solutions create sol complex of Network of Informati problems	The student will create solutions for complex Computer Network & Information Security problems and design	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		system components or processes that meet the specifications with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked satisfactory	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
4		The student will carry out investigations of complex problems using research-based knowledge and research methods including design of	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
	Problem Analysis	experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above

					marked satisfactory			
5		The student will create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to different computer science & engineering activities with an understanding of the limitations	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
	Modern Tool Usage		Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked satisfactory	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
6	The Engineer & Society	The student will apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal,	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked satisfactory or above 100% of the students shall pursue their	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above 100% of the students shall pursue their responsibility

					towards environment, society, ethics, health, safety, legal and cultural issues			environment, society, ethics, health, safety, legal and cultural issues
7	Environment &Sustainbility	Student will recognize the impact of the professional Computer Network & Information Security solutions in societal and environmental contexts and demonstrate the knowledge of and need for the sustainable development.	Comprehensive Examination Dissertation Rubrics	UG/PLO/D/CE UG/PLO/D/DN	Atleast 40% of the students shall obtain grade 'A' (>=75-100%) Atleast 80% of the students shall be marked satisfactory or above 100% of the students shall pursue their responsibility towards environment, society, ethics, health, safety, legal and cultural issues	Student Exit Survey Industry Internship	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above 100% of the students shall pursue their responsibility towards environment, society, ethics, health, safety, legal and cultural issues

8		The student will apply ethical principles and demonstrate professional ethics, responsibilities and norms of the engineering practice.	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked satisfactory or above	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
	Ethics		Comprehensive Exam	UG/PLO/D/CE Framework	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)			
			Behavioural Science Rubrics	UG/PLO9/D/BS	Atleast 85% students shall qualify the exam	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
9	Individual and Team Work	The student will demonstrate effectiveness as an individual and as a member or leader in teams and in multidisciplinary	Foreign Business Language Rubrics	UG/PLO9/D/F BL	Atleast 85% students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		settings.				Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a
			Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A'			grade 'A' or above

					(>=75-100%)			
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 80%			
					of the			
					students			
					shall be			
					marked			
					satisfactory			
10	Communication	The student will	Business	UG/PLO10/D/	Atleast 85%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		use effective	Communication	BC	students shall			of the students
		communication	Rubrics		qualify the			shall give a
		to cater to both			exam			(>-75-100%)
		non-technical						(>=75 10070)
		audiences.	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80%	Industry Internship	UG/PLO/ID/II	Atleast 40%
					of the			of the students
					students			grade 'A' or
					shall be			above
					marked			
					satisfactory			
			Comprehensive Exam	UG/PLO/D/CE	Atleast 40%			
					of the students			
					shall obtain			
					grade 'A' $(>-75, 100\%)$			
					(>=/J-100%)			
11	Project Management	The student will	Comprehensive Exam	UG/PLO/D/CE	Atleast 40%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	& Finance	demonstrate			of the students			of the students
		knowledge and			shall obtain			shall give a

		understanding of			grade 'A'			grade'A'
		the engineering			(>=75-100%)			(>=75-100%)
		and management						
		principles and						
		apply these to						
		one's own work,						
		as a member and						
		leader in a team						
		as well as to						
		manage projects						
		in						
		multidisciplinary						
		environments.						
12	Lifelong Learning	The student will	Comprehensive Exam	UG/PLO/D/CE	Atleast 40%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	6	recognise the	I I I I I I I I I I I I I I I I I I I		of the students			of the students
		need for and will			shall obtain			shall give a
		engage in			grade 'A'			grade'A'
		independent and			(>=75-100%)			(>=75-100%)
		life-long learning						
		in the broadest	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80%	Industry Internship	UG/PLO/ID/II	Atleast 40%
		context of			of the	F		of the students
		technological			students			shall obtain a
		change.			students			grade 'A' or
								above
					marked			
					satisfactory			

5. 8 Master's-Level Programme-

M.Tech.(Environmental Engineering)

5.8.1 Mission Statement

Programme Mission

"To provide education in all areas of Environmental Engineering and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

5.8.2 Programme Educational Objectives (PEOs)

Programme Educational Objectives

1. The students shall have the ability to apply knowledge of mathematics, science, computing and engineering for research, design and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.

2. The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.

3. Students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams

4. The student will have the ability to support and practice independent and life-long learning for professional development.

5. Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers

5.8.3 Programme Operational Objectives

Operational Goals same
1. The Programme intends to facilitate academically conducive environment and infrastructure to achieve excellence in teaching, learning and research.
2. The Programme will provide ample opportunities to its students to participate in curricular, co-curricular and extra-curricular activities for their holistic development.
3. The Programme will facilitate environment for innovation and research excellence for the intellectual growth of students and faculties.
4. The Programme will inculcate core values and ethical conduct amongst students, faculty and staff.
5. The Programme will encourage cultural diversity and a sense of social and environmental responsibility.
6. The Programme will provide ample opportunities for international exposure to faculty and students.
7. The Programme will be involved in continual improvement of processes and systems with aim to attain national/ international accreditations and university rankings.
8. The Programme will build a strong industry interaction by way of alumni networks and empanelment of expertise from industry.
9. The Programme will facilitate employment opportunities and also support students to start their own ventures.
10. The Programme will facilitate good governance in discharge of responsibilities and execution of policies and programs.

5.8.4 Programme Learning Outcomes

Intended Learning Outcomes

- 1. The student will effectively apply knowledge of mathematics, applied sciences and engineering to solve complex problems using concepts of Information Technology.
- 2. The student will identify, analyze research literature and formulate Environmental Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
 - 3. The student will create solutions for complex Environmental Engineering problems and design system components or processes that meet the specifications with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
 - 4. The student will carry out investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
 - 5. The student will create, select, and apply appropriate techniques, resources, and modern engineering tools including prediction and modeling to different civil engineering activities with an understanding of the limitations.
 - 6. The student will apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
 - 7. The student will recognize the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of and need for the sustainable development.
 - 8. The student will apply ethical principles and demonstrate professional ethics, responsibilities and norms of the engineering practice.
 - 9. The student will demonstrate effectiveness as an individual and as a member or leader in teams and in multidisciplinary settings.
 - 10. The student will use effective communication to cater to both technical and non-technical audiences.
 - 11. The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments.
 - 12. The student will recognise the need for and will engage in independent and life-long learning in the broadest context of technological change.

5.8.5 Programme Operational Outcomes

Operational O	utcomes
1.	The Programme will facilitate academically conducive environment and infrastructure to achieve excellence in teaching, learning
	and research.
2.	The Programme will provide ample opportunities to its students to participate in curricular, co-curricular and extracurricular
	activities for their holistic development.
3.	The Programme will facilitate environment for innovation and research excellence for the intellectual growth of students and
	faculty.
4.	The Programme will inculcate core values and ethical conduct amongst students, faculty and staff.
5.	The Programme will encourage cultural diversity and a sense of social and environmental responsibility.
6.	The Programme will provide ample opportunities for international exposure to faculty and students.
7.	The Programme will be involved in continual improvement of processes and systems with aim to attain national and international
	accreditations and university rankings.
8.	The Programme will build a strong industry interaction by way of alumni networks and empanelment of expertise from industry.
9.	The Programme will facilitate employment opportunities and also support students to start their own ventures.
10	. The Programme will facilitate good governance in discharge of responsibilities and execution of policies and programs.

5.8.6 PEO's – PLO mapping

Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs)

The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summaries of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note: $\sqrt{}$ in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):

Broad-Based Program Learning Goals (PEQs) Intended Program Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5
MASTER'S LEVEL PROGRAM					
Name of the programme: M.Tech (Environmental Engineering)					
Learning Outcome 1					
Learning Outcome 2					
Learning Outcome 3					
Broad-Based Program Learning Goals (PEQs) Intended Program Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5
---	--------------	----------	----------	----------	-------
Learning Outcome 4	\checkmark				
Learning Outcome 5					
Learning Outcome 6					
Learning Outcome 7					
Learning Outcome 8					
Learning Outcome 9					
Learning Outcome 10					
Learning Outcome 11					
Learning Outcome 12					

5.8.7 Student Learning Assessment for <u>M.Tech.(Environmental Engineering)</u>

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	PLO1	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked satisfactory	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
2	Investigation	PLO2	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)

			Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked satisfactory	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
3		PLO3	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
	Design/Development of Solutions		Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked satisfactory	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
4	Problem Analysis	PLO4	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above

					marked			
					satisfactory			
5	Modern Tool Usage	PLO5	Comprehensive	UG/PLO/D/CE	Atleast 40%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
			Examination		of the students			of the students
					shall obtain			shall give a
					grade 'A'			grade'A'
					(>=75-100%)			(>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 80%	Industry Internship	UG/PLO/ID/ II	Atleast 40%
					of the			of the students
					students			shall obtain a
					shall be			grade 'A' or
					marked			above
					satisfactory			
6	The Engineer &	PLO6	Comprehensive	UG/PLO/D/CE	Atleast 40%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Society		Examination		of the students			of the students
					shall obtain			shall give a
					grade 'A'			grade'A'
					(>=75-100%)			(>=75-100%)
			D'acceler D 1 des		A (1)	Later Later and		A (1) (400/
			Dissertation Rubrics	UG/PLU/D/DN	Atleast 80%	Industry Internship	UG/PLU/ID/ II	Atteast 40%
					of the students			of the students
					shall be			shall obtain a
					marked			grade A or
					satisfactory of			above
					above			100% of the
					100% of the			students shall
					students shall			pursue their
					pursue their			responsibility
1					responsibility			towards

					towards environment, society, ethics, health, safety, legal and cultural issues			environment, society, ethics, health, safety, legal and cultural issues
7		PLO7	Comprehensive Examination Dissertation Rubrics	UG/PLO/D/CE UG/PLO/D/DN	Atleast 40% of the students shall obtain grade 'A' (>=75-100%) Atleast 80% of the students shall be marked	Student Exit Survey Industry Internship	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or
	Environment & Sustainbility				satisfactory or above 100% of the students shall pursue their responsibility towards environment, society, ethics, health, safety, legal and cultural issues			above 100% of the students shall pursue their responsibility towards environment, society, ethics, health, safety, legal and cultural issues

8	Ethics	PLO8	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked satisfactory or above	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Comprehensive Exam	UG/PLO/D/CE Framework	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)			
			Behavioural Science Rubrics	UG/PLO9/D/BS	Atleast 85% students shall qualify the exam	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
9	Individual and Team Work	PLO9	Foreign Business Language Rubrics	UG/PLO9/D/F BL	Atleast 85% students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
						Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a
			Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A'			grade 'A' or above

					(>=75-100%)			
					``````````````````````````````````````			
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 80%			
					of the			
					students			
					shall be			
					marked			
					satisfactory			
					-			
10		PLO10	Business	UG/PLO10/D/	Atleast 85%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
			Communication	BC	students shall			of the students
			Rubrics		quality the			shall give a
					exam			grade $A^{\circ}$
								(>=/3-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 80%	Industry Internship	UG/PLO/ID/II	Atleast 40%
					of the			of the students
					students			shall obtain a
					shall be			grade 'A' or
	Communication				marked			above
					satisfactory			
					suisidetory			
			Comprehensive Exam	UG/PLO/D/CE	Atleast 40%			
					of the students			
					shall obtain			
					grade 'A'			
					(>=75-100%)			
11		PLO11	Comprehensive Exam	UG/PLO/D/CE	Atleast 40%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Project Management	-	I I I I I I I I I I I I I I I I I I I			······································		
					of the students			of the students
	& Finance				of the students shall obtain			of the students shall give a

					grade 'A' (>=75-100%)			grade'A' (>=75-100%)
12		PLO12	Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
	Life long learning		Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marked satisfactory	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above

#### 5.9 Bachelor's-Level Programme -

B.Tech.(Mechanical & Automation Engineering/ Mechanical Engineering/ Automobile Engineering),

B.Tech (Mechanical & Automation Engineering – 3C/ Mechanical Engineering -3C)

B.Tech (Mechanical & Automation Engineering– Evening/ Mechanical Engineering- Evening)

### **5.9.1 Mission Statement**

**Programme Mission** 

"To provide education in all areas of Mechanical & Automation Engineering and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

### 5.9.2 Programme Educational Objectives (PEOs)

#### Programme Educational Objectives

- 1. The students shall have the ability to apply knowledge of science, engineering and technology for research and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.
- 2. The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.
- 3. The students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams.
- 4. Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers.
- 5. The student will have the ability to support and practice independent and life-long learning for professional development.

## 5.9.3 Programme Operational Objectives

S.No	Operational Goals
1	The Programme will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	The Programme will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	The Programme will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	The Programme will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	The Programme will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	The Programme will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	The Programme will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	The Programme will create opportunities for international exposure for its students and faculty.

## 5.9.4 Programme Learning Outcomes

ended Le	earning Outcomes
1.	The student will apply knowledge of mathematics, sciences and engineering to solve problems using concepts of mechanical & automation engineering.
2.	The student will identify, formulate research literature and analyze mechanical & automation engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3.	The student will create solutions for mechanical & automation engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, economical, cultural, societal, and environmental considerations.
4.	The student will carry out investigations of problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions
5.	The student will create, select and apply appropriate techniques, resources and modern engineering and IT tools, necessary for computing practice with an understanding of the limitations.
6.	The student will apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and consequent responsibilities relevant to the professional engineering practice.
7.	The student will recognize the impact of the professional engineering solutions in political, global, economic, societal and environmental contexts and demonstrate the knowledge if and need for the sustainable development.
8.	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the engineering practice.
9.	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a common goal in multidisciplinary settings.
10.	The student will use effective communication to cater to both technical and non-technical audiences.
11.	The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments.
12.	The student will recognise the need for, and will engage in independent and life-long learning in the broadest context of technological change.

## 5.9.5 **Programme Operational Outcomes**

Ope	erational Outcomes
1	The faculty will use appropriate methodology and pedagogical tools for teaching, learning and development.
2	The curriculum will be contemporary and relevant to meet industry requirements and benchmarked on global standards by incorporating feedback from all the stakeholders.
3	The student will graduate in timely manner.
4	The student and faculty shall have academic facilities, technological resources for teaching and learning.
5	The student will earn achievements in inter-university Extra Curricular activities.
6	The faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to the existing Body of Knowledge.
7	The faculty and students will integrate ethics and values in teaching and Learning, in theory and practice.
8	The faculty will facilitate cultivation of cross cultural humanitarian values.
9	The faculty will facilitate joint research collaborations, invite international delegates and speakers for seminars and conferences and various other opportunities for global exposure
10	The faculty will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious accreditations from various national, international bodies and ranking bodies.
11	The faculty shall develop and maintain strong relationship with corporate and maintain lifelong alumni network and keep the curriculum responsive to industry needs.
12	The faculty will support all the students for quality placements or join family business or start their own venture.

### 5.9.6 PEO's – PLO mapping

Broad-Based Student Learning PEO PEO PEO PEO Goals (PEOs) PEO 5 2 3 4 1 Programme Learning Outcome (PLOs) BACHELOR'S LEVEL PROGRAMS B.TECH Learning Outcome 1  $\sqrt{}$ Learning Outcome 2  $\sqrt{}$ Learning Outcome 3  $\sqrt{}$ Learning Outcome 4  $\sqrt{}$ Learning Outcome 5  $\sqrt{}$ Learning Outcome 6  $\sqrt{}$ Learning Outcome 7  $\sqrt{}$ Learning Outcome 8  $\sqrt{}$ Learning Outcome 9  $\sqrt{}$ Learning Outcome 10  $\sqrt{}$ 

Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs). The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summarizes of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note:  $\sqrt{$  in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):

Broad-Based Student Learning Goals (PEOs) Programme Learning Outcome (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5
Learning Outcome 11					
Learning Outcome 12					

## 5.9.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	The student will apply knowledge of mathematics, sciences and engineering to solve problems	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		using concepts of mechanical & automation engineering	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
2	Investigation	The student will identify, formulate research literature and analyze mechanical &	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		automation engineering problems reaching substantiated	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or

		conclusions						above
		using first						
		principles of						
		mathematics,						
		natural sciences,						
		and engineering						
		sciences						
3	Design/Development	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	of Solutions	create solutions	Examination		the students			of the
		for mechanical			shall obtain			students shall
		& automation			grade 'A'			give a
		engineering			(>=75-100%)			grade'A'
		problems and						(>=75-100%)
		design system	Mala Davis of D. 1 alas		A (1) ( 400/ C	To 1 of a Tata and 's		A (1) ( 400/
		components or	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		processes that			the students			of the
		meet the			shall obtain a			students shall
		specified needs			grade 'A' or			obtain a
		with appropriate			above			grade 'A' or
		consideration for						above
		the public health						
		and safety,						
		cultural,						
		societal, and						
		environmental						
		considerations						

4	Problem Analysis	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		carry out	Examination		the students			of the
		investigations of			shall obtain			students shall
		problems using			grade 'A'			give a
		research-based			(>=75-100%)			grade'A'
		knowledge and						(>=75-100%)
		research						
		methods				Industry Internship	UG/PLO/ID/ II	Atleast 40%
		including design	Maior Draigat Dubriag		Atlaget 400/ of	4		of the
		of experiments,	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of			students shall
		analysis and			shall obtain a			obtain a
		interpretation of			shall obtail a			grade 'A' or
		data and			glade A of			above
		synthesis of			above			
		information to						
		provide valid						
		conclusions						
5	Madam Taal Haasa	The student will	Communitiens		Atlanet 200/ of	Student Enit Summer		A 41 + 950/
5	Modern 1001 Usage	The student will	Examination	UG/PLU/D/CE	Atleast 20% of	Student Exit Survey	UG/PLU/ID/ ES	Atleast 85%
		and apply	Examination		shall obtain			of the
		and appry			grade 'A'			give e
		tochniquos			(>-75, 100%)			give a
		resources and			(>=75-100%)			(>-75, 100%)
		modern						(>=75-10070)
		engineering and	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		IT tools	5 5		the students	· · ·		of the
		necessary for			shall obtain a			students shall
		computing			grade 'A' or			obtain a
		practice with an			above			grade 'A' or
		understanding of						above
		the limitations						
				1		1		

6	The Engineer &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Society	apply reasoning	Examination		the students			of the
		informed by			shall obtain			students shall
		contextual			grade 'A'			give a
		knowledge to			(>=75-100%)			grade'A'
		assess societal,						(>=75-100%)
		health, safety,						
		legal and	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		cultural issues			the students			of the
		and consequent			shall obtain a			students shall
		responsibilities			grade 'A' or			obtain a
		relevant to the			above			grade 'A' or
		professional			100% of the			above
		engineering			atudanta ahall			1000/ of the
		practice						100% of the
					pursue meir			students shan
					towards			pursue their
					towards			towards
					society othics			onvironment
					boolth sofaty			society
					logal and			society,
					cultural issues			safety legal
					Cultural issues			and cultural
								issues
								155005

7	Environment &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Sustainability	recognize the	Examination		the students			of the
		impact of the			shall obtain			students shall
		professional			grade 'A'			give a
		engineering			(>=75-100%)			grade'A'
		solutions in						(>=75-100%)
		societal and						
		environmental	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		contexts and			the students			of the
		demonstrate the			shall obtain a			students shall
		knowledge if			grade 'A' or			obtain a
		and need for the			above			grade 'A' or
		sustainable			1000/  of the			above
		development			100% of the			1000/254hz
					students shall			100% of the
					pursue their			students shall
					responsibility			pursue their
					towards			responsibility
					environment,			towards
					society, etnics,			environment,
					health, safety,			society,
					legal and			etnics, nealth,
					cultural issues			salety, legal
								and cultural
								issues

8	Ethics	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the	Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		engineering practice	Comprehensive Exam	UG/PLO/D/CE Framework	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			
			Behavioural Science Rubrics	UG/PLO9/D/BS	Atleast 85% students shall qualify the exam	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
9	Individual and Team Work	The student will demonstrate effectiveness as an individual and as a member or leader of team	Foreign Business Language Rubrics	UG/PLO9/D/F BL	Atleast 85% students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		assembled to undertake a common goal in multidisciplinary				Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall

		settings	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			obtain a grade 'A' or above
			Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above			
10	Communication	The student will use effective communication to cater to both technical and non-technical audiences	Business Communication Rubrics	UG/PLO10/D/ BC	Atleast 85% students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Major Project Rubrics	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above
			Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			

11	Project Management	The student will	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	& Finance	demonstrate			the students			of the
		knowledge and			shall obtain			students shall
		understanding of			grade 'A'			give a
		the engineering			(>=75-100%)			grade'A'
		and management						(>=75-100%)
		principles and						
		apply these to	Major Project Rubrics	UG/PLO/D/P2		Industry Internship	UG/PLO/ID/II	Atleast 40%
		one's own work,			Atleast 40% of			of the
		as a member and			the students			students shall
		leader in a team			shall obtain a			obtain a
		as well as to			grade 'A' or			grade 'A' or
		manage projects			above			above
		in						
		multidisciplinary						
		environments						
10	Lifelene Leening	The student will	Commentancing Energy		A the set 200/ sf	Stadart Erit Summer		A 41 + 950/
12	Literong Learning	rie student will	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLU/ID/ ES	Atteast 85%
		need for and			shall obtain			of the
		will on go go in			shall obtain			students shan
		independent and			(>-75, 100%)			give a
		life long			(>=75-100%)			(>-75, 100%)
		learning in the						(>=75-100%)
		broadest context	Major Project Rubrics	UG/PLO/D/P2		Industry Internship	UG/PLO/ID/II	Atleast 40%
		of technological	5 5		Atleast 40% of	* 1		of the
		change			the students			students shall
		enange			shall obtain a			obtain a
					grade A or			grade 'A' or
					adove			above
						1		

#### 5. 10 Master's-Level Programme -

### M.Tech.(Automobile Engineering)

B.Tech + M.Tech (AME)- Integrated

#### **5.10.1 Mission Statement**

### **Programme Mission**

"To provide education in all areas of Automobile Engineering and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

5.10.2 Programme Educational Objectives (PEOs)

rogramme Educational Objectives
1. The students shall have the ability to apply knowledge of science, engineering and technology for research and development of nove
products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.
2. The students shall have the ability to apply research knowledge and methods to solve engineering problems
3. The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.
4. Students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member leader in diverse teams
5. The student will have the ability to support and practice independent and life-long learning for professional development.
6. Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers

## 5.10.3 Programme Operational Objectives

S.No	Operational Goals
1	The Programme of M.Tech Automobile Engineering will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	The Programme will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	The Programme will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	The Programme will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	The Programme will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	The Programme will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	The Programme will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	The Programme will create opportunities for international exposure for its students and faculty.

## 5.10.4 Programme Learning Outcomes

Intended Learni	ng Outcomes
1.	The student will apply knowledge of mathematics, sciences and engineering to solve complex problems using concepts of
	automobile engineering.
2.	substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
3.	The student will create solutions for computer science & engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal, and environmental considerations
4.	The student will carry out investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions
5.	The student will create, select and apply appropriate techniques, resources and modern engineering tools including prediction and modelling to different automobile engineering activities with an understanding of the limitations.
6.	The student will apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and consequent responsibilities relevant to the professional engineering practice.
7.	The student will recognize the impact of the professional engineering solutions in societal and environmental contexts and and demonstrate the knowledge if and need for the sustainable development.
8.	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the engineering practice.
9.	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a common goal in multidisciplinary settings.
10.	The student will use effective communication to cater to both technical and non-technical audiences.
11.	The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments.
12.	The student will recognise the need for, and will engage in independent and life-long learning in the broadest context of technological change

## 5.10.5 Programme Operational Outcomes

Ope	erational Outcomes
1	The faculty will use appropriate methodology and pedagogical tools for teaching, learning and development.
2	The curriculum will be contemporary and relevant to meet industry requirements and benchmarked on global standards by incorporating feedback from all the stakeholders.
3	The student will graduate in timely manner.
4	The student and faculty shall have academic facilities, technological resources for teaching and learning.
5	The student will earn achievements in inter-university Extra Curricular activities.
6	The faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to the existing Body of Knowledge.
7	The faculty and students will integrate ethics and values in teaching and Learning, in theory and practice.
8	The faculty will facilitate cultivation of cross cultural humanitarian values.
9	The faculty will facilitate joint research collaborations, invite international delegates and speakers for seminars and conferences and various other opportunities for global exposure
10	The faculty will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious accreditations from various national, international bodies and ranking bodies.
11	The faculty shall develop and maintain strong relationship with corporate and maintain lifelong alumni network and keep the curriculum responsive to industry needs.
12	The faculty will support all the students for quality placements or join family business or start their own venture.

### 5.10.6 PEO's – PLO mapping

Broad-Based Student Learning Goals (PEOs) Programme Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
MASTER'S LEVEL PROGRAM	MS					
Name of the programme						
Learning Outcome 1	$\checkmark$					
Learning Outcome 2	$\checkmark$	$\checkmark$				
Learning Outcome 3	V	$\checkmark$				
Learning Outcome 4	$\checkmark$	$\checkmark$				
Learning Outcome 5	$\checkmark$	$\checkmark$				
Learning Outcome 6	1		$\checkmark$			
Learning Outcome 7						
Learning Outcome 8				$\checkmark$		

Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs). The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summarizes of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note:  $\sqrt{$  in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):

Broad-Based Student Learning Goals (PEOs) Programme Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
Learning Outcome 9						
Learning Outcome 10						
Learning Outcome 11						
Learning Outcome 12						

## 5.10.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Kilowieuge	knowledge of	Examination		shall obtain			students shall
		mathematics,			grade 'A'			give a
		sciences and			(>=75-100%)			grade'A'
		engineering to						(>=75-100%)
		solve problems	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Summer Internship	LIG/PLO/ID/ II	Atleast 40%
		of automobile	Dissertation Rubiles		the students	Summer mernismp		of the
		engineering			shall be marks			students shall
					satisfactory			obtain a
								grade 'A' or
								above
2	Investigation	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		formulate	Examination		shall obtain			of the students shall
		research			grade 'A'			give a
		literature and			(>=75-100%)			grade'A'
		analyze						(>=75-100%)
		automobile						
		engineering	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Summer Internship	UG/PLO/ID/ II	Atleast 40%
		problems			shall be marks			students shall
		reaching			satisfactory			obtain a
		conclusions						grade 'A' or

		using first						above
		principles of						
		mathematics,						
		natural sciences,						
		and engineering						
		sciences						
3	Design/Development	The student will	Comprehensive	LIG/PLO/D/CF	Atleast 40% of	Student Exit Survey	LIG/PLO/ID/ FS	Atleast 85%
5	of Solutions	create solutions	Examination	CONTECTOR	the students	Student Exit Survey		of the
	of bolutions	automobile	Examination		shall obtain			students shall
		engineering			grade 'A'			give a
		problems and			(>-75-100%)			grade'A'
		design system			(>=75 100/0)			(>=75-100%)
		components or						(>=/5 100/0)
		processes that	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Summer Internship	UG/PLO/ID/ II	Atleast 40%
		meet the			the students			of the
		specified needs			shall be marks			students shall
		with appropriate			satisfactory			obtain a
		consideration for						grade 'A' or
		the public health						above
		and safety,						
		cultural,						
		societal, and						
		environmental						
		considerations						

4	Problem Analysis	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		carry out	Examination		the students			of the
		investigations of			shall obtain			students shall
		problems using			grade 'A'			give a
		research-based			(>=75-100%)			grade'A'
		knowledge and						(>=75-100%)
		research						
		methods				Industry Internship	UG/PLO/ID/ II	Atleast 40%
		including design	Dissertation Dataire		A +1 = = = + 200/ = = f			of the
		of experiments,	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of			students shall
		analysis and			shall be marks			obtain a
		interpretation of			shall be marks			grade 'A' or
		data and			satisfactory			above
		synthesis of						
		information to						
		provide valid						
		conclusions						
		701 ( 1 ( 11			A (1 ) ( 400/ ) 6			A (1 ) 0 50(
5	Modern Tool Usage	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		create, select	Examination		the students			of the
		and apply			snall obtain			students shall
		appropriate			(> -75, 100%)			give a
		techniques,			(>=/3-100%)			grade A $(> -75, 100\%)$
		modern						(>=/3-100%)
		angineering and	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		tools necessary			the students			of the
		for computing			shall be marks			students shall
		nractice with an			satisfactory			obtain a
		understanding of			5			grade 'A' or
		the limitations						above
		and minimutions						
1		1	1	1	1	1		

6	The Engineer &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Society	apply reasoning	Examination		the students			of the
		informed by			shall obtain			students shall
		contextual			grade 'A'			give a
		knowledge to			(>=75-100%)			grade'A'
		assess societal,						(>=75-100%)
		health, safety,						
		legal and	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		cultural issues			the students			of the
		and consequent			shall be marks			students shall
		responsibilities			satisfactory			obtain a
		relevant to the			1000/ of the			grade 'A' or
		professional			students shall			above
		engineering			students shan			100% of the
		practice			responsibility			100% of the
					towards			students shan
					anvironment			rosponsibility
					environment,			towards
					bealth safety			environment
					legal and			society
					cultural issues			ethics health
					cultural issues			safety legal
								and cultural
								issues
								155405

7	Environment &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Sustainability	recognize the	Examination		the students			of the
		impact of the			shall obtain			students shall
		professional			grade 'A'			give a
		engineering			(>=75-100%)			grade'A'
		solutions in						(>=75-100%)
		societal and						
		environmental	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		contexts and			the students			of the
		demonstrate the			shall be marks			students shall
		knowledge if			satisfactory			obtain a
		and need for the			1000/			grade 'A' or
		sustainable			100% of the			above
		development			students shall			1000/
					pursue their			100% of the
					responsibility			students shall
					towards			pursue their
					environment,			responsibility
					society, ethics,			towards
					nealth, safety,			environment,
					legal and			society,
					cultural issues			ethics, health,
								safety, legal
								and cultural
								issues

8	Ethics	The student will apply ethical	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the
		principles and			shall be marks			students shall
		practice			satisfactory			give a
		professional						grade'A'
		ethics and						(>=75-100%)
		responsibilities						
		and norms of the						
		engineering	Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of			
		practice		Framework	the students			
					shall obtain			
					grade 'A'			
					(>=75-100%)			
			Rohavioural Science		Atlagst 850/	Industry Intornship		Atlaast 40%
			Pubrics	00/FL09/D/D3	Alleusi 0570	mousu y meensnip		of the
			Rublics		students shall			students shall
					qualify the			obtain a
					exam			grade 'A' or
								above
0	Individual and Team	The student will	Foreign Dusiness		Adlaggt 950/	Student Exit Survey		Atlaast 95%
9	Work	demonstrate	Language Pubrice	UU/FLU9/D/F	Alleast 85%	Student Exit Survey	00/FL0/ID/ ES	Atteast 65%
	W OIK	effectiveness as	Language Rubbles	DL	students shall			students shall
		an individual			qualify the			give a
		and as a member			exam			grve a grade'A'
		or leader of team						(>=75-100%)
		assembled to						(>=/5 100/0)
		undertake a				Industry Internship	UG/PLO/ID/ II	Atleast 40%
		common goal in						of the
		multidisciplinary						students shall
		settings	Comprehensive Exam Dissertation Rubrics	UG/PLO/D/CE UG/PLO/D/DN	Atleast 40% of the students shall obtain grade 'A' (>=75-100%) Atleast 80% of the students shall be marks satisfactory			obtain a grade 'A' or above
----	---------------------------------	-----------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------	----------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------	---------------------	-------------------------------	---------------------------------------------------------------------------------------------
10	Communication	The student will use effective communication to cater to both technical and non-technical audiences	Business Communication Rubrics Dissertation Rubrics	UG/PLO10/D/ BC UG/PLO/D/DN	Atleast 85% students shall qualify the exam Atleast 80% of	Student Exit Survey	UG/PLO/ID/ ES UG/PLO/ID/II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40%
			Comprehensive Exam	UG/PLO/D/CE	the students shall be marks satisfactory Atleast 40% of the students shall obtain grade 'A'			of the students shall obtain a grade 'A' or above
11	Project Management & Finance	The student will demonstrate knowledge and understanding of the engineering	Comprehensive Exam	UG/PLO/D/CE	(>=75-100%) Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A'

		and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marks satisfactory	Industry Internship	UG/PLO/ID/II	(>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
12	Lifelong Learning	The student will recognise the need for, and will engage in independent and life-long learning in the broadest context of technological change	Comprehensive Exam Dissertation Rubrics	UG/PLO/D/CE UG/PLO/D/DN	Atleast 40% of the students shall obtain grade 'A' (>=75-100%) Atleast 80% of	Student Exit Survey	UG/PLO/ID/ ES UG/PLO/ID/II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall
		e mange			the students shall be marks satisfactory			obtain a grade 'A' or above

#### 5.11 Masters

### M.Tech.(Industrial & Production Engineering)

#### **5.11.1 Mission Statement**

### **Programme Mission**

"To provide education in all areas of Industrial & Production Engineering and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

#### 5.11.2 Programme Educational Objectives (PEOs)

Programme Educational Objectives

- 1. The students shall have the ability to apply knowledge of science, engineering and technology for research and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.
- 2. The students shall have the ability to apply research knowledge and methods to solve engineering problems
- 3. The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.
- 4. Students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams
- 5. The student will have the ability to support and practice independent and life-long learning for professional development.
- Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers

# 5.11.3 Programme Operational Objectives

S.No	Operational Goals
1	The Programme of M.Tech Industrial & Production Engineering will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	The Programme will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	The Programme will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	The Programme will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	The Programme will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	The Programme will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	The Programme will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	The Programme will create opportunities for international exposure for its students and faculty.

# 5.11.4 Programme Learning Outcomes

Intended Learning	Outcomes
1.	The student will apply knowledge of mathematics, sciences and engineering to solve complex problems using concepts of computer science & engineering.
2.	The student will identify, formulate research literature and analyze complex automobile engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
3.	The student will create solutions for computer science & engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal, and environmental considerations
4.	The student will carry out investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions
5.	The student will create, select and apply appropriate techniques, resources and modern engineering tools including prediction and modelling to different automobile engineering activities with an understanding of the limitations.
6.	The student will apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and consequent responsibilities relevant to the professional engineering practice.
7.	The student will recognize the impact of the professional engineering solutions in societal and environmental contexts and and demonstrate the knowledge if and need for the sustainable development.
8.	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the engineering practice.
9.	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a common goal in multidisciplinary settings.
10	The student will use effective communication to cater to both technical and non-technical audiences.
11	. The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments.
12	The student will recognise the need for, and will engage in independent and life-long learning in the broadest context of technological change

# 5.11.5 Programme Operational Outcomes

Ope	erational Outcomes
1	The faculty will use appropriate methodology and pedagogical tools for teaching, learning and development.
2	The curriculum will be contemporary and relevant to meet industry requirements and benchmarked on global standards by incorporating feedback from all the stakeholders.
3	The student will graduate in timely manner.
4	The student and faculty shall have academic facilities, technological resources for teaching and learning.
5	The student will earn achievements in inter-university Extra Curricular activities.
6	The faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to the existing Body of Knowledge.
7	The faculty and students will integrate ethics and values in teaching and Learning, in theory and practice.
8	The faculty will facilitate cultivation of cross cultural humanitarian values.
9	The faculty will facilitate joint research collaborations, invite international delegates and speakers for seminars and conferences and various other opportunities for global exposure
10	The faculty will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious accreditations from various national, international bodies and ranking bodies.
11	The faculty shall develop and maintain strong relationship with corporate and maintain lifelong alumni network and keep the curriculum responsive to industry needs.
12	The faculty will support all the students for quality placements or join family business or start their own venture.

### 5.11.6 PEO's – PLO mapping

Broad-Based Student Learning Goals (PEOs) Programme Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
MASTER'S LEVEL PROGRAM	MS					
Name of the programme						
Learning Outcome 1	$\checkmark$	$\checkmark$				
Learning Outcome 2		$\checkmark$				
Learning Outcome 3		$\checkmark$				
Learning Outcome 4		$\checkmark$				
Learning Outcome 5		$\checkmark$				
Learning Outcome 6			$\checkmark$			
Learning Outcome 7			$\checkmark$			
Learning Outcome 8				$\checkmark$		

Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs). The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summarizes of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note:  $\sqrt{$  in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):

Broad-Based Student Learning Goals (PEOs) Programme Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
Learning Outcome 9						
Learning Outcome 10						
Learning Outcome 11						
Learning Outcome 12						

# 5.11.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	The student will apply	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		knowledge of			shall obtain			students shall
		mathematics,			grade 'A'			give a
		sciences and			(>=75-100%)			grade'A'
		engineering to						(>=75-100%)
		solve problems	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Summer Internship	UG/PLO/ID/ II	Atleast 40%
		of automobile			the students	I I I I I I I I I I I I I I I I I I I		of the
		engineering			shall be marks			students shall
					satisfactory			obtain a
								grade 'A' or
								above
	<b>.</b>							
2	Investigation	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		formulate	Examination		shall obtain			students shall
		research			grade 'A'			give a
		literature and			(>=75-100%)			grade'A'
		analyze						(>=75-100%)
		automobile	D'acceder D baier		A (1)	C		A (1 / 400/
		engineering	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Summer Internship	UG/PLO/ID/ II	Atleast 40%
		problems			shall be marks			students shall
		substantiated			satisfactory			obtain a
		conclusions						grade 'A' or

		using first principles of						above
		mathematics,						
		natural sciences,						
		and engineering						
		sciences						
3	Design/Development	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	of Solutions	create solutions	Examination		the students			of the
		automobile			shall obtain			students shall
		engineering			grade 'A'			give a
		problems and			(>=75-100%)			grade'A'
		design system						(>=75-100%)
		components or			A.1 ( 000/ C	G I I I I		A.1 . 400/
		processes that	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Summer Internship	UG/PLO/ID/ II	Atleast 40%
		meet the			the students			of the
		specified needs			shall be marks			students shall
		with appropriate			satisfactory			obtain a
		consideration for						grade A of
		the public health						above
		and safety,						
		cultural,						
		societal, and						
		environmental						
		considerations						

4	Problem Analysis	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		carry out	Examination		the students			of the
		investigations of			shall obtain			students shall
		problems using			grade 'A'			give a
		research-based			(>=75-100%)			grade'A'
		knowledge and						(>=75-100%)
		research						
		methods				Industry Internship	UG/PLO/ID/ II	Atleast 40%
		including design			A.1 ( 000) C	-		of the
		of experiments,	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of			students shall
		analysis and			the students			obtain a
		interpretation of			shall be marks			grade 'A' or
		data and			satisfactory			above
		synthesis of						
		information to						
		provide valid						
		conclusions						
			~					
5	Modern Tool Usage	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		create, select	Examination		the students			of the
		and apply			shall obtain			students shall
		appropriate			grade 'A'			give a
		techniques,			(>='/5-100%)			grade A'
		resources and						(>=/5-100%)
		modern	Dissertation Rubrics	LIG/PLO/D/DN	Atleast 80% of	Industry Internship	LIG/PLO/ID/ II	Atleast 40%
		engineering and	Dissertation Rubites	UG/TLO/D/DIV	the students	medistry merniship		of the
		tools, necessary			shall be marks			students shall
		nor computing			satisfactory			obtain a
		practice with an			substactory			grade 'A' or
		the limitations						above
		the miniations						

6	The Engineer &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Society	apply reasoning	Examination		the students			of the
		informed by			shall obtain			students shall
		contextual			grade 'A'			give a
		knowledge to			(>=75-100%)			grade'A'
		assess societal,						(>=75-100%)
		health, safety,						
		legal and	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		cultural issues			the students			of the
		and consequent			shall be marks			students shall
		responsibilities			satisfactory			obtain a
		relevant to the			1000/ of the			grade 'A' or
		professional			students shall			above
		engineering			students shan			100% of the
		practice			rosponsibility			100% of the
					towards			students shan
					anvironment			rosponsibility
					environment,			towards
					bealth safety			environment
					legal and			society
					cultural issues			ethics health
					cultural issues			safety legal
								and cultural
								iscues
								155005

7	Environment &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Sustainability	recognize the	Examination		the students			of the
		impact of the			shall obtain			students shall
		professional			grade 'A'			give a
		engineering			(>=75-100%)			grade'A'
		solutions in						(>=75-100%)
		societal and						
		environmental	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		contexts and			the students			of the
		demonstrate the			shall be marks			students shall
		knowledge if			satisfactory			obtain a
		and need for the			1000/ 6/1			grade 'A' or
		sustainable			100% of the			above
		development			students shall			1000/
					pursue their			100% of the
					responsibility			students shall
					towards			pursue their
					environment,			responsibility
					society, ethics,			towards
					health, safety,			environment,
					legal and			society,
					cultural issues			ethics, health,
								safety, legal
								and cultural
								issues

8	Ethics	The student will apply ethical	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the
		principles and			shall be marks			students shall
		practice			satisfactory			give a
		professional						grade'A'
		ethics and						(>=75-100%)
		responsibilities						
		and norms of the						
		engineering	Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of			
		practice		Framework	the students			
					shall obtain			
					grade 'A'			
					(>=75-100%)			
			Bahavioural Science		Atlaast 85%	Industry Internship		Atleast 40%
			Rubrics	00/1209/0/05	Alleusi 0570	mousu'y merniship	00/11/0/11/11	of the
			Rubiles		students shall			students shall
					qualify the			obtain a
					exam			grade 'A' or
								above
0	I. 1. 1. 1	The state 1 and 11	E D '		A 1 4 050/			A (1
9		I ne student will	Foreign Business	UG/PLU9/D/F	Atleast 85%	Student Exit Survey	UG/PLU/ID/ ES	Atleast 85%
	W OIK	offectiveness as	Language Rublics	DL	students shall			of the
		an individual			qualify the			give e
		an mutvicual			exam			give a
		or leader of team						(>-75, 100%)
		assembled to						(>=75-10070)
		undertake a				Industry Internship	UG/PLO/ID/ II	Atleast 40%
		common goal in						of the
		multidisciplinary						students shall
		multidisciplinary						students shall

		settings	Comprehensive Exam Dissertation Rubrics	UG/PLO/D/CE UG/PLO/D/DN	Atleast 40% of the students shall obtain grade 'A' (>=75-100%) Atleast 80% of the students shall be marks satisfactory			obtain a grade 'A' or above
10	Communication	The student will use effective communication to cater to both technical and non-technical audiences	Business Communication Rubrics Dissertation Rubrics	UG/PLO10/D/ BC UG/PLO/D/DN	Atleast 85% students shall qualify the exam Atleast 80% of	Student Exit Survey	UG/PLO/ID/ ES UG/PLO/ID/II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40%
			Comprehensive Exam	UG/PLO/D/CE	the students shall be marks satisfactory Atleast 40% of the students shall obtain grade 'A'			of the students shall obtain a grade 'A' or above
11	Project Management & Finance	The student will demonstrate knowledge and understanding of the engineering	Comprehensive Exam	UG/PLO/D/CE	(>=75-100%) Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A'

		and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marks satisfactory	Industry Internship	UG/PLO/ID/II	(>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
12	Lifelong Learning	The student will recognise the need for, and will engage in independent and life-long learning in the	Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		of technological change			Atleast 80% of the students shall be marks satisfactory	inclusity internship	00/120/12/11	of the students shall obtain a grade 'A' or above

#### 5.12 Masters

### M.Tech.(Mechatronics Engineering)

#### **5.12.1 Mission Statement**

#### **Programme Mission**

"To provide education in all areas of Mechatronics Engineering and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

#### 5.12.2 Programme Educational Objectives (PEOs)

Programme Educational Objectives

- 1. The students shall have the ability to apply knowledge of science, engineering and technology for research and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.
- 2. The students shall have the ability to apply research knowledge and methods to solve engineering problems
- 3. The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.
- 4. Students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams
- 5. The student will have the ability to support and practice independent and life-long learning for professional development.
- 6. Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers

# 5.12.3 Programme Operational Objectives

S.No	Operational Goals
1	The Programme of M.Tech Mechatronics Engineering will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	The Programme will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	The Programme will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	The Programme will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	The Programme will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	The Programme will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	The Programme will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	The Programme will create opportunities for international exposure for its students and faculty.

# 5.12.4 Programme Learning Outcomes

Intended Learning Out	comes
1.	The student will apply knowledge of mathematics, sciences and engineering to solve complex problems using concepts of computer science & engineering.
2.	The student will identify, formulate research literature and analyze complex automobile engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
3.	The student will create solutions for computer science & engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal, and environmental considerations
4.	The student will carry out investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions
5.	The student will create, select and apply appropriate techniques, resources and modern engineering tools including prediction and modelling to different automobile engineering activities with an understanding of the limitations.
6.	The student will apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and consequent responsibilities relevant to the professional engineering practice.
7.	The student will recognize the impact of the professional engineering solutions in societal and environmental contexts and and demonstrate the knowledge if and need for the sustainable development.
8.	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the engineering practice.
9.	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a common goal in multidisciplinary settings.
10	). The student will use effective communication to cater to both technical and non-technical audiences.
11	The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments.
12	2. The student will recognise the need for, and will engage in independent and life-long learning in the broadest context of technological change

# 5.12.5 Programme Operational Outcomes

Ope	erational Outcomes
1	The faculty will use appropriate methodology and pedagogical tools for teaching, learning and development.
2	The curriculum will be contemporary and relevant to meet industry requirements and benchmarked on global standards by incorporating feedback from all the stakeholders.
3	The student will graduate in timely manner.
4	The student and faculty shall have academic facilities, technological resources for teaching and learning.
5	The student will earn achievements in inter-university Extra Curricular activities.
6	The faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to the existing Body of Knowledge.
7	The faculty and students will integrate ethics and values in teaching and Learning, in theory and practice.
8	The faculty will facilitate cultivation of cross cultural humanitarian values.
9	The faculty will facilitate joint research collaborations, invite international delegates and speakers for seminars and conferences and various other opportunities for global exposure
10	The faculty will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious accreditations from various national, international bodies and ranking bodies.
11	The faculty shall develop and maintain strong relationship with corporate and maintain lifelong alumni network and keep the curriculum responsive to industry needs.
12	The faculty will support all the students for quality placements or join family business or start their own venture.

### 5.12.6 PEO's – PLO mapping

Broad-Based Student Learning Goals (PEOs) Programme Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
MASTER'S LEVEL PROGRAM	MASTER'S LEVEL PROGRAMS					
Name of the programme						
Learning Outcome 1	$\checkmark$					
Learning Outcome 2	V	$\checkmark$				
Learning Outcome 3	V	$\checkmark$				
Learning Outcome 4	$\checkmark$	$\checkmark$				
Learning Outcome 5	$\checkmark$	$\checkmark$				
Learning Outcome 6	1		$\checkmark$			
Learning Outcome 7						
Learning Outcome 8				$\checkmark$		

Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs). The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summarizes of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note:  $\sqrt{$  in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):

Broad-Based Student Learning Goals (PEOs) Programme Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
Learning Outcome 9						
Learning Outcome 10						
Learning Outcome 11						
Learning Outcome 12						

# 5.12.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	The student will apply	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		knowledge of			shall obtain			students shall
		mathematics,			grade 'A'			give a
		sciences and			(>=75-100%)			grade'A'
		engineering to						(>=75-100%)
		solve problems	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Summer Internship	UG/PLO/ID/ II	Atleast 40%
		of automobile			the students	I I I I I I I I I I I I I I I I I I I		of the
		engineering			shall be marks			students shall
					satisfactory			obtain a
								grade 'A' or
								above
	<b>.</b>							
2	Investigation	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		formulate	Examination		shall obtain			students shall
		research			grade 'A'			give a
		literature and			(>=75-100%)			grade'A'
		analyze						(>=75-100%)
		automobile	D'acceder D baier		A (1)	C		A (1 / 400/
		engineering	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Summer Internship	UG/PLO/ID/ II	Atleast 40%
		problems			shall be marks			students shall
		substantiated			satisfactory			obtain a
		conclusions						grade 'A' or

		using first						above
		principles of						
		mathematics,						
		natural sciences,						
		and engineering						
		sciences						
3	Design/Development	The student will	Comprehensive	LIG/PLO/D/CF	Atleast 40% of	Student Exit Survey	LIG/PLO/ID/ FS	Atleast 85%
5	of Solutions	create solutions	Examination	CONTECTOR	the students	Student Exit Survey		of the
	of bolutions	automobile	Examination		shall obtain			students shall
		engineering			grade 'A'			give a
		problems and			(>-75-100%)			grade'A'
		design system			(>=75 100/0)			(>=75-100%)
		components or						(>=/5 100/0)
		processes that	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Summer Internship	UG/PLO/ID/ II	Atleast 40%
		meet the			the students			of the
		specified needs			shall be marks			students shall
		with appropriate			satisfactory			obtain a
		consideration for						grade 'A' or
		the public health						above
		and safety,						
		cultural,						
		societal, and						
		environmental						
		considerations						

4	Problem Analysis	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		carry out	Examination		the students			of the
		investigations of			shall obtain			students shall
		problems using			grade 'A'			give a
		research-based			(>=75-100%)			grade'A'
		knowledge and						(>=75-100%)
		research						
		methods				Industry Internship	UG/PLO/ID/ II	Atleast 40%
		including design	Dissectation Datains		Atlanat 800/ of			of the
		of experiments,	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of			students shall
		analysis and			shall be marks			obtain a
		interpretation of			shall be marks			grade 'A' or
		data and			satisfactory			above
		synthesis of						
		information to						
		provide valid						
		conclusions						
5	Madam Taal Usaas	The student will	Communities		A +1 = = = + 400/ == f	Stadart Erit Summer		A 41 a a a 4 9 5 0/
5	Modern 1001 Usage	areata salaat	Examination	UG/PLU/D/CE	Atleast 40% of	Student Exit Survey	UG/PLU/ID/ ES	Atleast 85%
		and apply	Examination		shall obtain			of the
		and appry			grade 'A'			give e
		tochniquos			(>-75, 100%)			give a
		resources and			(>=75-100%)			(>-75, 100%)
		modern						(>=75-100%)
		engineering and	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		tools necessary			the students	* 1		of the
		for computing			shall be marks			students shall
		practice with an			satisfactory			obtain a
		understanding of						grade 'A' or
		the limitations						above
	1			1	1	1		

6	The Engineer &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Society	apply reasoning	Examination		the students			of the
		informed by			shall obtain			students shall
		contextual			grade 'A'			give a
		knowledge to			(>=75-100%)			grade'A'
		assess societal,						(>=75-100%)
		health, safety,						
		legal and	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		cultural issues			the students			of the
		and consequent			shall be marks			students shall
		responsibilities			satisfactory			obtain a
		relevant to the			1000/ of the			grade 'A' or
		professional			students shall			above
		engineering			students shan			100% of the
		practice			rosponsibility			100% of the
					towards			students shan
					anvironment			rosponsibility
					environment,			towards
					bealth safety			environment
					legal and			society
					cultural issues			ethics health
					cultural issues			safety legal
								and cultural
								iscues
								155005

7	Environment &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Sustainability	recognize the	Examination		the students			of the
		impact of the			shall obtain			students shall
		professional			grade 'A'			give a
		engineering			(>=75-100%)			grade'A'
		solutions in						(>=75-100%)
		societal and						
		environmental	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		contexts and			the students			of the
		demonstrate the			shall be marks			students shall
		knowledge if			satisfactory			obtain a
		and need for the			1000/			grade 'A' or
		sustainable			100% of the			above
		development			students shall			1000/
					pursue their			100% of the
					responsibility			students shall
					towards			pursue their
					environment,			responsibility
					society, ethics,			towards
					nealth, safety,			environment,
					legal and			society,
					cultural issues			ethics, health,
								safety, legal
								and cultural
								issues

8	Ethics	The student will apply ethical principles and practice professional ethics and	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marks satisfactory	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		responsibilities and norms of the engineering practice	Comprehensive Exam	UG/PLO/D/CE Framework	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)			
			Behavioural Science Rubrics	UG/PLO9/D/BS	Atleast 85% students shall qualify the exam	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
9	Individual and Team Work	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to	Foreign Business Language Rubrics	UG/PLO9/D/F BL	Atleast 85% students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		undertake a common goal in multidisciplinary				Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall

		settings	Comprehensive Exam Dissertation Rubrics	UG/PLO/D/CE UG/PLO/D/DN	Atleast 40% of the students shall obtain grade 'A' (>=75-100%) Atleast 80% of the students shall be marks satisfactory	-		obtain a grade 'A' or above
10	Communication	The student will use effective communication to cater to both technical and non-technical audiences	Business Communication Rubrics Dissertation Rubrics	UG/PLO10/D/ BC UG/PLO/D/DN	Atleast 85% students shall qualify the exam Atleast 80% of	Student Exit Survey	UG/PLO/ID/ ES UG/PLO/ID/II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40%
			Comprehensive Exam	UG/PLO/D/CE	the students shall be marks satisfactory Atleast 40% of the students shall obtain grade 'A'			of the students shall obtain a grade 'A' or above
11	Project Management & Finance	The student will demonstrate knowledge and understanding of the engineering	Comprehensive Exam	UG/PLO/D/CE	(>=75-100%) Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A'

		and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marks satisfactory	Industry Internship	UG/PLO/ID/II	(>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
12	Lifelong Learning	The student will recognise the need for, and will engage in independent and life-long learning in the	Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		broadest context of technological change	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marks satisfactory	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above

#### **5.13.1 Mission Statement**

### **Programme Mission**

"To provide education in all areas of Thermal & Fluid Sciences and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

### 5.13.2 Programme Educational Objectives (PEOs)

Programme Educational Objectives

- 1. The students shall have the ability to apply knowledge of science, engineering and technology for research and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.
- 2. The students shall have the ability to apply research knowledge and methods to solve engineering problems
- 3. The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.
- 4. Students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams
- 5. The student will have the ability to support and practice independent and life-long learning for professional development.
- 6. Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers

# 5.13.3 Programme Operational Objectives

S.No	Operational Goals
1	The Programme of M.Tech Thermal & Fluid Sciences will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	The Programme will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	The Programme will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	The Programme will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	The Programme will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	The Programme will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	The Programme will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	The Programme will create opportunities for international exposure for its students and faculty.

# 5.13.4 Programme Learning Outcomes

Intended Learning Out	comes
1.	The student will apply knowledge of mathematics, sciences and engineering to solve complex problems using concepts of computer science & engineering.
2.	The student will identify, formulate research literature and analyze complex automobile engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
3.	The student will create solutions for computer science & engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, cultural, societal, and environmental considerations
4.	The student will carry out investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions
5.	The student will create, select and apply appropriate techniques, resources and modern engineering tools including prediction and modelling to different automobile engineering activities with an understanding of the limitations.
6.	The student will apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and consequent responsibilities relevant to the professional engineering practice.
7.	The student will recognize the impact of the professional engineering solutions in societal and environmental contexts and and demonstrate the knowledge if and need for the sustainable development.
8.	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the engineering practice.
9.	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a common goal in multidisciplinary settings.
10	). The student will use effective communication to cater to both technical and non-technical audiences.
11	The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments.
12	2. The student will recognise the need for, and will engage in independent and life-long learning in the broadest context of technological change

# 5.13.5 Programme Operational Outcomes

Ope	erational Outcomes
1	The faculty will use appropriate methodology and pedagogical tools for teaching, learning and development.
2	The curriculum will be contemporary and relevant to meet industry requirements and benchmarked on global standards by incorporating feedback from all the stakeholders.
3	The student will graduate in timely manner.
4	The student and faculty shall have academic facilities, technological resources for teaching and learning.
5	The student will earn achievements in inter-university Extra Curricular activities.
6	The faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to the existing Body of Knowledge.
7	The faculty and students will integrate ethics and values in teaching and Learning, in theory and practice.
8	The faculty will facilitate cultivation of cross cultural humanitarian values.
9	The faculty will facilitate joint research collaborations, invite international delegates and speakers for seminars and conferences and various other opportunities for global exposure
10	The faculty will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious accreditations from various national, international bodies and ranking bodies.
11	The faculty shall develop and maintain strong relationship with corporate and maintain lifelong alumni network and keep the curriculum responsive to industry needs.
12	The faculty will support all the students for quality placements or join family business or start their own venture.

### 5.13.6 PEO's – PLO mapping

Broad-Based Student Learning Goals (PEOs) Programme Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
MASTER'S LEVEL PROGRAM	AS					
Name of the programme						
Learning Outcome 1	$\checkmark$	$\checkmark$				
Learning Outcome 2	$\checkmark$	$\checkmark$				
Learning Outcome 3	$\checkmark$	$\checkmark$				
Learning Outcome 4	$\checkmark$	$\checkmark$				
Learning Outcome 5	V	$\checkmark$				
Learning Outcome 6						
Learning Outcome 7			λ			
Learning Outcome 8				$\checkmark$		

Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs). The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summarizes of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note:  $\sqrt{$  in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):

Broad-Based Student Learning Goals (PEOs) Programme Learning Outcomes (PLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
Learning Outcome 9						
Learning Outcome 10						
Learning Outcome 11						
Learning Outcome 12						
# 5.13.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	The student will apply	Comprehensive Examination	UG/PLO/D/CE	Atleast 40% of the students	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		knowledge of			shall obtain			students shall
		mathematics,			grade 'A'			give a
		sciences and			(>=75-100%)			grade'A'
		engineering to						(>=75-100%)
		solve problems	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Summer Internship	UG/PLO/ID/ II	Atleast 40%
		of automobile			the students	I I I I I I I I I I I I I I I I I I I		of the
		engineering			shall be marks			students shall
					satisfactory			obtain a
								grade 'A' or
								above
	<b>.</b>							
2	Investigation	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		formulate	Examination		shall obtain			students shall
		research			grade 'A'			give a
		literature and			(>=75-100%)			grade'A'
		analyze						(>=75-100%)
		automobile	D'acceder D baier		A (1)	C		A (1 / 400/
		engineering	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Summer Internship	UG/PLO/ID/ II	Atleast 40%
		problems			shall be marks			students shall
		substantiated			satisfactory			obtain a
		conclusions						grade 'A' or

		using first						above
		principles of						
		mathematics,						
		natural sciences,						
		and engineering						
		sciences						
3	Design/Development	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	of Solutions	create solutions	Examination		the students			of the
		automobile			shall obtain			students shall
		engineering			grade 'A'			give a
		problems and			(>=75-100%)			grade'A'
		design system						(>=75-100%)
		components or						
		processes that	<b>Dissertation Rubrics</b>	UG/PLO/D/DN	Atleast 80% of	Summer Internship	UG/PLO/ID/ II	Atleast 40%
		meet the			the students			of the
		specified needs			shall be marks			students shall
		with appropriate			satisfactory			obtain a
		consideration for						grade 'A' or
		the public health						above
		and safety,						
		cultural,						
		societal, and						
		environmental						
		considerations						

4	Problem Analysis	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		carry out	Examination		the students			of the
		investigations of			shall obtain			students shall
		problems using			grade 'A'			give a
		research-based			(>=75-100%)			grade'A'
		knowledge and						(>=75-100%)
		research						
		methods				Industry Internship	UG/PLO/ID/ II	Atleast 40%
		including design	Dissectation Datains		Atlanat 800/ of			of the
		of experiments,	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of			students shall
		analysis and			shall be marks			obtain a
		interpretation of			shall be marks			grade 'A' or
		data and			satisfactory			above
		synthesis of						
		information to						
		provide valid						
		conclusions						
5	Madam Taal Usaas	The student will	Communities		A +1 = = = + 400/ == f	Stadart Erit Summer		A 41 a a a 4 9 5 0/
5	Modern 1001 Usage	areata salaat	Examination	UG/PLU/D/CE	Atleast 40% of	Student Exit Survey	UG/PLU/ID/ ES	Atleast 85%
		and apply	Examination		shall obtain			of the
		and appry			grade 'A'			give e
		tochniquos			(>-75, 100%)			give a
		resources and			(>=75-100%)			(>-75, 100%)
		modern						(>=75-100%)
		engineering and	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		tools necessary			the students	* 1		of the
		for computing			shall be marks			students shall
		practice with an			satisfactory			obtain a
		understanding of						grade 'A' or
		the limitations						above
	1			1	1	1		

6	The Engineer &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Society	apply reasoning	Examination		the students			of the
		informed by			shall obtain			students shall
		contextual			grade 'A'			give a
		knowledge to			(>=75-100%)			grade'A'
		assess societal,						(>=75-100%)
		health, safety,						
		legal and	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		cultural issues			the students			of the
		and consequent			shall be marks			students shall
		responsibilities			satisfactory			obtain a
		relevant to the			100% of the			grade 'A' or
		professional			students shall			above
		engineering			pursue their			100% of the
		practice			responsibility			students shall
					towards			pursue their
					environment			responsibility
					society ethics			towards
					health safety			environment
					legal and			society
					cultural issues			ethics, health.
					••••••••			safety, legal
								and cultural
								issues

7	Environment &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Sustainability	recognize the	Examination		the students			of the
		impact of the			shall obtain			students shall
		professional			grade 'A'			give a
		engineering			(>=75-100%)			grade'A'
		solutions in						(>=75-100%)
		societal and						
		environmental	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		contexts and			the students			of the
		demonstrate the			shall be marks			students shall
		knowledge if			satisfactory			obtain a
		and need for the			1000/			grade 'A' or
		sustainable			100% of the			above
		development			students shall			1000/
					pursue their			100% of the
					responsibility			students shall
					towards			pursue their
					environment,			responsibility
					society, ethics,			towards
					nealth, safety,			environment,
					legal and			society,
					cultural issues			ethics, health,
								safety, legal
								and cultural
								issues

8	Ethics	The student will apply ethical principles and practice professional ethics and	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marks satisfactory	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		responsibilities and norms of the engineering practice	Comprehensive Exam	UG/PLO/D/CE Framework	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)			
			Behavioural Science Rubrics	UG/PLO9/D/BS	Atleast 85% students shall qualify the exam	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
9	Individual and Team Work	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to	Foreign Business Language Rubrics	UG/PLO9/D/F BL	Atleast 85% students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		undertake a common goal in multidisciplinary				Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall

		settings	Comprehensive Exam Dissertation Rubrics	UG/PLO/D/CE UG/PLO/D/DN	Atleast 40% of the students shall obtain grade 'A' (>=75-100%) Atleast 80% of the students shall be marks satisfactory			obtain a grade 'A' or above
10	Communication	The student will use effective communication to cater to both technical and non-technical audiences	Business Communication Rubrics Dissertation Rubrics	UG/PLO10/D/ BC UG/PLO/D/DN	Atleast 85% students shall qualify the exam Atleast 80% of	Student Exit Survey	UG/PLO/ID/ ES UG/PLO/ID/II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40%
			Comprehensive Exam	UG/PLO/D/CE	the students shall be marks satisfactory Atleast 40% of the students shall obtain grade 'A'			of the students shall obtain a grade 'A' or above
11	Project Management & Finance	The student will demonstrate knowledge and understanding of the engineering	Comprehensive Exam	UG/PLO/D/CE	(>=75-100%) Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A'

		and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments	Dissertation Rubrics	UG/PLO/D/DN	Atleast 80% of the students shall be marks satisfactory	Industry Internship	UG/PLO/ID/II	(>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
12	Lifelong Learning	The student will recognise the need for, and will engage in independent and life-long learning in the	Comprehensive Exam	UG/PLO/D/CE	Atleast 40% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		of technological change			Atleast 80% of the students shall be marks satisfactory	inclusity internship	00/120/12/11	of the students shall obtain a grade 'A' or above

#### 5.14 Master's-Level Programme -

### M. Tech (Electronics & Communication Engineering)

#### **5.14.1 Mission Statement**

#### **Programme Mission**

"To provide education at PG level in Electronics & Communication Engineering and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

### 5. 14.2 Programme Educational Objectives (PEOs)

Programme Educational Objectives						
1.	The students shall have the ability to apply knowledge of mathematics, science and engineering for research, design and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.					
2.	The students shall have the ability to apply research knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusion.					
3.	The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.					
4.	Students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams.					
5.	The student will have the ability to support and practice independent and life-long learning for professional development.					
6.	Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers.					

# 5. 14.3 Programme Operational Objectives

S.No	Operational Goals
1	The Programme will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	The Programme will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	The Programme will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	The Programme will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	The Programme will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	The Programme will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	The Programme will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	The Programme will create opportunities for international exposure for its students and faculty.

### **5. 14.4 Programme Learning Outcomes**

Intended Learning Outcomes

- 1. The student will demonstrate an in depth knowledge of Electronics and Communication Engineering to discriminate, evaluate, analyze and synthesize existing and new knowledge.
- 2. The student will demonstrate an innovative thinking to conceptualize and solve complex engineering problems, design and conduct experiments, and evaluate a feasible optimal solution that meet the specified needs with appropriate consideration for the public health and safety, <u>economical</u>, cultural, societal, and environmental considerations in the field of Electronics and Communication Engineering.
- 3. The student will demonstrate the research based knowledge and research methods to extract unsolved problems through literature survey, analyze and interpret data, synthesize the information and higher order skill to view things in broader perspective in the field of Electronics and Communication Engineering for the development of scientific/technical knowledge.
- 4. The student will demonstrate an ability to critically analyze complex engineering problems and apply independent judgement to carry out research in a wider theoretical, practical and policy context to solve complex engineering problems.
- 5. The student will 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.
- 6. The student will be able to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. The student will be able to understand the impact of the professional engineering solutions in <u>political</u>, <u>global</u>, <u>economic</u>, <u>societal</u> and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. The student will demonstrate professional and intellectual integrity, ethics of research and scholarship, and understanding of research outcomes and responsibility to contribute to the community for sustainable development of society.
- 9. The student will be able to demonstrate understanding of group dynamics, recognize opportunities and contribute as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. The student will be able to 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.
- 11. The student will be able to demonstrate knowledge and understanding of Engineering and Management Principles as an individual, and as a member or leader in diverse teams considering economical and financial factors.
- 12. The student will understand the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological changes and <u>contemporary issues</u>.

# 5. 14.5Programme Operational Outcomes

Ope	erational Outcomes
1	The faculty will use appropriate methodology and pedagogical tools for teaching, learning and development.
2	The curriculum will be contemporary and relevant to meet industry requirements and benchmarked on global standards by incorporating feedback from all the stakeholders.
3	The student will graduate in timely manner.
4	The student and faculty shall have academic facilities, technological resources for teaching and learning.
5	The student will earn achievements in inter-university Extra Curricular activities.
6	The faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to the existing Body of Knowledge.
7	The faculty and students will integrate ethics and values in teaching and Learning, in theory and practice.
8	The faculty will facilitate cultivation of cross cultural humanitarian values.
9	The faculty will facilitate joint research collaborations, invite international delegates and speakers for seminars and conferences and various other opportunities for global exposure
10	The faculty will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious accreditations from various national, international bodies and ranking bodies.
11	The faculty shall develop and maintain strong relationship with corporate and maintain lifelong alumni network and keep the curriculum responsive to industry needs.
12	The faculty will support all the students for quality placements or join family business or start their own venture.

### 5. 14.6 Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs)

The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summaries of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note:  $\sqrt{}$  in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
MASTER'S LEVEL PROGRAM	IS					
Name of the programme						
Learning Outcome 1	$\checkmark$	$\checkmark$				
Learning Outcome 2	$\checkmark$	$\checkmark$				
Learning Outcome 3	V	$\checkmark$				
Learning Outcome 4	$\checkmark$	$\checkmark$				

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
Learning Outcome 5		$\checkmark$				
Learning Outcome 6			V			
Learning Outcome 7			$\checkmark$			
Learning Outcome 8				$\checkmark$		
Learning Outcome 9						
Learning Outcome 10						
Learning Outcome 11						
Learning Outcome 12					√	

# 5. 14.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge		Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
2	Investigation		Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or

							above
3	Design/Development of Solutions	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above

4	Problem Analysis	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
5	Modern Tool Usage	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above

6	The Engineer &	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Society	Examination		the students			of the
				shall obtain			students shall
				grade 'A'			give a
				(>=75-100%)			grade'A'
							(>=75-100%)
		Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
				the students			of the
				shall obtain a			students shall
				grade 'A' or			obtain a
				above			grade 'A' or
				100% of the			above
				students shall			100% of the
				pursue their			students shall
				responsibility			pursue their
				towards			responsibility
				environment			towards
				society, ethics,			environment.
				health safety			society
				legal and			ethics, health.
				cultural issues			safety, legal
							and cultural
							issues

7	Environment &	Comprehensive Examination	UG/PLO/D/CE	Atleast 20%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Sustainability			of the			of the
				students shall			students shall
				obtain grade			give a
				'A' (>=75-			grade'A'
				100%)			(>=75-
							100%)
		Dissertation Rubrics	UG/PLO/D/DN	Atleast 40%	Industry Internship	UG/PLO/ID/ II	Atleast 40%
				of the			of the
				students shall			students shall
				obtain a grade			obtain a
				'A' or above			grade 'A' or
				1000/ 5/1			above
				100% of the			1000/ 6/1
				students shall			100% of the
				pursue their			students shall
				responsibility			pursue their
				towards			responsibility
				environment,			towards
				society,			environment,
				ethics, health,			society,
				safety, legal			ethics,
				and cultural			health,
				issues			safety, legal
							and cultural
							issues

8	Ethics	Dissertation Ru	ubrics	UG/PLO/D/DN	Atleast 40%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
					of the			of the
					students shall			students shall
					obtain a grade			give a
					'A' or above			grade'A'
								(>=75-
								100%)
		Comprehensive Example	amination	UG/PLO/D/CE	Atleast 20%			
					of the			
					students shall			
					obtain grade			
					'A' (>=75-			
					100%)			
		Behavioural Scienc	e Rubrics	UG/PLO9/D/BS	Atleast 85%	Industry Internship	UG/PLO/ID/ II	Atleast 40%
					of the			of the
					students shall			students shall
					quality the			obtain a
					exam.			grade 'A' or
								above
9	Individual and	Foreign Business I	Language	UG/PLO9/D/F	Atleast 85%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Team Work	Rubrics		BL	of the			of the
					students shall			students shall
					qualify the			give a
					exam.			grade'A'
								(>=75-
								100%)

		Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75- 100%)	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
		Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above			
10	Communication	Business Communication Rubrics	UG/PLO10/D/ BC	Atleast 85% of the students shall qualify the exam.	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75- 100%)
		Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above

		Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75- 100%)			
11	Project Management & Finance	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75- 100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75- 100%)
		Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above
12	Lifelong Learning	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75- 100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75- 100%)

	Dissertation Rubrics	UG/PLO/D/DN	Atleast 10%	Industry Internship	UG/PLO/ID/II	Atleast 40%
			Atteast 4070			of the
			of the			students shall
			students shall			obtain a
			obtain a grade			grade 'A' or
			A or above			above

#### 5.15 Master's-Level Programme -

#### M. Tech (Wireless Communication)

### 5.15.1 Mission Statement

#### **Programme Mission**

"To provide education at postgraduate level in Wireless Communication and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

### 5.15.2 Programme Educational Objectives (PEOs)

### **Educational Goals**

- 1. The students shall have the ability to apply knowledge of mathematics, science and engineering for research, design and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.
- 2. The students shall have the ability to apply research knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusion.
- 3. The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.
- 4. Students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams.
- 5. The student will have the ability to support and practice independent and life-long learning for professional development.
- 6. Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers.

# 5.15.3 Programme Operational Objectives

S.No	Operational Goals
1	The Programme will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	The Programme will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	The Programme will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	The Programme will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	The Programme will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	The Programme will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	The Programme will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	The Programme will create opportunities for international exposure for its students and faculty.

#### **5.15.4 Programme Learning Outcomes**

Intended Learning Outcomes

- 1. The student will demonstrate an in depth knowledge of Wireless Communication Systems and Technology to discriminate, evaluate, analyse and synthesize existing and new knowledge.
- 2. The student will demonstrate an innovative thinking to conceptualize and solve complex engineering problems, design and conduct experiments, and evaluate a feasible optimal solution that meet the specified needs with appropriate consideration for the public health and safety, <u>economical</u>, cultural, societal, and environmental considerations in the field of Wireless Communication Systems and Technology.
- 3. The student will demonstrate the researchbased knowledge and research methods to extract unsolved problems through literature survey, analyse and interpret data, synthesize the information and higher order skill to view things in broader perspective in the field of Wireless Communication Systems and Technology for the development of scientific/ technical knowledge.
- 4. The student will demonstrate an ability to critically analyze complex engineering problems and apply independent judgement to carry out research in a wider theoretical, practical and policy context to solve complex engineering problems.
- 5. The student will 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.
- 6. The student will be able to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. The student will be able to understand the impact of the professional engineering solutions in <u>political</u>, <u>global</u>, <u>economic</u>, <u>societal</u> and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. The student will demonstrate professional and intellectual integrity, ethics of research and scholarship, and understanding of research outcomes and responsibility to contribute to the community for sustainable development of society.
- 9. The student will be able to demonstrate understanding of group dynamics, recognize opportunities and contribute as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. The student will be able to 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.
- 11. The student will be able to demonstrate knowledge and understanding of Engineering and Management Principles as an individual, and as a member or leader in diverse teams considering economical and financial factors.
- 12. The student will understand the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological changes and <u>contemporary issues</u>.

# 5.15.5Programme Operational Outcomes

Ope	erational Outcomes
1	The faculty will use appropriate methodology and pedagogical tools for teaching, learning and development.
2	The curriculum will be contemporary and relevant to meet industry requirements and benchmarked on global standards by incorporating feedback from all the stakeholders.
3	The student will graduate in timely manner.
4	The student and faculty shall have academic facilities, technological resources for teaching and learning.
5	The student will earn achievements in inter-university Extra Curricular activities.
6	The faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to the existing Body of Knowledge.
7	The faculty and students will integrate ethics and values in teaching and Learning, in theory and practice.
8	The faculty will facilitate cultivation of cross cultural humanitarian values.
9	The faculty will facilitate joint research collaborations, invite international delegates and speakers for seminars and conferences and various other opportunities for global exposure
10	The faculty will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious accreditations from various national, international bodies and ranking bodies.
11	The faculty shall develop and maintain strong relationship with corporate and maintain lifelong alumni network and keep the curriculum responsive to industry needs.
12	The faculty will support all the students for quality placements or join family business or start their own venture.

### 5.15.6 Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs)

The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summaries of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note:  $\sqrt{}$  in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
MASTER'S LEVEL PROGRAM	IS					
Name of the programme						
Learning Outcome 1	$\checkmark$					
Learning Outcome 2						
Learning Outcome 3						
Learning Outcome 4	$\checkmark$	$\checkmark$				

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
Learning Outcome 5		$\checkmark$				
Learning Outcome 6						
Learning Outcome 7						
Learning Outcome 8				$\checkmark$		
Learning Outcome 9						
Learning Outcome 10						
Learning Outcome 11						
Learning Outcome 12					√	

# 5.15.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	PLO1	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
2	Investigation	PLO2	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or

								above
3	Design/Development of Solutions	PLO3	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above

4	Problem Analysis	PLO4	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
5	Modern Tool Usage	PLO5	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above

6	The Engineer &	PLO6	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Society		Examination		the students			of the
					shall obtain			students shall
					grade 'A'			give a
					(>=75-100%)			grade'A'
								(>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
					the students			of the
					shall obtain a			students shall
					grade 'A' or			obtain a
					above			grade 'A' or
					100% of the			above
					students shall			100% of the
					students shan			students shall
					responsibility			students shan
					towards			responsibility
					environment			towards
					society ethics			environment
					health safety			society
					legal and			ethics health
					cultural issues			safety legal
					Culturul 155405			and cultural
								issues
								155405

7	Environment &	PO7	Comprehensive Examination	UG/PLO/D/CE	Atleast 20%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Sustainability				of the			of the
					students shall			students shall
					obtain grade			give a
					'A' (>=75-			grade'A'
					100%)			(>=75-
								100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40%	Industry Internship	UG/PLO/ID/ II	Atleast 40%
					of the			of the
					students shall			students shall
					obtain a grade			obtain a
					'A' or above			grade 'A' or
					1000/ -f + h =			above
					100% of the			1000/ of the
								100% of the
					pursue their			students shall
					responsibility			pursue their
					towards			responsibility
					environment,			towards
					society,			environment,
					etnics, nealth,			society,
					salety, legal			etnics,
					and cultural			nealth,
					issues			salety, legal
								and cultural
								issues

8	Ethics	PLO8	Dissertation Rubrics	UG/PLO/D/DN	Atleast 40%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
					of the			of the
					obtain a grade			give a
					'A' or above			give a
					Tr of above			(>=75-
								100%)
								,
			Comprehensive Examination	UG/PLO/D/CE	Atleast 20%			
					of the			
					students shall			
					obtain grade			
					'A' (>=75-			
					100%)			
			Behavioural Science Rubrics	UG/PLO9/D/BS	Atleast 85%	Industry Internship	UG/PLO/ID/ II	Atleast 40%
					of the			of the
					students shall			students shall
					qualify the			obtain a
					exam.			grade 'A' or
								above
9	Individual and	PLO9	Foreign Business Language	UG/PLO9/D/F	Atleast 85%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Team Work		Rubrics	BL	of the			of the
					students shall			students shall
					qualify the			give a
					exam.			grade'A'
								(>=75-
								1000()

			Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75- 100%)	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above			
10	Communication	PLO10	Business Communication Rubrics	UG/PLO10/D/ BC	Atleast 85% of the students shall qualify the exam.	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75- 100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above
			Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75- 100%)			
----	------------------------------------	-------	---------------------------	-------------	--------------------------------------------------------------------------------	---------------------	---------------	----------------------------------------------------------------------------------
11	Project Management & Finance	PLO11	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75- 100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75- 100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above
12	Lifelong Learning	PLO12	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75- 100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75- 100%)

	Dissertation Rubrics	UG/PLO/D/DN	Atleast 10%	Industry Internship	UG/PLO/ID/II	Atleast 40%
			Atteast 4070			of the
			of the			students shall
			students shall			obtain a
			obtain a grade			grade 'A' or
			A or above			above

M. Tech (VLSI)

### **5.16.1 Mission Statement**

#### **Programme Mission**

"To provide education at PG level in Very Large Scale Integration and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action"

## 5.16.2 Programme Educational Objectives (PEOs)

## **Educational Goals**

- 1. The students shall have the ability to apply knowledge of mathematics, science and engineering for research, design and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.
- 2. The students shall have the ability to apply research knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusion.
- 3. The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.
- 4. Students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams.
- 5. The student will have the ability to support and practice independent and life-long learning for professional development.
- 6. Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers.

# 5.16.3 Programme Operational Objectives

S.No	Operational Goals
1	The Programme will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	The Programme will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
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5	The Programme will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	The Programme will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	The Programme will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	The Programme will create opportunities for international exposure for its students and faculty.

#### **5.16.4 Programme Learning Outcomes**

Intended Learning Outcomes

- 1. The student will demonstrate an in depth knowledge of VLSI Technology to discriminate, evaluate, analyse and synthesize existing and new knowledge.
- 2. The student will demonstrate an innovative thinking to conceptualize and solve complex engineering problems, design and conduct experiments, and evaluate a feasible optimal solution that meet the specified needs with appropriate consideration for the public health and safety, economical, cultural, societal, and environmental considerations in the field of VLSI.
- 3. The student will demonstrate the research based knowledge and research methods to extract unsolved problems through literature survey, analyze and interpret data, synthesize the information and higher order skill to view things in broader perspective in the field of VLSI for the development of scientific/ technical knowledge.
- 4. The student will demonstrate an ability to critically analyze complex engineering problems and apply independent judgement to carry out research in a wider theoretical, practical and policy context to solve complex engineering problems.
- 5. The student will 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.
- 6. The student will be able to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. The student will be able to understand the impact of the professional engineering solutions in political, global, economic, societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. The student will demonstrate professional and intellectual integrity, ethics of research and scholarship, and understanding of research outcomes and responsibility to contribute to the community for sustainable development of society.
- 9. The student will be able to demonstrate understanding of group dynamics, recognize opportunities and contribute as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. The student will be able to 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.
- 11. The student will be able to demonstrate knowledge and understanding of Engineering and Management Principles as an individual, and as a member or leader in diverse teams considering economical and financial factors.
- 12. The student will understand the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological changes and contemporary issues.

# 5.16.5Programme Operational Outcomes

Ope	erational Outcomes
1	The faculty will use appropriate methodology and pedagogical tools for teaching, learning and development.
2	The curriculum will be contemporary and relevant to meet industry requirements and benchmarked on global standards by incorporating feedback from all the stakeholders.
3	The student will graduate in timely manner.
4	The student and faculty shall have academic facilities, technological resources for teaching and learning.
5	The student will earn achievements in inter-university Extra Curricular activities.
6	The faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to the existing Body of Knowledge.
7	The faculty and students will integrate ethics and values in teaching and Learning, in theory and practice.
8	The faculty will facilitate cultivation of cross cultural humanitarian values.
9	The faculty will facilitate joint research collaborations, invite international delegates and speakers for seminars and conferences and various other opportunities for global exposure
10	The faculty will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious accreditations from various national, international bodies and ranking bodies.
11	The faculty shall develop and maintain strong relationship with corporate and maintain lifelong alumni network and keep the curriculum responsive to industry needs.
12	The faculty will support all the students for quality placements or join family business or start their own venture.

## 5.16.6 Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs)

The broad-based student learning goals identified in Section I above encompass the intended student learning outcomes as articulated in this section, and are general composites or summaries of these outcomes. These relationships are summarized in the outcomes-to-goals mapping below (Note:  $\sqrt{\text{ in a given cell of the table indicates the intended learning outcome in that row is associated with the learning goal in that column.):$ 

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
MASTER'S LEVEL PROGRAM	IS					
Name of the programme						
Learning Outcome 1	$\checkmark$	$\checkmark$				
Learning Outcome 2	$\checkmark$	$\checkmark$				
Learning Outcome 3		V				
Learning Outcome 4	$\checkmark$	$\checkmark$				
Learning Outcome 5						

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
Learning Outcome 6			$\checkmark$			
Learning Outcome 7			$\checkmark$			
Learning Outcome 8						
Learning Outcome 9						
Learning Outcome 10						
Learning Outcome 11						
Learning Outcome 12					√	$\checkmark$

# 5.16.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct Assessment	Performance		Indirect Assessment	Performance
				Assessment			Assessment	
1	Engineering Knowledge		Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
2	Investigation	Investigation	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or

							above
3	Design/Development of Solutions	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above

4	Problem Analysis		Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	industry internship		Affeast 40% of the students shall obtain a grade 'A' or above
5	Modern Tool Usage	e	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above

6	The Engineer &	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Society	Examination		the students			of the
				shall obtain			students shall
				grade 'A'			give a
				(>=75-100%)			grade'A'
							(>=75-100%)
		Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
				the students			of the
				shall obtain a			students shall
				grade 'A' or			obtain a
				above			grade 'A' or
				100% of the			above
				students shall			100% of the
				pursue their			students shall
				responsibility			pursue their
				towards			responsibility
				environment			towards
				society ethics			environment
				health safety			society
				legal and			ethics, health
				cultural issues			safety, legal
				1.100101 100000			and cultural
							issues

7	Environment &	Comprehensive Examination	UG/PLO/D/CE	Atleast 20%	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	Sustainability			of the			of the
				students shall			students shall
				obtain grade			give a
				'A' (>=75-			grade'A'
				100%)			(>=75-
							100%)
		Dissertation Rubrics	UG/PLO/D/DN	Atleast 40%	Industry Internship	UG/PLO/ID/ II	Atleast 40%
				of the			of the
				students shall			students shall
				obtain a grade			obtain a
				'A' or above			grade 'A' or
				1000/ 01			above
				100% of the			1000/ 61
				students shall			100% of the
				pursue their			students shall
				responsibility			pursue their
				towards			responsibility
				environment,			towards
				society,			environment,
				ethics, health,			society,
				safety, legal			ethics,
				and cultural			health,
				issues			safety, legal
							and cultural
							issues

8	Ethics	Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75- 100%)
		Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75- 100%)			
		Behavioural Science Rubrics	UG/PLO9/D/BS	Atleast 85% of the students shall qualify the exam.	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
9	Individual and Team Work	Foreign Business Language Rubrics	UG/PLO9/D/F BL	Atleast 85% of the students shall qualify the exam.	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75- 100%)

		Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75- 100%)	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
		Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above			
10	Communication	Business Communication Rubrics	UG/PLO10/D/ BC	Atleast 85% of the students shall qualify the exam.	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75- 100%)
		Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above

		Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75- 100%)			
11	Project Management & Finance	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75- 100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75- 100%)
		Dissertation Rubrics	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above
12	Lifelong Learning	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75- 100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75- 100%)

	Dissertation Rubrics	UG/PLO/D/DN	Atleast 10%	Industry Internship	UG/PLO/ID/II	Atleast 40%
			Atleast 4070			of the
			of the			students shall
			students shall			obtain a
			obtain a grade			grade 'A' or
			'A' or above			above

#### 5.17 BACHELOR'S-Level Programme-

#### **Bachelor of Technology in Electrical & Electronics Engineering**

## **5.17.1 Mission Statement**

## ProgrammeMission

To provide education at under graduate level in Electrical & Electronics Engineering and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action.

# 5.17.2 Programme Educational Objectives (PEOs)

Educationa	al Goals
1.	The students shall have the ability to apply knowledge of science, electrical engineering and technology for research and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.
2.	The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and environmental contexts.
3.	The students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team member/ leader in diverse teams.
4.	Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain effective performance in the professional/entrepreneurial careers.
5.	The student will have the ability to support and practice independent and life-long learning for professional development

# 5.17.3 Programme Operational Objectives

S.No	Operational Goals
1	The Programme will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	The Programme will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	The Programme will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	The Programme will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	The Programme will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	The Programme will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	The Programme will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	The Programme will create opportunities for international exposure for its students and faculty.

# 5.17.4 Programme Learning Outcomes

Learning	Outcomes
1.	The student will apply knowledge of mathematics, sciences and engineering to solve problems using concepts of Electrical & Electronics Engineering.
2.	The student will identify, formulate research literature and analyze electrical & electronics engineering problems reaching substantiated conclusions using first
	principles of mathematics, natural sciences, and engineering sciences
3.	The student will create solutions for electrical & electronics engineering problems and design system components or processes that meet the specified needs
	with appropriate consideration for the public health and safety, economical, cultural, societal, and environmental considerations.
4.	The student will carry out investigations of problems using research-based knowledge and research methods including design of experiments, analysis and
	interpretation of data and synthesis of information to provide valid conclusions.
5.	The student will create, select and apply appropriate techniques, resources and modern engineering and IT tools, necessary for engineering practice with an
	understanding of the limitations.
6.	The student will apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and consequent responsibilities
	relevant to the professional engineering practice.
7.	The student will recognize the impact of the professional engineering solutions in political, global, economic, societal and environmental contexts and
	demonstrate the knowledge if and need for the sustainable development.
8.	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the engineering practice.
9.	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a common goal in multidisciplinary
	settings.
10.	The student will use effective communication to cater to both technical and non-technical audiences.
11.	The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and
	leader in a team as well as to manage projects in multidisciplinary environments.
12.	The student will recognise the need for, and will engage in independent and life-long learning in the broadest context of technological change and contemporary
	issues.

# 5.17.5 Programme Operational Outcomes

Ope	erational Outcomes
1	The faculty will use appropriate methodology and pedagogical tools for teaching, learning and development.
2	The curriculum will be contemporary and relevant to meet industry requirements and benchmarked on global standards by incorporating feedback from all the stakeholders.
3	The student will graduate in timely manner.
4	The student and faculty shall have academic facilities, technological resources for teaching and learning.
5	The student will earn achievements in inter-university Extra Curricular activities.
6	The faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to the existing Body of Knowledge.
7	The faculty and students will integrate ethics and values in teaching and Learning, in theory and practice.
8	The faculty will facilitate cultivation of cross cultural humanitarian values.
9	The faculty will facilitate joint research collaborations, invite international delegates and speakers for seminars and conferences and various other opportunities for global exposure
10	The faculty will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious accreditations from various national, international bodies and ranking bodies.
11	The faculty shall develop and maintain strong relationship with corporate and maintain lifelong alumni network and keep the curriculum responsive to industry needs.
12	The faculty will support all the students for quality placements or join family business or start their own venture.

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5		
(SLOs)							
BACHELOR'S LEVEL PROGR	BACHELOR'S LEVEL PROGRAMS						
Name of the programme							
Learning Outcome 1	$\checkmark$						
Learning Outcome 2	V						
Learning Outcome 3	V						
Learning Outcome 4							
Learning Outcome 5							
Learning Outcome 6							
Learning Outcome 7		$\checkmark$					

5.17.6 Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs)

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5
Learning Outcome 8					
Learning Outcome 9				$\checkmark$	
Learning Outcome 10				$\checkmark$	
Learning Outcome 11				$\checkmark$	
Learning Outcome 12					V

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	The student will apply knowledge of mathematics, sciences and engineering to	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		solve problems using concepts of Electrical & Electronics Engineering.	Major Project Rubric	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
2	Investigation	The student will identify, formulate research literature and analyze electrical &	Comprehensive Examination Major Project Rubric	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		electronics engineering problems reaching substantiated	Major Project Rubric	00/PL0/D/P2	the students shall obtain a grade 'A' or above		00/PL0/ID/ II	of the students shall obtain a grade 'A' or

# 5.17.7 Student Learning Assessment for B.Tech in Electrical & Electronics Engineering

		conclusions using first principles of mathematics, natural sciences, and engineering sciences						above
3	Design/Development of Solutions	The student will create solutions for electrical & electronics engineering problems and design system	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		components or processes that meet the specified needs with appropriate consideration for the public health and safety, economical, cultural, societal, and environmental considerations.	Major Project Rubric	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
4	Problem Analysis	The student will carry out investigations of problems using research-based	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A'	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A'

		knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.	Major Project Rubric	UG/PLO/D/P2	(>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	(>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
5	Modern Tool Usage	The student will create, select and apply appropriate techniques, resources and modern	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		engineering and IT tools, necessary for engineering practice with an understanding of the limitations.	Major Project Rubric	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
6	The Engineer & Society	The student will apply reasoning informed by contextual knowledge to	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A'	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A'

		assess societal, health, safety, legal and			(>=75-100%)			(>=75-100%)
		legal and cultural issues and consequent responsibilities relevant to the professional engineering practice	Major Project Rubric	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above 100% of the students shall pursue their responsibility towards environment, society, ethics, health, safety, legal and cultural issues	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above 100% of the students shall pursue their responsibility towards environment, society, ethics, health, safety, legal and cultural issues
7	Environment & Sustainability	The student will recognize the impact of the professional engineering solutions in global, economic, societal and environmental	Comprehensive Examination Major Project Rubric	UG/PLO/D/CE UG/PLO/D/P2	Atleast 20% of the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or	Student Exit Survey Industry Internship	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a
		contexts and demonstrate the			grade A Of			grade 'A' or

		knowledge if and need for the sustainable			above 100% of the			above 100% of the
		development			students shall pursue their responsibility towards environment, society, ethics, health, safety, legal and cultural issues			students shall pursue their responsibility towards environment, society, ethics, health, safety, legal and cultural issues
8	Ethics	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the	Major Project Rubric	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		engineering practice	Comprehensive Exam	UG/PLO/D/CE Framework	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			
			Behavioural Science Rubrics	UG/PLO9/D/BS	Atleast 85% students shall qualify the	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a

					exam			grade 'A' or above
9	Individual and Team Work	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a	Foreign Business Language Rubrics	UG/PLO9/D/F BL	Atleast 85% students shall qualify the exam	Student Exit Survey Industry Internship	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40%
		common goal in multidisciplinary settings	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			of the students shall obtain a grade 'A' or above
			Major Project Rubric	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above			
10	Communication	The student will use effective communication to cater to both technical and	Business Communication Rubrics	UG/PLO10/D/ BC	Atleast 85% students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A'

		non-technical						(>=75-100%)
		audiences						
			Major Project Pubric		Atlasst 40% of	Industry Internship		Atlaast 40%
			Major Project Rublic	00/FL0/D/F2	the students	mousu'y mernship	00/110/11	Atleast 40%
					shall obtain a			of the
					shall obtail a			obtain a
					above			grade 'A' or
					above			above
								above
			Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of			
					the students			
					shall obtain			
					grade 'A'			
					(>=75-100%)			
11	Drojact Managamant	The student will	Comprehensive Even		Atlaast 200% of	Student Exit Survey		Atlanst 85%
11	Floject Management	The student will	Comprehensive Exam	UG/FLU/D/CE	Atleast 20% Of	Student Exit Survey	UG/FLU/ID/ ES	Alleast 05%
	& Finance	demonstrate			the students			of the
	& Finance	demonstrate			the students			of the students shall
	& Finance	demonstrate knowledge and			the students shall obtain			of the students shall
	& Finance	demonstrate knowledge and understanding of the engineering			the students shall obtain grade 'A'			of the students shall give a grade (A)
	& Finance	demonstrate knowledge and understanding of the engineering and management			the students shall obtain grade 'A' (>=75-100%)			of the students shall give a grade'A'
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and			the students shall obtain grade 'A' (>=75-100%)			of the students shall give a grade'A' (>=75-100%)
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%)	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40%
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work.	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%)	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above

12	Lifelong Learning	The student will	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		recognise the			the students			of the
		need for, and			shall obtain			students shall
		will engage in			grade 'A'			give a
		independent and			(>=75-100%)			grade'A'
		life-long						(>=75-100%)
		learning in the						
		broadest context	Major Project Rubric	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/II	Atleast 40%
		of technological			the students			of the
		change			shall obtain a			students shall
		C C			shall obtail a			obtain a
					glade A of			grade 'A' or
					above			above
								1

### 5.18 Bachelor of Technology in Electronics & Instrumentation Engineering

### 5.18. 1 Mission Statement

#### **Programme Mission**

To provide education at under graduate Electronics & Instrumentation Engineering and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action

## 5.18.2 Programme Educational Objectives (PEOs)

Educatio	onal Goals
1.	The students shall have the ability to apply knowledge of science, electronics & instrumentation engineering and technology for research and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and
	as an entrepreneur.
2.	The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal, cultural and
	environmental contexts.
3.	The students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/ team
	member/ leader in diverse teams.
4.	Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain

	effective performance in the professional/entrepreneurial careers.
5.	The student will have the ability to support and practice independent and life-long learning for professional development

# 5.18.3 Programme Operational Objectives

S.No	Operational Goals
1	The Programme will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	The Programme will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	The Programme will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	The Programme will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	The Programme will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	The Programme will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	The Programme will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	The Programme will create opportunities for international exposure for its students and faculty.

# 5.18.4 Programme Learning Outcomes

Learning	g Outcomes
1.	The student will apply knowledge of mathematics, sciences and engineering to solve problems using concepts of Electronics & Instrumentation Engineering.
2.	The student will identify, formulate research literature and analyze Electronics & Instrumentation engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
3.	The student will create solutions for Electronics & Instrumentation engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, economical, cultural, societal, and environmental considerations
4.	The student will carry out investigations of problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.
5.	The student will create, select and apply appropriate techniques, resources and modern engineering and IT tools, necessary for engineering practice with an understanding of the limitations.
6.	The student will apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and consequent responsibilities relevant to the professional engineering practice.
7.	The student will recognize the impact of the professional engineering solutions in political, global, economic, societal and environmental contexts and demonstrate the knowledge if and need for the sustainable development.
8.	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the engineering practice.
9.	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a common goal in multidisciplinary settings.
10.	The student will use effective communication to cater to both technical and non-technical audiences.

11.	The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments.
12.	The student will recognise the need for, and will engage in independent and life-long learning in the broadest context of technological change and contemporary issues.

# 5.18.5 Programme Operational Outcomes

Ope	erational Outcomes
1	The faculty will use appropriate methodology and pedagogical tools for teaching, learning and development.
2	The curriculum will be contemporary and relevant to meet industry requirements and benchmarked on global standards by incorporating feedback from all the stakeholders.
3	The student will graduate in timely manner.
4	The student and faculty shall have academic facilities, technological resources for teaching and learning.
5	The student will earn achievements in inter-university Extra Curricular activities.
6	The faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to the existing Body of Knowledge.
7	The faculty and students will integrate ethics and values in teaching and Learning, in theory and practice.
8	The faculty will facilitate cultivation of cross cultural humanitarian values.
9	The faculty will facilitate joint research collaborations, invite international delegates and speakers for seminars and conferences and various other opportunities for global exposure
Op	erational Outcomes
----	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
10	The faculty will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious accreditations from various national, international bodies and ranking bodies.
11	The faculty shall develop and maintain strong relationship with corporate and maintain lifelong alumni network and keep the curriculum responsive to industry needs.
12	The faculty will support all the students for quality placements or join family business or start their own venture.

# 5.18.6 Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs)

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5		
BACHELOR'S LEVEL PROGR	AMS						
Name of the programme	Name of the programme						
Learning Outcome 1							

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5
Learning Outcome 2	$\checkmark$				
Learning Outcome 3	$\checkmark$				
Learning Outcome 4					
Learning Outcome 5					
Learning Outcome 6					
Learning Outcome 7		$\checkmark$			
Learning Outcome 8					
Learning Outcome 9				$\checkmark$	
Learning Outcome 10					
Learning Outcome 11				$\checkmark$	

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5
Learning Outcome 12					$\checkmark$

## 5.18.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	The student will apply knowledge of mathematics, sciences and engineering to solve problems using concepts	Comprehensive Examination Major Project Rubric	UG/PLO/D/CE UG/PLO/D/P2	Atleast 20% of the students shall obtain grade 'A' (>=75-100%) Atleast 40% of	Student Exit Survey	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40%
		of Electronics & Instrumentation Engineering.			the students shall obtain a grade 'A' or above			of the students shall obtain a grade 'A' or above
2	Investigation The student v identify, formulate research literature ar analyze	The student will identify, formulate research literature and analyze Electronics &	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		Instrumentation Engineering problems reaching substantiated conclusions	Major Project Rubric	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or

		using first						above
		principles of						
		mathematics,						
		natural sciences,						
		and engineering						
		sciences						
3	Design/Development	The student will	Comprehensive	LIG/PLO/D/CF	Atleast 20% of	Student Exit Survey	LIG/PLO/ID/ FS	Atleast 85%
5	of Solutions	create solutions	Examination	CONLORD	the students	Student Exit Survey		of the
	of bolutions	for Electronics	Examination		shall obtain			students shall
		R R			grade 'A'			give a
		Instrumentation			(>-75, 100%)			grve a
		Engineering			(>=75-10070)			(>-75, 100%)
		problems and						(>=/5-100/0)
		design system	Major Project Rubric	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		components or	5		the students	v 1		of the
		processes that			shall obtain a			students shall
		meet the			grade 'A' or			obtain a
		specified needs			above			grade 'A' or
		with appropriate						above
		consideration for						
		the public health						
		and safety						
		and safety,						
		cultural						
		societal and						
		anvironmental						
		considerations						
		considerations.						
4	Problem Analysis	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		carry out	Examination		the students			of the
		investigations of			shall obtain			students shall
		problems using			grade 'A'			give a
		research-based						grade'A'

		knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.	Major Project Rubric	UG/PLO/D/P2	(>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	(>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
5	Modern Tool Usage	The student will create, select and apply appropriate techniques, resources and modern	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		engineering and IT tools, necessary for engineering practice with an understanding of the limitations.	Major Project Rubric	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
6	The Engineer & Society	The student will apply reasoning informed by contextual knowledge to	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A'	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A'

		assess societal, health, safety, legal and			(>=75-100%)			(>=75-100%)
		cultural issues and consequent responsibilities relevant to the professional engineering practice	Major Project Rubric	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above 100% of the students shall pursue their responsibility towards environment, society, ethics, health, safety, legal and cultural issues	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above 100% of the students shall pursue their responsibility towards environment, society, ethics, health, safety, legal and cultural issues
7	Environment & Sustainability	The student will recognize the impact of the professional engineering solutions in global, economic, societal and environmental contexts and	Comprehensive Examination Major Project Rubric	UG/PLO/D/CE UG/PLO/D/P2	Atleast 20% of the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or	Student Exit Survey Industry Internship	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a
		demonstrate the						grade 'A' or

		knowledge if and need for the sustainable development			above 100% of the students shall pursue their responsibility towards			above 100% of the students shall pursue their responsibility towards
					environment, society, ethics, health, safety, legal and cultural issues			environment, society, ethics, health, safety, legal and cultural issues
8	Ethics	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the	Major Project Rubric	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		engineering practice	Comprehensive Exam	UG/PLO/D/CE Framework	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			
			Behavioural Science Rubrics	UG/PLO9/D/BS	Atleast 85% students shall qualify the	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a

					exam			grade 'A' or above
9	Individual and Team Work	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a	Foreign Business Language Rubrics	UG/PLO9/D/F BL	Atleast 85% students shall qualify the exam	Student Exit Survey Industry Internship	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40%
		common goal in multidisciplinary settings	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			of the students shall obtain a grade 'A' or above
			Major Project Rubric	UG/PLO/D/P2	Atleast 40% of the students shall obtain a grade 'A' or above			
10	Communication	The student will use effective communication to cater to both technical and	Business Communication Rubrics	UG/PLO10/D/ BC	Atleast 85% students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A'

		non-technical						(>=75-100%)
		audiences						
			Major Project Pubric		Atlasst 40% of	Industry Internship		Atlaast 40%
			Major Project Rublic	00/FL0/D/F2	the students	mousu'y mernship	00/110/11	Atleast 40%
					shall obtain a			of the
					shall obtail a			obtain a
					above			grade 'A' or
					above			above
								above
			Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of			
					the students			
					shall obtain			
					grade 'A'			
					(>=75-100%)			
11	Ducient Management	The student will	Commente and Enor		A the set 200/ sf	Stadart Erit Summer		A 41 + 950/
11	Project Management	The student will	Comprehensive Exam	UG/PLU/D/CE	Atleast 20% of	Student Exit Survey	UG/PLU/ID/ ES	Atleast 85%
	e Einenee	domonstrato	1		the students	5		of the
	& Finance	demonstrate			the students			of the
	& Finance	demonstrate knowledge and			the students shall obtain			of the students shall
	& Finance	demonstrate knowledge and understanding of the engineering			the students shall obtain grade 'A'			of the students shall give a
	& Finance	demonstrate knowledge and understanding of the engineering			the students shall obtain grade 'A' (>=75-100%)			of the students shall give a grade'A'
	& Finance	demonstrate knowledge and understanding of the engineering and management			the students shall obtain grade 'A' (>=75-100%)			of the students shall give a grade'A' (>=75-100%)
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%)	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40%
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%)	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
	& Finance	demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments	Major Project Rubric	UG/PLO/D/P2	the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above

12	Lifelong Learning	The student will	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
		recognise the			the students			of the
		need for, and			shall obtain			students shall
		will engage in			grade 'A'			give a
		independent and			(>=75-100%)			grade'A'
		life-long						(>=75-100%)
		learning in the						
		broadest context	Major Project Rubric	UG/PLO/D/P2	Atleast 40% of	Industry Internship	UG/PLO/ID/II	Atleast 40%
		of technological			the students			of the
		change			shall obtain a			students shall
		C C			shall obtail a			obtain a
					glade A of			grade 'A' or
					above			above
								1

#### 5.19 Master's-Level Programme-

#### Master of Technology in Power Systems

#### **5.19.1** Mission Statement

#### **Programme Mission**

To provide education at post graduate level in Electrical Engineering with specialization in Power Systems and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action

#### 5.19.2 Programme Educational Objectives (PEOs)

Educational	Goals
1.	The students shall have the ability to apply knowledge of science, power systems engineering and technology for research and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams and as an entrepreneur.
2.	The students shall have the ability to apply research knowledge and methods to solve engineering problems
3.	The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal,

	cultural and environmental contexts.
4.	Students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/
	team member/ leader in diverse teams
5.	The student will have the ability to support and practice independent and life-long learning for professional
	development.
6.	Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain
	effective performance in the professional/entrepreneurial careers

## 5.19.3 Programme Operational Objectives

S.No	Operational Goals
1	The Programme will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	The Programme will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	The Programme will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	The Programme will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	The Programme will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	The Programme will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	The Programme will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	The Programme will create opportunities for international exposure for its students and faculty.

## 5.19.4 Programme Learning Outcomes

Programm	e Learning Outcomes
1.	The student will apply knowledge of mathematics, sciences and engineering to solve problems using concepts of Power Systems Engineering.
2.	The student will identify, formulate research literature and analyze Power Systems Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
3.	The student will create solutions for Power Systems Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, economical, cultural, societal, and environmental considerations
4.	The student will carry out investigations of problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.
5.	The student will create, select and apply appropriate techniques, resources and modern engineering and IT tools, necessary for engineering practice with an understanding of the limitations.
6.	The student will apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and consequent responsibilities relevant to the professional engineering practice.
7.	The student will recognize the impact of the professional engineering solutions in political, global, economic, societal and environmental contexts and demonstrate the knowledge if and need for the sustainable development.
8.	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the engineering practice.
9.	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a common goal in multidisciplinary settings.
10.	The student will use effective communication to cater to both technical and non-technical audiences.

11.	The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments.
12.	The student will recognise the need for, and will engage in independent and life-long learning in the broadest context of technological change and contemporary issues

## 5.19.5Programme Operational Outcomes

Ope	erational Outcomes
1	The faculty will use appropriate methodology and pedagogical tools for teaching, learning and development.
2	The curriculum will be contemporary and relevant to meet industry requirements and benchmarked on global standards by incorporating feedback from all the stakeholders.
3	The student will graduate in timely manner.
4	The student and faculty shall have academic facilities, technological resources for teaching and learning.
5	The student will earn achievements in inter-university Extra Curricular activities.
6	The faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to the existing Body of Knowledge.
7	The faculty and students will integrate ethics and values in teaching and Learning, in theory and practice.
8	The faculty will facilitate cultivation of cross cultural humanitarian values.
9	The faculty will facilitate joint research collaborations, invite international delegates and speakers for seminars and conferences and various other opportunities for global exposure
10	The faculty will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious accreditations from various national, international bodies and ranking bodies.
11	The faculty shall develop and maintain strong relationship with corporate and maintain lifelong alumni network and keep the curriculum responsive to industry needs.
12	The faculty will support all the students for quality placements or join family business or start their own venture.

5.19.6 Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs)

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
MASTER'S LEVEL PROGRAM						
Name of the programme						
Learning Outcome 1		$\checkmark$				
Learning Outcome 2		$\checkmark$				
Learning Outcome 3						
Learning Outcome 4		$\checkmark$				
Learning Outcome 5		$\checkmark$				
Learning Outcome 6						

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
Learning Outcome 7			$\checkmark$			
Learning Outcome 8						
Learning Outcome 9					$\checkmark$	
Learning Outcome 10						
Learning Outcome 11						
Learning Outcome 12						

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	ngineering nowledge nowledge nowledge mathematics, sciences and engineering to solve problems using concepts of Power System engineering.	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubite		the students shall obtain a grade 'A' or above	Summer mernship		of the students shall obtain a grade 'A' or above
2	Investigation	The student will identify, formulate research literature and analyze Power System	Comprehensive Examination	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		engineering problems reaching substantiated	Dissertation Rubric	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or	Summer Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a

# 5.19.7 Student Learning Assessment for M.Tech Power Systems

		conclusions			above			grade 'A' or
		using first						above
		principles of						
		mathematics,						
		natural sciences,						
		and engineering						
		sciences						
2	Design/Development	The student will	Comprehensive		Atlaast 20% of	Student Exit Survey		Atlaast 95%
5	of Solutions	create solutions	Examination	UU/FLU/D/CE	the students	Student Exit Survey	UU/FLU/ID/ LS	Alleast 65%
	of Solutions	for Dower	Examination		shall obtain			of the
		System			shall obtain			students shan
		System			(> -75, 100%)			give a
		engineering			(>=75-100%)			(> -75, 100%)
		design system						(>=75-100%)
			Dissertation Rubric	UG/PLO/D/DN	Atleast 40% of	Summer Internship	UG/PLO/ID/ II	Atleast 40%
		components or	Dissertation reactive	00/120/2/21	the students	Summer meensmp		of the
		processes that			shall obtain a			students shall
		meet the			grade 'A' or			obtain a
		specified needs			above			grade 'A' or
		with appropriate			above			above
		consideration for						above
		the public health						
		and safety,						
		cultural,						
		societal, and						
		environmental						
		considerations						
			1		1			

4	Problem Analysis	The student	Comprehensive Examination	UG/PLO/D/C	Atleast 20% of	Student Exit	UG/PLO/ID/	Atleast 85%
		will carry out		Е	the students	Survey	ES	of the
		investigations			shall obtain			students shall
		of problems			grade 'A'			give a
		using research-			(>=75-100%)			grade'A'
		based						(>=75-100%)
		knowledge and						
		research				Industry	UG/PLO/ID/ II	Atleast 40%
		methods	Discontration D. I. dis		A (1)	Internship		of the
		including	Dissertation Rubric	UG/PLO/D/D	Atleast 40% of			students shall
		design of		IN	the students			obtain a
		experiments,			snall obtain a			grade 'A' or
		analysis and			grade A or			above
		interpretation			above			
		of data and						
		synthesis of						
		information to						
		provide valid						
		conclusions						
5	Modern Tool	The student	Comprehensive Examination		Atlaast 20% of	Student Evit		Atlanst 85%
5		The student	Comprehensive Examination	UG/PLO/D/C	Atleast 20% of	Student Exit		Atteast 85%
	Usage	will cleate,		E	shall obtain	Survey	ES	of the
		select and			shall obtain			students shan
		appry			(>-75, 100%)			give a
		techniques			(>=/3-100%)			(>-75, 100%)
		teeninques,						(~-/3-100%)

		resources and	Dissertation Rubric	UG/PLO/D/D	Atleast 40% of	Industry	UG/PLO/ID/ II	Atleast 40%
		modern		Ν	the students	Internship		of the
		engineering			shall obtain a			students shall
		and IT tools			grade 'A' or			obtain a
		including			above			grade 'A' or
		prediction and						above
		modelling to						
		different power						
		system						
		engineering						
		activities with						
		an						
		understanding						
		of the						
		limitations.						
6	The Engineer &	The student	Comprehensive Examination		Atleast 20% of	Student Evit		Atleast 85%
0	Society	will apply	Comprehensive Examination	F	the students	Survey	ES	of the
	Society	reasoning		L	shall obtain	Survey	LS	students shall
		informed by			grade 'A'			give a
		contextual			(>=75-100%)			grve a grade'A'
		knowledge to			(>=/5 100/0)			(>=75-100%)
		assess societal.						(> /0 100/0)
		health, safety.	Dissertation Rubric	UG/PLO/D/D	Atleast 40% of	Industry	UG/PLO/ID/ II	Atleast 40%
		legal and		Ν	the students	Internship		of the
		cultural issues			shall obtain a			students shall
		and consequent			grade 'A' or			obtain a
		responsibilities			above			grade 'A' or
		relevant to the			1000/ of the			above
		professional			students shall			100% of the
		engineering			pursue their			students shall
		practice			responsibility			pursue their
					towards			responsibility
					towards	1		responsionity

					environment, society, ethics, health, safety, legal and cultural issues			towards environment, society, ethics, health, safety, legal and cultural issues
7	Environment & Sustainability	The student will recognize the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge if and need for the sustainable development	Comprehensive Examination Dissertation Rubric	UG/PLO/D/C E UG/PLO/D/D N	Atleast 20% of the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above 100% of the students shall pursue their responsibility towards environment, society, ethics, health, safety, legal and	Student Exit Survey Industry Internship	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above 100% of the students shall pursue their responsibility towards environment, society, ethics, health,
					cultural issues			safety, legal and cultural issues

8	Ethics	The student will apply ethical principles and practice professional ethics and responsibilities	Dissertation Rubric	UG/PLO/D/D N	Atleast 40% of the students shall obtain a grade 'A' or above	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		and norms of the engineering practice	Comprehensive Exam	UG/PLO/D/C E Framework	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			
			Behavioural Science Rubrics	UG/PLO9/D/ BS	Atleast 85% students shall qualify the exam	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
9	Individual and Team Work	The student will demonstrate effectiveness as an individual and as a	Foreign Business Language Rubrics	UG/PLO9/D/ F BL	Atleast 85% students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)

		member or leader of team assembled to undertake a common goal in multidisciplinar y settings	Comprehensive Exam	UG/PLO/D/C E	Atleast 20% of the students shall obtain grade 'A'	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
			Dissertation Rubric	UG/PLO/D/D N	Atleast 40% of the students shall obtain a grade 'A' or above			
10	Communication	The student will use effective communication to cater to both technical and non-technical	Business Communication Rubrics	UG/PLO10/D/ BC	Atleast 85% students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		audiences Dissertation Rubric	UG/PLO/D/D N	Atleast 40% of the students shall obtain a grade 'A' or above	Industry UG/PLO/ID/II Internship		Atleast 40% of the students shall obtain a grade 'A' or above	
			Comprehensive Exam	UG/PLO/D/C E	Atleast 20% of the students shall obtain			

					grade 'A' (>=75-100%)			
11	Project Management & Finance	The student will demonstrate knowledge and understanding of the engineering	Comprehensive Exam	UG/PLO/D/C E	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinar y environments	Dissertation Rubric	UG/PLO/D/D N	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above
12	Lifelong Learning	The student will recognise the need for, and will engage in independent and life-long learning in the	Comprehensive Exam	UG/PLO/D/C E	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		broadest context of technological	Dissertation Kubric	N	Atteast 40% of the students shall obtain a	Internship		of the students shall

	change		grade 'A' or		obtain a
			above		grade 'A' or
					above

#### Master of Technology in Control Systems

#### **5.20.1**Mission Statement

#### ProgrammeMission

To provide education at post graduate level in Electrical Engineering with specialization in Control Systems and in the futuristic and emerging frontier areas of knowledge, learning and research and to develop the overall personality of students by making them not only excellent Engineering professionals and technocrats but also good individuals, with understanding and regards for human values, pride in their heritage and culture, a sense of right and wrong and yearning for perfection and imbibe attributes of courage of conviction and action.

## **5.20.2 Programme Educational Objectives (PEOs)**

]	Educational Goals
1.	The students shall have the ability to apply knowledge of science, control systems engineering and technology for
	research and development of novel products and solutions as an individual/ member of a team/ leader in diverse teams
	and as an entrepreneur.
2.	The students shall have the ability to apply research knowledge and methods to solve engineering problems.
3.	The students shall have the ability to examine the impact of engineering solutions in societal, health, safety, legal,
	cultural and environmental contexts.
4.	Students will be able to practice professional ethics and academic integrity and demonstrate these as an individual/
	team member/ leader in diverse teams
5.	The student will have the ability to support and practice independent and life-long learning for professional
	development.
6.	Students will be able to demonstrate professional attitudes, effective communication and behavioral skills and sustain
	effective performance in the professional/entrepreneurial careers

## 5.20.3 Programme Operational Objectives

S.No	Operational Goals
1	The Programme will create appropriate teaching learning resources, infrastructure and conducive environment for excellence in teaching, learning, research and professional development of students
2	The Programme will provide Professional development programmes/opportunities to the faculty and staff to regularly upgrade their knowledge and skills and bring excellence in teaching, learning and research
3	The Programme will demonstrate sensitivity to the diverse needs of students and accordingly develop facilities and services.
4	The Programme will continuously strive to build strong industry interaction, alumni networks and empanelment of expertise from industry.
5	The Programme will continually improve the quality of facilities, services, resources and processes with an aim to attain national and international accreditations and institutional ranking.
6	The Programme will arrange all necessary support system for the students to facilitate campus recruitment, higher education or starting their own ventures.
7	The Programme will act ethically to ensure transparency and good governance while discharging various responsibilities to its stakeholders and execution of policies and programs
8	The Programme will create opportunities for international exposure for its students and faculty.

## 5.20.4 Programme Learning Outcomes

]	Programme Learning Outcomes
1.	The student will apply knowledge of mathematics, sciences and engineering to solve problems using concepts of Control Systems Engineering.
2.	The student will identify, formulate research literature and analyze Control Systems Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
3.	The student will create solutions for Control Systems Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, economical, cultural, societal, and environmental considerations
4.	The student will carry out investigations of problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.
5.	The student will create, select and apply appropriate techniques, resources and modern engineering and IT tools, necessary for engineering practice with an understanding of the limitations.
6.	The student will apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and consequent responsibilities relevant to the professional engineering practice.
7.	The student will recognize the impact of the professional engineering solutions in political, global, economic, societal and environmental contexts and demonstrate the knowledge if and need for the sustainable development.
8.	The student will apply ethical principles and practice professional ethics and responsibilities and norms of the engineering practice.
9.	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a common goal in multidisciplinary settings.
10	The student will use effective communication to cater to both technical and non-technical audiences.

11	The student will demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team as well as to manage projects in multidisciplinary environments.
12	The student will recognise the need for, and will engage in independent and life-long learning in the broadest context of technological change and contemporary issues.

## 5.20.5 Programme Operational Outcomes

Ope	erational Outcomes
1	The faculty will use appropriate methodology and pedagogical tools for teaching, learning and development.
2	The curriculum will be contemporary and relevant to meet industry requirements and benchmarked on global standards by incorporating feedback from all the stakeholders.
3	The student will graduate in timely manner.
4	The student and faculty shall have academic facilities, technological resources for teaching and learning.
5	The student will earn achievements in inter-university Extra Curricular activities.
6	The faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to the existing Body of Knowledge.
7	The faculty and students will integrate ethics and values in teaching and Learning, in theory and practice.
8	The faculty will facilitate cultivation of cross cultural humanitarian values.
9	The faculty will facilitate joint research collaborations, invite international delegates and speakers for seminars and conferences and various other opportunities for global exposure
10	The faculty will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious accreditations from various national, international bodies and ranking bodies.
11	The faculty shall develop and maintain strong relationship with corporate and maintain lifelong alumni network and keep the curriculum responsive to industry needs.
12	The faculty will support all the students for quality placements or join family business or start their own venture.

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
MASTER'S LEVEL PROGRAM	IS					
Name of the programme						
Learning Outcome 1	$\checkmark$	$\checkmark$				
Learning Outcome 2						
Learning Outcome 3		$\checkmark$				
Learning Outcome 4	$\checkmark$	$\checkmark$				
Learning Outcome 5	$\checkmark$	$\checkmark$				
Learning Outcome 6						

5.20.6 Mapping of Intended Programme Learning Outcomes to Broad-Based Programme Educational Objectives (PEOs)

Broad-Based Student Learning Goals (PEQs) Intended Student Learning Outcomes (SLOs)	PEO 1	PEO 2	PEO 3	PEO 4	PEO 5	PEO 6
Learning Outcome 7			$\checkmark$			
Learning Outcome 8				$\checkmark$		
Learning Outcome 9					$\checkmark$	
Learning Outcome 10						
Learning Outcome 11						
Learning Outcome 12						
### 5.20.7 Student Learning Assessment

S.No	Attributes	PLO's	Direct	Tool No for	Target	Indirect	Tool No for	Target
				Direct	Performance		Indirect	Performance
				Assessment			Assessment	
1	Engineering Knowledge	The student will apply knowledge of mathematics, sciences and engineering to solve problems using concepts of Control system engineering	Comprehensive Examination Dissertation Rubric	UG/PLO/D/CE UG/PLO/D/DN	Atleast 20% of the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Student Exit Survey	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or
2	Investigation	The student will identify, formulate research literature and analyze Control system engineering problems reaching substantiated conclusions	Comprehensive Examination Dissertation Rubric	UG/PLO/D/CE UG/PLO/D/DN	Atleast 20% of the students shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Student Exit Survey	UG/PLO/ID/ ES UG/PLO/ID/ II	Atleast 85% of the students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or

		using first						above
		principles of						
		mathematics,						
		natural sciences,						
		and engineering						
		sciences						
			~			~		
3	Design/Development	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85%
	of Solutions	create solutions	Examination		the students			of the
		for Control			shall obtain			students shall
		system			grade 'A'			give a
		engineering			(>=75-100%)			grade'A'
		problems and						(>=75-100%)
		design system						
		components or	Dissertation Rubric	UG/PLO/D/DN	Atleast 40% of	Summer Internship	UG/PLO/ID/ II	Atleast 40%
		processes that			the students			of the
		meet the			shall obtain a			students shall
		specified needs			grade 'A' or			obtain a
		with appropriate			above			grade 'A' or
		consideration for						above
		the public health						
		and safety,						
		cultural,						
		societal, and						
		environmental						
		considerations						

4	Problem Analysis	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/	Atleast 85%
		carry out	Examination		the students		ES	of the
		investigations of			shall obtain			students shall
		problems using			grade 'A'			give a
		research-based			(>=75-100%)			grade'A'
		knowledge and						(>=75-100%)
		research methods						
		including design of				Industry Internship	UG/PLO/ID/ II	Atleast 40%
		experiments,			A.1 / 400/ C			of the
		analysis and	Dissertation Rubric	UG/PLO/D/DN	Atleast 40% of			students shall
		interpretation of			the students			obtain a
		data and synthesis			snall obtain a			grade 'A' or
		of information to			grade A or			above
		provide valid			above			
		conclusions						
5	Modern Tool Usage	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/	Atleast 85%
		create, select and	Examination		the students		FS	of the
							LS	of the
		apply appropriate			shall obtain		Lo	students shall
		apply appropriate techniques,			shall obtain grade 'A'		Lo	students shall give a
		apply appropriate techniques, resources and			shall obtain grade 'A' (>=75-100%)		ES	students shall give a grade'A'
		apply appropriate techniques, resources and modern			shall obtain grade 'A' (>=75-100%)			students shall give a grade'A' (>=75-100%)
		apply appropriate techniques, resources and modern engineering and IT			shall obtain grade 'A' (>=75-100%)			students shall give a grade'A' (>=75-100%)
		apply appropriate techniques, resources and modern engineering and IT tools including	Dissertation Rubric	UG/PLO/D/DN	shall obtain grade 'A' (>=75-100%) Atleast 40% of	Industry Internship	UG/PLO/ID/ II	students shall give a grade'A' (>=75-100%) Atleast 40%
		apply appropriate techniques, resources and modern engineering and IT tools including prediction and	Dissertation Rubric	UG/PLO/D/DN	shall obtain grade 'A' (>=75-100%) Atleast 40% of the students	Industry Internship	UG/PLO/ID/ II	students shall give a grade'A' (>=75-100%) Atleast 40% of the
		apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to	Dissertation Rubric	UG/PLO/D/DN	shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a	Industry Internship	UG/PLO/ID/ II	students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall
		apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to different control	Dissertation Rubric	UG/PLO/D/DN	shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or	Industry Internship	UG/PLO/ID/ II	students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a
		apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to different control system engineering	Dissertation Rubric	UG/PLO/D/DN	shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or
		apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to different control system engineering activities with an	Dissertation Rubric	UG/PLO/D/DN	shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
		apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to different control system engineering activities with an understanding of	Dissertation Rubric	UG/PLO/D/DN	shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above
		apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to different control system engineering activities with an understanding of the limitations.	Dissertation Rubric	UG/PLO/D/DN	shall obtain grade 'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/ II	students shall give a grade'A' (>=75-100%) Atleast 40% of the students shall obtain a grade 'A' or above

6	The Engineer &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/	Atleast 85%
	Society	apply reasoning	Examination		the students		ES	of the
		informed by			shall obtain			students shall
		contextual			grade 'A'			give a
		knowledge to			(>=75-100%)			grade'A'
		assess societal,						(>=75-100%)
		health, safety, legal						
		and cultural issues	Dissertation Rubric	UG/PLO/D/DN	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		and consequent			the students			of the
		responsibilities			shall obtain a			students shall
		relevant to the			grade 'A' or			obtain a
		professional			above			grade 'A' or
		engineering			1000% of the			above
		practice			100% of the			1000/264hz
								100% of the
					pursue their			students shall
					towards			
					towards			towards
					environment,			lowards
					society, ethics,			
					logal and			society,
					legal allu			entics, fieatin,
					cultural issues			and cultural
								155005
7	Environment &	The student will	Comprehensive	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/	Atleast 85%
	Sustainability	recognize the	Examination		the students		ES	of the
		impact of the			shall obtain			students shall
		professional			grade 'A'			give a
		engineering			(>=75-100%)			grade'A'
		solutions in						(>=75-100%)

		societal and	Dissertation Rubric	UG/PLO/D/DN	Atleast 40% of	Industry Internship	UG/PLO/ID/ II	Atleast 40%
		environmental			the students			of the
		contexts and			shall obtain a			students shall
		demonstrate the			grade 'A' or			obtain a
		knowledge if and			above			grade 'A' or
		need for the						above
		sustainable			100% of the			
		development			students shall			100% of the
					pursue their			students shall
					responsibility			pursue their
					towards			responsibility
					environment,			towards
					society, ethics,			environment,
					health, safety,			society,
					legal and			ethics, health,
					cultural issues			safety, legal
								and cultural
								issues
8	Ethics	The student will	Dissertation Rubric	UG/PLO/D/DN	Atleast 40% of	Student Exit Survey	UG/PLO/ID/	Atleast 85%
		apply ethical			the students		ES	of the
		principles and			shall obtain a			students shall
		practice			grade 'A' or			give a
		professional ethics			above			grade'A'
		and responsibilities						(>=75-100%)
		and norms of the						
		engineering						
		practice	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of			
			-	Framework	the students			
					shall obtain			
					grade 'A'			

					(>=75-100%)			
			Behavioural Science Rubrics	UG/PLO9/D/B S	Atleast 85% students shall qualify the exam	Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall obtain a grade 'A' or above
9	Individual and Team Work	The student will demonstrate effectiveness as an individual and as a member or leader of team assembled to undertake a	Foreign Business Language Rubrics	UG/PLO9/D/F BL	Atleast 85% students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
		common goal in multidisciplinary settings				Industry Internship	UG/PLO/ID/ II	Atleast 40% of the students shall
			Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			obtain a grade 'A' or above
			Dissertation Rubric	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above			

10	Communication	The student will use effective communication to cater to both technical and non- technical audiences	Business Communication Rubrics	UG/PLO10/D/ BC	Atleast 85% students shall qualify the exam	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)
			Dissertation Rubric	UG/PLO/D/DN	Atleast 40% of the students shall obtain a grade 'A' or above	Industry Internship	UG/PLO/ID/II	Atleast 40% of the students shall obtain a grade 'A' or above
			Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)			
11	Project Management & Finance	The student will demonstrate knowledge and understanding of the engineering and management	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of the students shall obtain grade 'A' (>=75-100%)	Student Exit Survey	UG/PLO/ID/ ES	Atleast 85% of the students shall give a grade'A' (>=75-100%)

		principles and	Dissertation Rubric	UG/PLO/D/DN		Industry Internship	UG/PLO/ID/II	Atleast 40%
		apply these to			Atleast 40% of			of the
		one's own work, as			the students			students shall
		a member and			shall obtain a			obtain a
		leader in a team as			grade 'A' or			grade 'A' or
		well as to manage			above			above
		projects in						
		multidisciplinary						
		environments						
12	Lifelong Learning	The student will	Comprehensive Exam	UG/PLO/D/CE	Atleast 20% of	Student Exit Survey	UG/PLO/ID/	Atleast 85%
		recognise the need			the students		ES	of the
		for, and will			shall obtain			students shall
		engage in			grade 'A'			give a
		independent and			(>=75-100%)			grade'A'
		life-long learning						(>=75-100%)
		in the broadest				<b>x</b> 1 . <b>x</b> . 11		
		context of	Dissertation Rubric	UG/PLO/D/DN	Atleast 40% of	Industry Internship	UG/PLO/ID/II	Atleast 40%
		technological			the students			of the
		change			shall obtain a			students shall
					grade 'A' or			obtain a
					above			grade 'A' or
								above

# Section VI

**Domain Operational Outcomes & Operational Outcome Assessment Plan** 

# 6.1 Operational Assessment

#	Broad-Based Operational	Intended Operational Outcomes	Assessment Measures/Methods	Performance Objectives
	Goals	for the Domain	for Intended Operational	(Targets/Criteria)
			Outcomes	
1	FET intends to facilitate academically conducive environment and infrastructure to achieve excellence in teaching, learning and research.	<ul> <li>FET will encourage faculty to use appropriate methodology and pedagogical tools for teaching, learning and development of students.</li> <li>The students of FET will graduate in timely manner.</li> </ul>	<ul> <li>Student feedback of course faculty.</li> <li>Faculty qualification and experience files.</li> <li>Graduation rate in convocation report. <ul> <li>on completion of Registration period (N) during extended period (N+1+1 for PG and N+2+1)</li> </ul> </li> </ul>	<ul> <li>All faculty shall have a minimum criteria of greater than 70% overall score in student feedback.</li> <li>All faculty to be either M.Tech/PhD or shall have industry experience.</li> </ul>
			for UG)	<ul> <li>At least 80% students shall graduate on completion of Registration period (N)</li> <li>80% of remaining</li> </ul>

				students shall pass during extended period (N+1+1 for PG and N+2+1 for UG)
2	FET will provide ample opportunities to its students to participate in curricular, co- curricular and extracurricular activities for their holistic development.	• The students of FET will participate in Co-Curricular and Extra Curricular activities	<ul> <li>Functional and area specific club, Committees, Sports Events, co-curricular and extracurricular activities and student's participation in inter institutional competition.</li> <li>List of Award winners</li> </ul>	<ul> <li>Every student shall be a part of at least one Club or Committee or inter institutional competition.</li> <li>.</li> </ul>
3	FET will facilitate environment for innovation and research excellence for the intellectual growth of faculty.	• FET shall maintain appropriate academic facilities and technological Resources for teaching and learning.	<ul> <li>Faculty data about Research work and other Scholar activities such as:</li> <li>Scholarship of teaching; published and unpublished articles, manuscripts, books, curriculum review and evaluation of teaching material.</li> <li>Scholarship of Discovery: published articles, manuscripts, papers presented, dissertations/</li> </ul>	

r				
			<ul> <li>thesis,</li> <li>Scholarship of Integration: published articles, manuscripts, papers presented, dissertations/ thesis, conference and workshops attended.</li> </ul>	
			• Scholarship of application: published articles, manuscripts, papers presented, consultations, policy analysis, programme evaluation.	
			• Professional activities: Routine consulting, conference, workshop, professional meeting attendance, professional membership.	
4	FET will inculcate core values and ethical conduct amongst students, faculty and staff.	• The FET will integrate ethics and values in teaching, theory and practice, develop and retain excellent students, faculty and staff.	<ul> <li>Attrition Rate</li> <li>Courses embedded in curriculum such as Behavioral Science Courses, Human Values and Community Outreach, etc.</li> <li>Plagiarism check.</li> <li>Feedback system.</li> </ul>	<ul> <li>Attrition rate shall be below 10% annually</li> <li>Faculty Feedback shall be taken for each course.</li> <li>80% faculty shall have 4 or 5 on 5 point Likert Scale.</li> <li>100% of the students shall have plagiarism</li> </ul>

				15% or below
5	FET will encourage cultural diversity and a sense of social and environmental responsibility.	• FET will facilitate joint research collaborations; invite international delegates and speakers for seminars and conferences and various other opportunities for global exposure.	<ul> <li>List of community/ social sector projects/ activities/ engagements.</li> <li>Organizing Cultural programmes.</li> <li>Day of Belongingness.</li> <li>Celebration of festivals for culturally diverse group of students.</li> </ul>	• Atlease 80% faculty and students should be engaged in organizing/ participating the various events and activities
6	FET will provide ample opportunities for international exposure to faculty and students.		<ul> <li>Study Abroad Programme</li> <li>Exchange Programs for students.</li> <li>Conferences/ Seminars organized by national and international speakers and delegates.</li> <li>Collaborative Research.</li> </ul>	• 100% students and faculty of FET shall be offered an opportunity for international exposure through various programs designed for the purpose.
7	FET will be involved in continual improvement of processes and systems and aim to attain national and international accreditations and university rankings.	• The curriculum is contemporary, developed in collaborative consultation with all the stakeholders, benchmarked with global standards and relevant to the industry requirements	<ul> <li>Ranking in national and international ranking agencies.</li> <li>Accreditation at institutions and programme levels.</li> </ul>	<ul> <li>Continuous review and enhancement of all the required systems and processes to upgrade/ maintain high standards</li> </ul>

		• FET will be continuously	
		engaged in developing/ reviewing processes, policies and systems to achieve	
		various national, international bodies and ranking bodies	
8	FET will build a strong industry interaction by way of alumni networks and empanelment of expertise from industry.	• FET will develop and maintain strong relationship with corporate and support all the students for quality placements or join family	
9	FET will facilitate employment opportunities and also support students to start their own ventures.	business or start their own venture.	
10	FET will facilitate good governance in discharge of responsibilities and execution of policies and programs.	• FET will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious accreditations from various national, international bodies and ranking bodies.	

### **6.2 Operational Outcomes**

	Intended Operational Outcomes
1.	FET will encourage faculty to use appropriate methodology and pedagogical tools for teaching, learning and development of students.
2.	The curriculum is contemporary, developed in collaborative consultation with all the stakeholders, benchmarked with global
	standards and relevant to the industry requirements.
3.	The students of FET will graduate in timely manner.
4.	FET shall maintain appropriate academic facilities and technological Resources for teaching and learning.
5.	The students of FET will participate in Co Curricular and Extra Curricular activities.
6.	Faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to
	the existing Body of Knowledge.
7.	The FET will integrate ethics and values in teaching, theory and practice, develop and retain excellent students, faculty and
	staff.
/.	staff.

8.	FET will facilitate joint research collaborations; invite international delegates and speakers for seminars and conferences and		
	various other opportunities for global exposure.		
9.	FET will be continuously engaged in developing/ reviewing processes, policies and systems to achieve prestigious		
	accreditations from various national, international bodies and ranking bodies.		
10.	FET will develop and maintain strong relationship with corporate and support all the students for quality placements or join		
	family business or start their own venture.		

### 6.3 Operational Outcome Assessment Plan

• Faculty will be engaged in scholarly and professional activities in order to enhance their competencies and to contribute to the existing Body of Knowledge.

### Section VII

Linkage of Outcomes Assessment with Strategic Planning

Provide a narrative that describes the ways in which the results from implementing your outcomes assessment plan (i.e., changes and improvements needed) are linked to the strategic planning processes of the academic business unit and the institution.

#### **Faculty of Engineering & Technology**

- Goals set by University Planning Committee
- Objectives with high priority in strategic planning for desired outcomes

#### STRATEGIC PROCESS OF CONTINUOUS IMPROVEMENTS

