AMRITA VISHWA VIDYAPEETHAM, AMRITA SCHOOL OF ENGINEERING

SELF ASSESSMENT REPORT(TIER - I) FOR Mechanical Engg.

Part A : Institutional Information

1 Name and Address of the Institution

AMRITA VISHWA VIDYAPEETHAM, AMRITA SCHOOL OF ENGINEERING,
AMRITA SCHOOL OF ENGINEERING AMRITA NAGAR PO ETTIMADAI COIMBATORE - 641 112 TAMIL NADU

2 Name and Address of Affiliating University

3 Year of establishment of the Institution:

1994

4 Type of the Institution:

○ Institute of National Infortance	○ Autonomous
○ University	○ Any other(please specify)
◉ Deemed University	

5 Ownership Status:

○ Central Government	☑ Trust
○ State Government	☐ Society
○ Government Aided	☐ Section 25 Company
○ Self financing	☐ Any Other(Please Specify)

6 Other Academic Institutions of the Trust/Society/Company etc., if any

Name of Institutions	Year of Establishment	Programs of Study	Location
Amrita School of Busine	1996	MBA	Coimbatore
Amrita School of Engine	2002	B.Tech	Kollam, Kerala
Amrita School of Engine	2002	M.Tech	Kollam, Kerala
Amrita School of Engine	2002	MCA	Kollam Kerala
Amrita School of Engine	2002	PhD	Kollam Kerala
Amrita School of Arts &	2003	B.Com - Bachelor of Co	Kollam Kerala

Amrita School of Arts &	2003	BCA - Bachelor of Com	Kollam, Kerala
Amrita School of Arts &	2003	BBA - Bachelor of Busin	Kollam, Kerala
Amrita School of Arts &	2003	M.Com - Master of Com	Kollam, Kerala
Amrita School of Arts &	2003	M.Sc	Kollam, Kerala
Amrita School of Arts &	2003	MSW - Master of Social	Kollam, Kerala
Amrita School of Arts &	2003	5 Yr.Integrated M.Sc	Kollam, Kerala
Amrita School of Arts &	2003	MA	Kollam, Kerala
Amrita School of Arts &	2003	5 Yr.Integrated M.A Eng	Kollam, Kerala
Amrita School of Arts &	2003	Ph.D	Kollam, Kerala
Amrita School of Biotecl	2005	B.Sc	Kollam, Kerala
Amrita School of Biotecl	2005	M.Sc	Kollam, Kerala
Amrita School of Biotecl	2005	Ph.D	Kollam, Kerala
Amrita School of Ayurve	2004	BAMS	Kollam, Kerala
Amrita School of Ayurve	2004	MD	Kollam, Kerala
Amrita School of Ayurve	2004	MS	Kollam, Kerala
Amrita School of Ayurve	2004	Ph.D	Kollam, Kerala
Amrita School of Engine	2002	B.Tech	Bangalore, Karnataka
Amrita School of Engine	2002	M.Tech	Bangalore, Karnataka
Amrita School of Engine	2002	Ph.D	Bangalore, Karnataka
Amrita School of Medici	2002	MBBS	Kochi, Kerala
Amrita School of Medici	2002	B.Sc	Kochi, Kerala
Amrita School of Medici	2002	M.Sc	Kochi, Kerala
Amrita School of Medici	2002	MPH - Master of Public	Kochi, Kerala
Amrita School of Medici	2002	MHA - Hospital Adminis	Kochi, Kerala
Amrita School of Medici	2002	MD	Kochi, Kerala
Amrita School of Medici	2002	MS	Kochi, Kerala
Amrita School of Medici	2002	DM	Kochi, Kerala
Amrita School of Medici	2002	MCh	Kochi, Kerala
Amrita School of Medici	2002	PG Diploma	Kochi, Kerala
Amrita School of Medici	2002	M.Phil	Kochi, Kerala
Amrita College of Nursi	2002	B.Sc. Nursing	Kochi, Kerala
Amrita College of Nursi	2002	M Sc Nursing	Kochi, Kerala
Amrita School of Pharm	1997	B.Pharm	Kochi, Kerala
Amrita School of Pharm	1997	Pharm.D	Kochi, Kerala
Amrita School of Pharm	1997	M.Pharm	Kochi, Kerala
Amrita School of Pharm	1997	Pharm.D(P.B)	Kochi, Kerala
Amrita School of Pharm	1997	Ph.D	Kochi, Kerala
Amrita School of Dentist	2003	BDS	Kochi, Kerala

Amrita School of Dentist	2003	MDS	Kochi, Kerala
Amrita School of Dentist	2003	Diploma in Dental Mech	Kochi, Kerala
Amrita School of Dentist	2003	Ph.D	Kochi, Kerala
Amrita School of Arts ar	2003	B.Com	Kochi, Kerala
Amrita School of Arts ar	2003	B.Sc	Kochi, Kerala
Amrita School of Arts ar	2003	BBA	Kochi, Kerala
Amrita School of Arts ar	2003	B.F.A - Photography	Kochi, Kerala
Amrita School of Arts ar	2003	MCA	Kochi, Kerala
Amrita School of Arts ar	2003	MFA	Kochi, Kerala
Amrita School of Arts ar	2003	M.Com	Kochi, Kerala
Amrita School of Arts ar	2003	MJMC - Master of Journ	Kochi, Kerala
Amrita School of Arts ar	2003	M.Sc	Kochi, Kerala
Amrita School of Arts ar	2003	M.A	Kochi, Kerala
Amrita School of Arts ar	2003	MCA Integrated 5 Yr	Kochi, Kerala
Amrita School of Arts ar	2003	M.Sc	Kochi, Kerala
Amrita School of Arts ar	2003	M.Phil	Kochi, Kerala
Amrita School of Arts ar	2003	PhD	Kochi, Kerala
Amrita Centre for Nanos	2007	M.Tech	Kochi, Kerala
Amrita Centre for Nanos	2007	M.Sc	Kochi, Kerala
Amrita Centre for Nanos	2007	PhD	Kochi, Kerala
Amrita School of Arts ar	2003	BBM - Bachelor of Busir	Mysore, Karnataka
Amrita School of Arts ar	2003	BCA - Bachelor of Comp	Mysore, Karnataka
Amrita School of Arts ar	2003	B.Com	Mysore, Karnataka
Amrita School of Arts ar	2003	B.Sc. Visual Media	Mysore, Karnataka
Amrita School of Arts ar	2003	BBA - Bachelor of Busir	Mysore, Karnataka
Amrita School of Arts ar	2003	B.Sc. - PCM	Mysore, Karnataka
Amrita School of Arts ar	2003	MCA	Mysore, Karnataka
Amrita School of Arts ar	2003	M.Com	Mysore, Karnataka
Amrita School of Arts ar	2003	M.Sc	Mysore, Karnataka
Amrita School of Arts ar	2003	B.Ed - Bachelor of Educ	Mysore, Karnataka
Amrita School of Arts ar	2003	Integrated 5 Year -MCA	Mysore, Karnataka
Amrita School of Arts ar	2003	Integrated 5 Year -M Sc	Mysore, Karnataka
Amrita School of Arts ar	2003	B.Sc., B.Ed - PCM (Inte	Mysore, Karnataka
Amrita School of Arts ar	2003	PhD	Mysore, Karnataka

7 Details of all the programs being offered by the Institution under consideration:

Name of Program	Program Applied level	Start of year	Year of AICTE approval	Initial Intake	Intake Increase	Current Intake	Accreditation status	From	To	Program for consideration	Program for Duration
B.Tech – Mechanical Engineering	UG	1994	1994	40	Yes	180	Granted accreditation for 5 years for the period (specify period)	2002	2007	Yes	4

Sanctioned Intake for Last Five Years for the B.Tech – Mechanical Engineering	
Academic Year	**Sanctioned Intake**
2019-20	180
2018-19	180
2017-18	240
2016-17	180
2015-16	180
2014-15	180

M.Tech - Engineering Design	PG	2003	2003	18	Yes	30	Eligible but not applied	--	--	No	2

Sanctioned Intake for Last Five Years for the M.Tech - Engineering Design	
Academic Year	**Sanctioned Intake**
2019-20	30
2018-19	30
2017-18	30
2016-17	30
2015-16	25
2014-15	25

M.Tech - Manufacturing Engineering	PG	2003	2003	18	Yes	30	Eligible but not applied	--	--	No	2

Sanctioned Intake for Last Five Years for the M.Tech - Manufacturing Engineering	
Academic Year	**Sanctioned Intake**
2019-20	30
2018-19	30
2017-18	30
2016-17	30
2015-16	25
2014-15	25

M.Tech - Automotive Engineering	PG	2011	2011	24	Yes	30	Eligible but not applied	--	--	No	2

Name of Program	Program Applied level	Start of year	Year of AICTE approval	Initial Intake	Intake Increase	Current Intake	Accreditation status	From	To	Program for consideration	Program for Duration

Sanctioned Intake for Last Five Years for the M.Tech - Automotive Engineering	
Academic Year	**Sanctioned Intake**
2019-20	30
2018-19	30
2017-18	30
2016-17	30
2015-16	30

Sanctioned Intake for Last Five Years for the M.Tech - Automotive Engineering	
Academic Year	**Sanctioned Intake**
2014-15	24

8 Programs to be considered for Accreditation vide this application:

S No	Level	Discipline	Program
1	Under Graduate	Engineering & Technology	Computer Science & Engg.
2	Under Graduate	Engineering & Technology	Electronics & Communication Engg.
3	Under Graduate	Engineering & Technology	Mechanical Engg.

9 Total number of employees

A. Regular* Employees (Faculty and Staff):

Items	2019-20		2018-19		2017-18	
	MIN	MAX	MIN	MAX	MIN	MAX
Faculty in Engineering (Male)	172	172	165	176	172	181
Faculty in Engineering (Female)	92	94	94	107	101	106
Faculty in Maths, Science & Humanities teaching in engineering program (Male)	50	50	57	57	57	57
Faculty in Maths, Science & Humanities teaching in engineering program (Female)	43	43	40	40	39	39
Non-teaching staff (Male)	276	280	290	295	289	311
Non-teaching staff (Female)	75	75	73	82	75	83

B. Contractual* Employees (Faculty and Staff):

Items	2019-20		2018-19		2017-18	
	MIN	MAX	MIN	MAX	MIN	MAX
Faculty in Engineering (Male)	8	8	7	8	8	8
Faculty in Engineering (Female)	0	0	1	1	0	0
Faculty in Maths, Science & Humanities teaching in engineering Programs (Male)	2	2	2	2	4	4
Faculty in Maths, Science & Humanities teaching in engineering Programs (Female)	1	1	1	1	6	6
Non-teaching staff (Male)	13	13	16	16	10	12
Non-teaching staff (Female)	0	0	1	2	2	3

10 Total number of Engineering students:

Engineering and Technology- UG	☑ Shift1	☐ Shift2
Engineering and Technology- PG	☑ Shift1	☐ Shift2
Engineering and Technology- Polytechnic	☐ Shift1	☐ Shift2
MBA	☐ Shift1	☐ Shift2
MCA	☐ Shift1	☐ Shift2

Engineering and Technology- UG Shift-1

Course Name	2019-20	2018-19	2017-18
Total no. of Boys	3557	3463	3397
Total no. of Girls	967	945	958
Total	**4524**	**4408**	**4355**

Engineering and Technology- PG Shift-1

Course Name	2019-20	2018-19	2017-18
Total no. of Boys	317	397	493
Total no. of Girls	180	208	276
Total	**497**	**605**	**769**

11 Vision of the Institution:

To be a global leader in the delivery of engineering education, transforming individuals to become creative, innovative, and socially responsible contributors in their professions.

12 Mission of the Institution:

- To provide best-in-class infrastructure and resources to achieve excellence in technical education,
- To promote knowledge development in thematic research areas that have a positive impact on society, both nationally and globally,
- To design and maintain the highest quality education through active engagement with all stakeholders – students, faculty, industry, alumni and reputed academic institutions,
- To contribute to the quality enhancement of the local and global education ecosystem,
- To promote a culture of collaboration that allows creativity, innovation, and entrepreneurship to flourish, and
- To practice and promote high standards of professional ethics, transparency, and accountability

13 Contact Information of the Head of the Institution and NBA coordinator, if designated:

Head of the Institution	
Name	Dr Sasangan Ramanathan
Designation	Dean- Engineering
Mobile No.	7598155285
Email ID	sasangan@amrita.edu

NBA Coordinator, If Designated

Name	MAHADEVAN S
Designation	Dy Dean
Mobile No.	9944312309
Email ID	s_mahadevan@cb.amrita.edu

PART B: Criteria Summary

Critera No.	Criteria	Total Marks	Institute Marks
1	VISION, MISSION AND PROGRAM EDUCATIONAL OBJECTIVES	50	50.00
2	PROGRAM CURRICULUM AND TEACHING - LEARNING PROCESSES	100	100.00
3	COURSE OUTCOMES AND PROGRAM OUTCOMES	175	175.00
4	STUDENTS' PERFORMANCE	100	85.13
5	FACULTY INFORMATION AND CONTRIBUTIONS	200	196.55
6	FACILITIES AND TECHNICAL SUPPORT	80	80.00
7	CONTINUOUS IMPROVEMENT	75	75.00
8	FIRST YEAR ACADEMICS	50	47.48
9	STUDENT SUPPORT SYSTEMS	50	50.00
10	GOVERNANCE, INSTITUTIONAL SUPPORT AND FINANCIAL RESOURCES	120	120.00
	Total	**1000**	**979**

Part B : Criteria Summary

1 VISION, MISSION AND PROGRAM EDUCATIONAL OBJECTIVES (50)

Total Marks 50.00

1.1 State the Vision and Mission of the Department and Institute (5)

Total Marks 5.00

Institute Marks : 5.00

Vision of the institute	To be a global leader in the delivery of engineering education, transforming individuals to become creative, innovative, and socially responsible contributors in their professions.
Mission of the institute	• To provide best-in-class infrastructure and resources to achieve excellence in technical education, • To promote knowledge development in thematic research areas that have a positive impact on society, both nationally and globally, • To design and maintain the highest quality education through active engagement with all stakeholders – students, faculty, industry, alumni and reputed academic institutions, • To contribute to the quality enhancement of the local and global education ecosystem, • To promote a culture of collaboration that allows creativity, innovation, and entrepreneurship to flourish, and • To practice and promote high standards of professional ethics, transparency, and accountability
Vision of the Department	To transform our students into outstanding mechanical engineers with strong domain knowledge and skills, society-centric research intent, and exemplary ethical values, making them the most desired professionals by research institutions, industry and society.
Mission of the Department	

Mission No.	Mission Statements
M1	To develop in each student, a profound understanding of fundamentals, motivation for continuous learning, and practical problem-solving skills for building a successful career.
M2	To create and share technical knowledge and collaborate with industry and institutions for the betterment of society.
M3	To imbibe ethical values, leadership qualities and entrepreneurial skills in students.
M4	To sustain a conducive environment to involve students and faculty in research and development.

1.2 State the Program Educational Objectives (PEOs) (5)

Total Marks 5.00

Institute Marks : 5.00

PEO No.	Program Educational Objectives Statements
PEO1	Apply their knowledge in Science, Mathematics and Engineering to address industrial and societal problems with a strong emphasis on creativity, confidence, ethics, and responsibility.
PEO2	Apply latest computational, analytical, experimental tools and techniques to develop and improve products and processes.
PEO3	Ability to solve multidisciplinary problems by working in cross-functional teams.
PEO4	Develop and upgrade technical, intellectual and emotional skills for life-long learning to compete in the rapidly evolving world.
PEO5	Nurture entrepreneurial ventures and foster research activities that support sustainable economic development to enhance the quality of life.

1.3 Indicate where the Vision, Mission and PEOs are published and disseminated among stakeholders (15)

Total Marks 15.00

Institute Marks : 15.00

Dissemination of Vision & Mission of the Institution and Vision, Mission & PEOs of the department are indicated in the Table 1.1

Sr. No	Locations / Stakeholders	Institute		Department		
		Vision	Mission	Vision	Mission	PEO
1.	College website Web Link https://www.amrita.edu/school/engineering/coimbatore/mechanical	√	√	√	√	√
2.	College and Department notice boards	√	√	√	√	√
3.	Common areas (Institute)	√	√	-	-	-
4.	Common areas (Department)	√	√	√	√	√
5.	Staff rooms, labs, class rooms (Department)	-	-	√	√	√
6.	College brochure	√	√	√	√	√
7.	Department brochure	√	√	√	√	√
8.	Curriculum Handbook	√	√	√	√	√
9.	Course file	√	√	√	√	√
10	Inpods software	√	√	√	√	√
11.	Students (direct interaction)	√	√	√	√	√
12.	Parents (through web-portal / mail)	√	√	√	√	√
13.	Alumni(through web-portal / mail)	√	√	√	√	√
14.	Recruiters(through web-portal / mail)	√	√	√	√	√
15.	Board of studies members (through mail, meeting)	√	√	√	√	√

Table 1.1 Dissemination of Vision, Mission and PEOs

The development and evaluation of the program educational objectives involves a review/feedback process to continuously improve the curriculum of program educational objectives with the involvement of all the stakeholders including students, industry experts, faculty members, and alumni.

1.4 State the process for defining the Vision and Mission of the Department, and PEOs of the program (15) Total Marks 15.00

Institute Marks : 15.00

The department's Vision and Mission are framed on the basis of the vision and mission of the Institute. Process for defining the Vision and Mission of the department and PEOs of the program is shown in Figure 1.1.

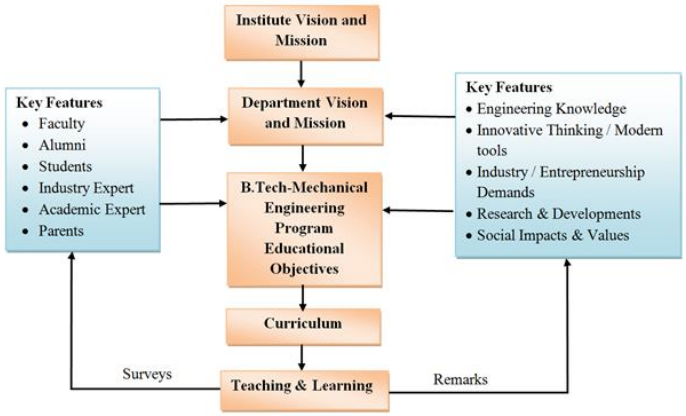


Figure 1.1. Process for defining the Vision and Mission of the department and PEOs of the Program

1.5 Establish consistency of PEOs with Mission of the Department (10) Total Marks 10.00

Institute Marks : 10.00

PEO statements and its consistency with the mission of the department is shown in Table B.1.5.

PEO Statements	M1	M2	M3	M4
PEO1: Apply their knowledge in Science, Mathematics and Engineering to address industrial and societal problems with a strong emphasis on creativity, confidence, ethics, and responsibility.	3	3	1	**3**
PEO2: Apply latest computational, analytical, experimental tools and techniques to develop and improve products and processes.	3	3	1	**3**
PEO3: Ability to solve multidisciplinary problems by working in cross-functional teams.	1	2	3	**2**
PEO4: Develop and upgrade technical, intellectual and emotional skills for life-long learning to compete in the rapidly evolving world.	2	3	3	**3**
PEO5: Nurture entrepreneurial ventures and foster research activities that support sustainable economic development to enhance the quality of life.	2	3	3	**3**

Note: 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Table B.1.5 Consistency of PEOs with Mission of the Department

Justifications:

The mission of the department comprises of four important statements. The following paragraph highlights the consistency of the department mission and PEOs.

M1: To develop in each student, a profound understanding of fundamentals, motivation for continuous learning, and practical problem-solving skills for building a successful career.

The PEOs 1 and 2 are consistent with the above mission statement. The first PEO focuses on training students on basic and advanced topics of Mechanical Engineering. The second PEO facilitate the students to have better technical competencies for a successful engineering career.

M2: To create and share technical knowledge and collaborate with industry and institutions for the betterment of society.

M3: To imbibe ethical values, leadership qualities and entrepreneurial skills in students.

The PEOs 3 and 4 prepare the students for successful engineering career by inculcating leadership qualities to encourage entrepreneurship, communication skillsalong with professional and ethical responsibilities for the betterment of the society with a respect for diversity in opinions and culture.

M4: To sustain a conducive environment to involve students and faculty in research and development

The PEOs 4 and 5 are consistent with the above mission statement. The PEO 4 moulds the students to learn continuously to upgrade their skills for betterment of society to generate new ideas, products etc., and nurture education for life. PEO 5 fosters R & D and disseminates the technology through publications and providing technical expertise and training to industry.

PEO Statements	M1	M2	M3	M4
Apply their knowledge in Science, Mathematics and Engineering to address industrial and societal problems with a strong emphasis on creativity, confidence, ethics, and responsibility.	3	3	1	3
Apply latest computational, analytical, experimental tools and techniques to develop and improve products and processes.	3	3	1	3
Ability to solve multidisciplinary problems by working in cross-functional teams.	1	2	3	2
Develop and upgrade technical, intellectual and emotional skills for life-long learning to compete in the rapidly evolving world.	2	3	3	3
Nurture entrepreneurial ventures and foster research activities that support sustainable economic development to enhance the quality of life.	2	3	3	3

2 PROGRAM CURRICULUM AND TEACHING - LEARNING PROCESSES (100)

Total Marks 100.00

2.1 Program Curriculum (30)

Total Marks 30.00

2.2 Teaching-Learning Processes (70) Total Marks 70.00

2.2.1 Describe Processes followed to improve quality of Teaching & Learning (15)

Institute Marks : 15.00

The teaching-learning process and the process followed to improve the quality is shown in Figure 2.3. The teaching-learning process of the B.Tech Mechanical Engineering programme follows the course syllabus and the overall program curriculum. At the beginning of the semester, the course mentor convenes the course committee meeting comprising of all faculty members offering the course and finalises the course plan considering the feedback from the previous editions of the same course; the Course Mentor holds the responsibility to ensure effective delivery of the course as per the academic timetable and requirements.

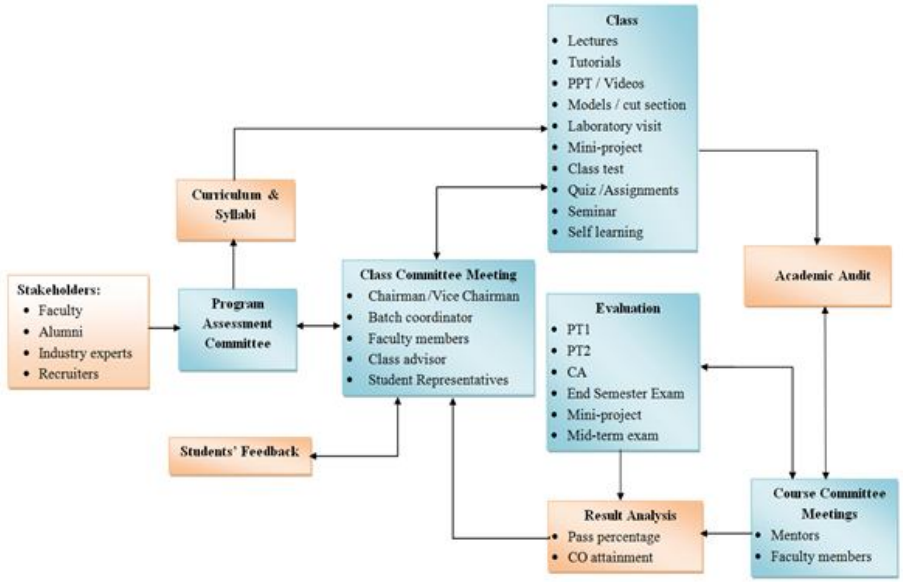


Figure 2.3 Processes followed to improve the quality of Teaching & Learning

The course material for each course consists of standard textbooks and other supplementary learning material including lecture notes, slides, videos, etc. These are shared with the students via the "Intranet" portal and AUMS learning management module. Students also have access to the central library which houses a good collection of text/reference books. A separate digital library which caters to the needs of the students and faculty members is also maintained. This digital library gives them access to E-resources which includes E-books, E-learning portals, Intranet learning portal (VIDYA) and academic journals.

For theory courses, the class room sessions generally include lectures, tutorials, quizzes, presentations, and mini-project. Several improved and innovative teaching methods are employed in delivering the theory and lab sessions to enhance the teaching and learning experience. Some of the courses such as Kinematics of Machines, Numerical Methods, and Finite Element Methods are offered as lab-integrated courses.

A. Adherence to the academic calendar

- The academic calendar is prepared centrally by the School of Engineering and released to the students and faculty members through the campus intranet facility
- Link to the current academic calendar: https://intranet.cb.amrita.edu/sites/default/files/Academic_Calendar_2019_20.pdf (https://intranet.cb.amrita.edu/sites/default/files/Academic_Calendar_2019_20.pdf)
- The academic calendar has two semesters – namely odd and even semesters
- The adherence to the various components of the academic calendar includes course registration, commencement of classes, exam schedule (Periodical test 1 & 2, End semester examination), holidays, last instruction day etc.

B. Pedagogical initiatives

Faculty members are encouraged to use pedagogical initiatives which enhance the conceptual understanding of the students and their ability to apply the concepts to practical situations. Student feedback mechanisms as well as the attainment levels are assessed to introduce pedagogical changes. Some of the changes made are listed in Table 2.2.

Sl. No.	Courses	Pedagogical initiatives
1.	15MEC212 Kinematics of Machines	• Offered as Lab integrated course. • Mechanisms are demonstrated using models.
2.	15MEC313 Introduction to Finite Element Methods	• Offered as Lab integrated course. • Individual attention has been provided to the students to improve their proficiency in the usage of software packages. • Hands-on sessions / Tutorials
3.	15MEC201 Engineering Thermodynamics	• Videos / Animations are used to improve the understanding of the concepts on energy balance and power cycles. • Tutorials are conducted in addition to the regular assignments.
4.	15MEC303 Heat Power Engineering	• Tutorial sessions, animation/video presentations are introduced for better understanding of concepts.

Sl. No.	Courses	Pedagogical initiatives
5.	15MEC275 Design Thinking	• New elective course (2-0-2-3) is offered catering to the industry requirements. • Design Thinking is offered for the students to facilitate innovative thinking process on product design and development. • This course involves group activities to foster critical thinking and problem-solving.
6.	15MEC481 Computer Integrated Manufacturing lab	• Automation concepts are demonstrated in the laboratory. • Application-based experiments are introduced. • Computer-Aided Manufacturing (CAM) is introduced to develop tool path simulations. • Course-based projects have been made a part of the assessment.
7.	15MEC495 Project Phase I 15MEC499 Project phase II	• Project course is offered in two phases (Phase I &II). Students conduct literature review, formulate the problem and define the methodology in Project Phase I. • In Phase II, students' carryout projects involving theoretical and /or computational and/or fabrication and/or experimental work. • The project work phase II focuses on the synthesis of knowledge gained over the entire duration of the course. • Project work is monitored continuously by the project guides and periodic review is conducted by a review panel comprising of faculty members. • The progress of project work is recorded and monitored through project diary.
8.	15MEC386a Metrology lab	• Selection of measuring equipment for measurement of a given industrial component has been introduced as an activity in the laboratory.

Table 2.2. Pedagogical Initiatives

Various pedagogical initiatives are being used to help students to understand the concepts and relate them to real-world examples. To supplement the chalk and talk method, the following practices are in place:

- Use of ICT enabled teaching techniques like Audio-visual aids, Multimedia aids etc.,
- Course plan and materials are shared in the learning portals: CMS(https://cms.cb.amrita.edu/login) and AUMS(https://aums.amrita.edu)
- Encourage students to take-up mini-projects as a part of the course
- Organize seminars / open book test /group discussion and quiz
- Demonstrations using cut sections, actual product/assembly, soft prototypes and simulation tools
- Encourage self-learning through VIDYA (http://vidya.amritanet.edu/) / NPTEL / relevant learning portals for advanced topics
- Discuss case studies to facilitate the students apply their knowledge to solve real-time problems

C. Methodologies to support weak students and encourage bright students

Department has effective mentoring of students by the batch coordinator assisted by class advisors. In order to guide the students in planning their courses of study, advise them on academic programmes and monitor their progress, the department assigns a batch of 20 students to a faculty member who will be designated as their advisor. A designated batch coordinator conducts periodic reviews of the academic activities for the entire batch.

Every course offered in the program is monitored by course mentor. The course mentor coordinates all the academic activities pertaining to the teaching-learning process. Periodic review meetings are convened by the course mentor and any short-fall in teaching and learning is corrected. The following initiatives are taken to support the slow learners and encourage the bright students. The details are shown below:

Initiatives for bright students:

- Internship / Industrial projects
- Projects in the research lab
- Fast track courses
- Student Exchange programmes to reputed universities
- Credit transfer facility
- Participation in national-level competitions
- Opportunities to work on research projects and to publish their work in quality journals

Initiatives taken for the benefit of slow learners:

- Remedial courses (Runtime redo, Contact courses)
- Mentoring/Counselling
- Supplementary examinations
- Extra classes and tutorial sessions
- Provision for slow learners to complete the program in 12 semesters

D. Quality of classroom teaching

- Traditional Chalk and Talk method
- Power point presentations
- Screening of videos / Animations
- Activity-based learning
- Tutorials
- Demonstration of concepts using models
- ICT enabled classrooms

E. Conduct of experiments

- The engineering concepts and their applications are discussed in the classroom as well as in lab class before conducting the experiments.
- Well-equipped laboratories and periodic up-gradation of facilities.
- Training sessions are arranged for lab staffs before the commencement of the lab course.
- Use of latest software package for modelling and analysis.
- Detailed and updated laboratory manuals.
- Periodic calibration of equipment / instruments.
- Periodic maintenance of equipment / instruments.
- Safety awareness and the conduct of experiments by following safety standards.

F. Continuous Assessment in the laboratory

- The components of evaluation include continuous assessment and end semester examination.
- Continuous evaluation component carries a weightage of 80% and the end semester evaluation component has 20% weightage.
- Continuous evaluation components for every experiment are based on: a) the student's understanding the concept b) whether he/she knows the procedure for the conduct of the experiment c) the correctness of the results, interpretation and documentation d) oral viva on the experiment.
- A student who has been awarded I (Incomplete) grade shall take up additional lab sessions to complete the course in the ensuing semester.

G. Student feedback of teaching-learning process and actions taken

Every class of the undergraduate programme will have a class committee to monitor the teaching-learning process. The constitution of the class committee is as follows:

i) Batch coordinator

ii) Class advisors of the class and all the faculty members offering courses for the class.

iii) Four student class representatives from each class. These class representatives are elected by the class for a period of one year. Adequate representation is given for girl students.

The class committee meets at least thrice in a semester. Student class representatives give their feedback and suggestions to the batch coordinator who then discusses with the class advisers and faculty members. The first meeting of the class committee at the beginning of the semester finalises the academic programme. The teaching-learning process is reviewed during the subsequent meetings. During the meeting following academic activities are reviewed:

i) Total number of classes handled by the faculty member.

ii) Attendance details of the students.

iii) An all-round review on the progress of the course is conducted. Coverage of syllabus as per the lecture plan, assignment/tutorial/quiz conducted, special lectures/sessions/tasks given to bright students, remedial measures taken for the benefit of weak students etc are reviewed.

iv) Students' feedback about the teaching-learning process and the pace of the course is collected and are conveyed to the respective faculty members. Corrections are suggested based on feedback.

v) Pertinent issues and corrective actions suggested/taken are brought to the attention of the Chairperson of the Department. Student feedback mechanism and the respective action taken are given in Table 2.3.

S.No.	Feedback Collection	Process details	Action
1	Feedback is collected periodically from the students in an online mode twice in a semester: mid-semester and end of semester.	The feedback is made available online to the individual faculty members and Chairperson.	The Chairperson discusses with the individual faculty member for the necessary corrective action / measures if required.
2	Two interim class committee meetings are conducted.	The second class committee meeting is generally conducted after the first assessment and third meeting is conducted after the second assessment. Both the meetings are held in the presence of the Chairperson /Vice-Chairperson and/or the Dean (Engineering) and the student class representatives. The class committee meeting serves as a platform to discuss the performance of the students and to discuss matters related to the teaching-learning process.	The Chairperson discusses with the course committee and/or the Chairpersons of other departments (for issues related to courses offered by other departments) and about mid-course corrective action, if required.
3	Mentoring/Advising hour	The faculty advisors and department counsellors interact with the students collectively / selectively to discuss on academic and non-academic issues of the individual students.	The issues if any, are either resolved by the advisors and batch co-ordinators and if necessary the issue is brought to the notice of the Chairperson / Vice Chairperson.

Table 2.3 Feedback and action taken

2.2.2 Quality of end semester examination, internal semester question papers, assignments and evaluation (15) Institute Marks : 15.00

After the conduct of every periodical assessment test and end semester, course faculty/mentors compute the CO attainment levels. Overall attainment is also computed at the end of the semester including continuous assessment components and end semester examination. Observations with regard to CO attainment are recorded and corrective actions are discussed. Based on these corrections, the course committee can suggest the revision required in the syllabus. The question papers are audited by the quality improvement committee for ensuring the quality of the question papers. At the Institution level, end semester answer script audit is also carried out by the deputy controller of examination.

A. Process for internal semester question paper setting and evaluation and effective process implementation

- The course committee meeting is convened by the course mentor.
- The course mentor along with the faculty handling the course decides the question paper format.
- The questions are jointly prepared by the faculty handling the course in-line with the course plan and COs and submitted to the review committee. The suggestions of the committee, if any, are incorporated in the question paper.
- The final question paper is submitted to the controller of examinations.
- Internal assessment examinations and end semester examination answer scripts are evaluated by following the round-robin scheme and the evaluated answer scripts are audited by the course mentor.
- Institution level end semester answer script audit is also carried out by the controller of examination.
- The evaluated answer scripts (Internal assessment) are distributed to the respective students and the scheme of evaluation and key are explained. The process of question paper setting is given in Figure 2.4.

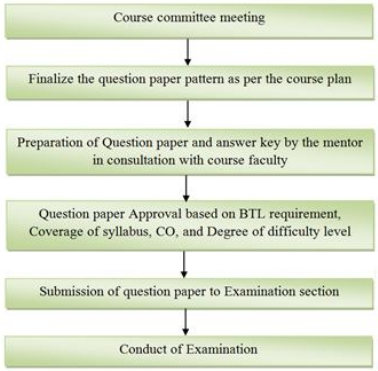


Figure 2.4 Process for question paper setting

- Questions are framed based on various BTLs as per the defined COs.
- The question paper submitted by the mentor is reviewed by the quality improvement committee. A sample of question paper and sample question paper audit report is shown in Annexure.2.1.

ANNEXURE 2.1 (A)

Sample question paper

Amrita Vishwa Vidyapeetham
B.Tech. First Assessment Dec 2019
Fourth Semester
Mechanical Engineering

15MEC 212 Kinematics of Machines

Time : Two hours Maximum : 50 Marks

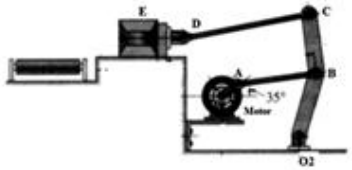
Answer all questions

Course Outcomes

At the end of the course, the student will be able to

CO1	Classify mechanisms and solve for mobility
CO2	Perform kinematic analysis of mechanisms
CO3	Construct cam profiles for a given motion
CO4	Analyze different types of gear trains
CO5	Develop and perform kinematic analysis of mechanisms using software

1. For the package moving mechanism driven by a motor shown in the figure, Draw the



kinematic diagram (not to scale) and find the number of degrees of freedom using the Kutzbach criteria. [CO1],(6)

2. For a slider moving on a slotted link which is rotating with an angular velocity ω, derive expressions for velocity and acceleration of the slider. Represent velocity and accelerations in vector diagrams. [CO2],(8)

3. Define the term inversion of a kinematic chain. Draw all the inversions of a slider crank mechanism. Mention its practical applications. [CO1],(6)

4. Name one indexing mechanism and one straight line mechanism. Draw its kinematic diagrams. [CO1],(4)

ANNEXURE 2.1 (B)

Sample of question paper audit report

Amrita VishwaVidyapeetham
Department of Mechanical Engineering, Coimbatore

Question Paper Audit Report – B.Tech / M.Tech

Academic Year: Semester (odd/even): Date:
Course (Code and Title):
Semester: Programme:
Course Mentor: Set(1/2):
Total Marks: Total No. of Questions:
Credit of the course:

1. Questions Coverage based on Term wise Portions

Term	1	2	3
Marks			

2. Questions Coverage based on Difficulty Level:

Type	Easy	Average	Challenging/Above Average
Marks			
Q. No			

3. Outcome Based Education Report

QN #	CO #	BTL#	Marks Allotted	QN #	CO #	BTL#	Marks Allotted	QN #	CO #	BTL#	Marks Allotted
1				a)				b)			
2				a)				b)			
3				a)				b)			
4				a)				b)			
5				a)				b)			
6				a)				b)			
7				a)				b)			
8				a)				b)			
9				a)				b)			
10				a)				b)			
11				a)				b)			
12				a)				b)			
13				a)				b)			
14				a)				b)			
15				a)				b)			

4. Are all the syllabus portion complete? Yes | No

Programme	B.Tech				M.Tech
Section	A	B	C	D	ATE / EDN / MPS
Name of the Faculty:					
Percentage of portions covered					
No of classes conducted till date _____(hrs)					

Work register of all the batches need to be available for the review.

Signature of the Mentor Signature of the Chairperson

B. The process to ensure questions from outcomes/learning levels perspective

Questions in periodical test 1, test 2 and end semester are set in such a way that, it will be mapped to the corresponding Course Outcomes (COs). This is ensured by the quality improvement committee by thoroughly checking the BTL, COs, coverage of syllabus and degree of difficulty. If any shortcoming in the question paper is observed, it is returned to the course mentor for corrective action. Similarly, the questions in continuous assessment components such as quiz, assignments etc are also mapped with corresponding COs. Question wise CO mapping is indicated in question papers. Experiments are mapped with corresponding COs in laboratory courses. In project course, the project evaluation components are mapped with COs.

C. Evidence of COs coverage in-class test / mid-term tests

After the completion of periodical test 1 and 2, the CO attainment is computed. On calculation of the CO attainment, the scope for improvement and the gap analysis is carried out. The detailed calculation of CO attainment for CIE and SEE is given in criterion 3. A sample template for gap analysis is given in Annexure 2.2.

ANNEXURE 2.2

Amrita School of Engineering, Coimbatore

Department of Mechanical Engineering

First Assessment - Analysis Report

1. Name of the Mentor :
2. Course Code with Title :
3. Academic Year with Semester :
4. Attainment Table :

COs	CO1	CO2	CO3	CO4	CO5	CO6	Class Strength	Name of Faculty Member
Section A								
Section B								
Section C								

5. Observations:

6. Action Taken:

Signature of the Course Mentor Signature of the Faculty Members

Date:

D. Quality of Assignment and its relevance to COs:

During the beginning of the semester, course mentor convenes the course committee meeting with other faculty members offering the course. The details of the lecture plan for conducting the course is worked out by the course committee. A detailed lecture plan including session wise topics, number of assignments, tutorials / quiz and evaluation pattern is prepared. The assignments / quizzes / tutorials are mapped to the COs. Typically, three to four assignments /tutorials / quizzes are conducted for every course. The quality of the assignments / quizzes / tutorials is reviewed by the quality assurance committee from time to time.

2.2.3 Quality of student projects (20)

Institute Marks : 20.00

A. Identification of projects and allocation methodology for faculty

Project batches consist typically of three to four students. A brief idea is provided to the students regarding the various areas in which the faculty of the department offers guidance. The specialization and area of interest of the faculty members of the department is displayed and circulated among the students. The students select their guides based on their interest and finalise their project problem after discussions with the guide. With the consent of the guide, project details are submitted to the department project coordinator. The coordinator allocates batch number and stream (Design / Thermal / Manufacturing / Industrial Engineering & Management) in which the proposed project will be reviewed/evaluated. Care is taken to ensure that any given time a faculty member guides a maximum of four projects. Students are encouraged to carry out industry projects / internships with the guidance of faculty members and industry experts. If any group is not able to find a guide, they have to inform to UG project coordinator. The UG project coordinator will discuss with the group and allot a guide. Project group have the provision to have a co-guide from other departments after approval from the department. The guide allotment is typically completed by 3rd week of the 7th semester.

The project work is divided into two phases; phase I (15MEC495) and phase II (15MEC499). In phase I, the students select their problem, guide and identify an area for the project. Literature survey is done in this area and problem statement and objectives are finalized. Then the project team arrives a methodology to execute the project and prepares a work plan. In phase II, the team executes the planned work (Phase I) and prepares a report after completing the project.

B. Types and relevance of the projects and their contribution towards the attainment of POs and PSOs

Students choose their project in one of the following streams: Design, Thermal Engineering, Manufacturing, Industrial Engineering & Management. During their project work, literature survey is first conducted by the group. Based on this, a research problem is formulated and solved using the concepts and knowledge acquired in the course of study. This process also enables the students to learn to work as a team. The details of CO-PO-PSO attainment of the project work are shown in criterion 3.

The types of projects carried out by the 2015-2019 batch of B.Tech students are given in Table 2.4.

Type	Number of projects	Percentage %
Application	16	36
Product	10	22
Research & Review	19	42

Table 2.4 Types of Projects

CO attainment through CIE and SEE for the 2015 – 2019 batch students is shown in Table 2.5.

Course	COs	Internal Examination (CIE)		End Semester Examination (SEE)		Direct 50% of CIE and 50% of SEE		Indirect		Final Course Attainment 80% of Direct and 20% of Indirect		Target	Attainment
		Attainment	Level	Attainment	Level	Attainment	Level	Attainment	Level	Attainment	Level	(%)	Yes/No
15MEC499 - Project II	CO1	81.45	3	68.83	3	78.93	3	85.3	3	80.2	3	70	Yes
	CO2	81.94	3	62.49	3	78.05	3	85.3	3	79.5	3	70	Yes
	CO3	82.48	3	70.02	3	79.99	3	85.3	3	81.05	3	70	Yes
	CO4	86.49	3	69.34	3	83.06	3	85.3	3	83.51	3	70	Yes
	CO5	83.05	3	64.19	3	73.62	3	85.3	3	75.96	3	70	Yes

Table 2.5 CO Attainment for Project

All the COs have been attained for the set target level. PO attainment is computed and shown in Table 2.6.

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
15MEC499	Project Phase II	2.95	2.95	2.97	2.97	2.97	2.97	2.95	2.70	2.84	2.35	3.00	2.97	2.82	2.97	2.96

Table 2.6 PO Attainment for Project

All the POs are attained for the set target level.

C. Projects related to Industry

The university assists the students to earn internship opportunities in industry / research organizations. The project work carried out during internship is supervised / mentored by an external guide from the industry / research organisations and an internal guide from the department. The project reviews are conducted along with the regular students carrying out their project work in campus. In case a student/team is unable to attend the review in person, Skype reviews are arranged. However, the student/team is expected to appear for their final project review conducted in the presence of an external reviewer, in person. The list of industry related projects are given in Table 2.7.

Group No.	Name	Roll No.	Guide Name	Project Title
1	Naveen Kumar V	15027	Dr. P. G Saleeshya	Study and Analysis of Wastes in Manufacturing Systems using Lean Tools
	Pranav Raja R. S	15036		
	Rubesh S	15040		
	Sanjeevi K. S	15043		
2	Lakshana P	15021	Dr. P. G Saleeshya	A Model to Assess the Leanness of Manufacturing Industries

	Shriram K	15255		
	Thirnesh R	15260		
3	Akaash.V	15003	Dr.P.Raghuram	Supply Chain Risk Mapping in Manufacturing Industry
	S.Guhan	15015		
	Kurinchinathan.R	15019		
	N.Rohan	15038		
4	M.Eshwar Srinivas	15116	Dr.K.RameshKumar	Grinding Wheel Condition Monitoring using Acoustic Emission Signature
	Rahul	15142		
	J.Revant	15147		
5	Aakash Sp	15101	Dr.P.Raghuram	Assessment of Supply Chain Risk Mitigation Capability using Data Envelopment Analysis
	Ajit Balakrishnan	15104		
	Gokul Gowri Shankar K	15122		
	Jishnu S	15129		
6	Ashish Kumar Singh	15007	Dr. K. Balaji	Experimental Characterization of Liquid Sheet Emerging From an Effervescent Atomizer
	Avinash Kumar	15008		
	Lokram P	15133		
	Hari Sankar S	15511		
7	Abishek R. M	15205	Dr. M. Saimurugan	Design and Fabrication of an Automated Turmeric Sowing Machine
	Dhanush Muthu Kumaran	15218		
	Maharajan C	15231		
	Mithun R	15235		
8	Abhirup A	15202	Mr. A. Srinivaas	Design and Fabrication of Lean Suspension
	Badusha Mohaideen S	15212		
	Sarang Chandran	15251		
	Selva Kumar	15252		
9	Dharshan R	15113	Dr. Saravanamurugan	Design of Tuned Mass Damper For Lathe Vibration Mitigation
	P.S. Rogith	15149		
	Sujith T	15158		
	Kousik Bimal. N	15512		
10	Abay Sudarshan N	15201	Dr. Sanjivi Arul	Automatic Tile Laying Machine
	Abiram Anbu	15204		
	Sathyatrinath	15216		
11	Dev Prasath	15217	Mr. A Arun	Experimental Evaluation of Tube Formability in Tube Hydroforming Process
	Dinesh Kumar	15219		
	Fahim Ahamed S A	15221		
	Harsha Bharath	15225		

Table 2.7 List of industry related projects

D. Process for monitoring and evaluation

The overall process for monitoring and evaluation of project work is shown in Figure 2.5.

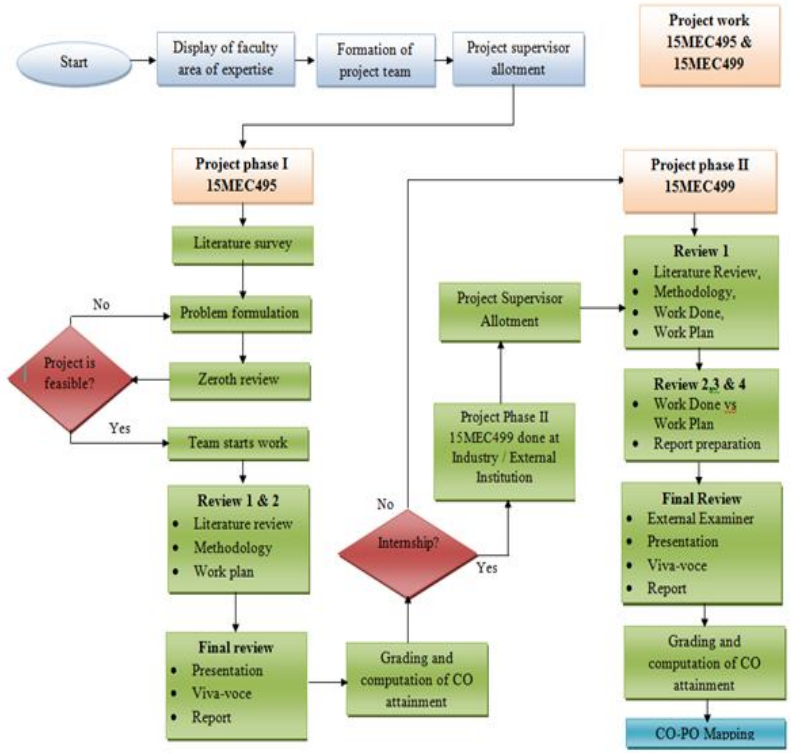


Figure 2.5 Process for monitoring and evaluation of project work

Project evaluation scheme

Project reports submitted by the project team are evaluated for its originality, clarity, technical content, documentation and presentation. Internal assessment of the project work through internal reviews has 60% weightage. External evaluation through presentation and viva-voce examination in the presence of an external expert carries 40% weightage. The mark split up for internal and external component is shown in Table 2.8. The CO details for each review is given in Annexure 2.3.

Internal	Review 1	15%
	Review 2	15%
	Review 3	15%
	Review 4	15%
Sub Total		**60%**
External	Internal Examiner	20%
	External Examiner	20%
Total		**100**

Table 2.8. Mark Split-up

ANNEXURE 2.3

Mark for each CO components

Review	Course Outcome	Evaluation		Marks Split	Total Marks
		Aspect	Criteria		
Review 1	CO1	Title & Objective (10)	Novelty	2	100
			Clear statement	3	
			Understanding	5	

	CO1	Terminology (15)	Eqs & Understanding	15	
	CO1	Literature Review (30)	Papers in last 5 Yrs	10	
			Papers Source	10	
			Scope of work	10	
	CO2	Methodology (20)		20	
	CO5	Presentation (25)	Detailed plan for 8 weeks	10	
			Presentation	15	
Review 2	CO2	Metholodogy (20)	Understanding	20	100
	CO3	Plan, manage and execute work (40)	Detail plan	20	
			Work done vs Plan	20	
	CO5	Presentation (40)	Report Chap 1 & 2	20	
			Presentation	20	
Review 3	CO3	Plan, manage and execute work (40)	Work done vs plan	40	100
	CO4	Result Analysis (20)	Understanding	20	
	CO5	Presentation (40)	Report Chap 3	20	
			Presentation	20	
Final Internal Review	CO4	Result Analysis (60)	Quantum of work	40	100
			Understanding	20	
	CO5	Presentation (20)	Presentation	20	
		Report (20)		20	
External Review	CO1	Identify a problem statement and conduct thorough literature survey and define objective and scope of work.		15	100
	CO2	Develop methodology (design) for conducting theoretical/experimental study		15	
	CO3	Plan, manage and execute theoretical/experimental work to obtain results with a concern for safety, industry and environment.		20	
	CO4	Organize, analyze results and draw conclusions through group discussion.		20	
	CO5	Document technical report and orally present findings.		30	

E. The process to assess individual and team performance

The contributions by each project team member towards the completion of the project and the performance of the project team as a unit are evaluated by the review committee and the guide. The presentation and communication skills of each member and their conceptual clarity about the problem, methodology and results are evaluated during the review presentation. The students performance as a project team member is evaluated by the guide, who also assesses the members individual contribution. A project diary is maintained by the project team which includes the progress details of the project work.

F. Quality of completed projects/working prototypes

The following procedures are in place to ensure the quality of the project work:

- The feasibility of the work is reviewed based on technical content, resources availability, time, cost and deliverables (Phase I).
- **Progress Reviews**: Four progress reviews are held at regular intervals in which the project team is asked to present the progress of their work. A panel of faculty members reviews the progress of the work and suggests corrective actions (Phase I & Phase II). Regular written feedbacks regarding the progress of the project is given to the panel by the respective guides too.
- **External Review**: After the competition of the work, each project team is required to present the work to an external examiner. Working models, prototypes and simulations are demonstrated during this review to the external examiner. The external reviewer conducts a critical review of the project and evaluates it. Each project team is required to submit a project report in the standard format given to them in advance.
- A plagiarism check is conducted on each report to ensure its originality. It is expected that the report confirms to a similarity index of 20% or less.

The quality of the completed project work is evident from the following:

- Industry projects
- Paper published from the project
- Patent
- Working models / Prototypes
- Algorithm development/codes

- Case studies
- Research centric projects

G. Evidences of papers published /Awards received by projects etc.

Students with a CGPA of 8 or more, passing all courses in the first attempt in eight semesters from the date of joining the programming, are awarded First Class with Distinction for submitting a Journal/Conference paper or for filing a patent through the project. The list of students is given in Annexure 2.4.

ANNEXURE 2.4

List of Students with Distinction B. Tech 2015-2019 Batch

S.No.	Roll No.	Student's Name
1	CB.EN.U4MEE15001	Adithya Viswanath
2	CB.EN.U4MEE15002	Ajay Vyshnave C C
3	CB.EN.U4MEE15003	Akaash V
4	CB.EN.U4MEE15008	Avinash Kumar
5	CB.EN.U4MEE15009	Bollina Harsha Vardhan
6	CB.EN.U4MEE15010	B Dharsan
7	CB.EN.U4MEE15013	Gayathri M
8	CB.EN.U4MEE15014	Guhakeshav M
9	CB.EN.U4MEE15017	Kolluri Guna Shekar
10	CB.EN.U4MEE15022	Madha Yogith
11	CB.EN.U4MEE15027	Naveen Kumar V
12	CB.EN.U4MEE15033	Poongkundran T
13	CB.EN.U4MEE15034	Potturu Bharath Kumar
14	CB.EN.U4MEE15036	Pranav Raja R S
15	CB.EN.U4MEE15039	Roshan Prasad
16	CB.EN.U4MEE15049	Shyam Sundar S
17	CB.EN.U4MEE15050	Siddharth S S
18	CB.EN.U4MEE15052	A Sumanth Ram
19	CB.EN.U4MEE15053	Sunkara Venkata Siva S Surya Subhash
20	CB.EN.U4MEE15058	Vignesh K
21	CB.EN.U4MEE15059	Vigneshvar V
22	CB.EN.U4MEE15060	Vijeykumar S
23	CB.EN.U4MEE15063	S R Vishwanth
24	CB.EN.U4MEE15109	Aswin Ramaswamy G
25	CB.EN.U4MEE15113	Darshan R
26	CB.EN.U4MEE15114	G Deepal
27	CB.EN.U4MEE15116	Eshwar Srinivas M
28	CB.EN.U4MEE15129	Jisnu S
29	CB.EN.U4MEE15134	Narenthiran N
30	CB.EN.U4MEE15137	P Prasanna
31	CB.EN.U4MEE15139	Ragav P
32	CB.EN.U4MEE15140	Raghul Anandh K S
33	CB.EN.U4MEE15142	Rahul Sree Kumar

S.No.	Roll No.	Student's Name
34	CB.EN.U4MEE15143	Ram Vignesh M
35	CB.EN.U4MEE15147	J Revant
36	CB.EN.U4MEE15157	A Sujeeth Selvam
37	CB.EN.U4MEE15160	Varun Joseph Chettupuzha
38	CB.EN.U4MEE15161	Venkatraman R
39	CB.EN.U4MEE15164	Yukesh Aravind A
40	CB.EN.U4MEE15207	Akshay Naidu
41	CB.EN.U4MEE15208	M S Anbumanivel
42	CB.EN.U4MEE15211	Ashwin A
43	CB.EN.U4MEE15214	Chand Swaroop C B
44	CB.EN.U4MEE15215	Chandru P
45	CB.EN.U4MEE15228	A K Kaushik Narasimhan
46	CB.EN.U4MEE15242	C Pranav
47	CB.EN.U4MEE15246	G Rohith
48	CB.EN.U4MEE15253	Shashank Prakash Nair
49	CB.EN.U4MEE15256	R Srinath
50	CB.EN.U4MEE15257	B Sriram
51	CB.EN.U4MEE15502	Kirutiga S

2.2.4 Initiatives related to industry interaction (10)

Institute Marks : 10.00

A. Industry supported laboratories

a) AARTC: Amrita Automotive Research and Technology Center (AARTC)

Amrita Automotive Research and Technology Center (AARTC) established with industry support to provide state of art facilities for students to work on live projects. AARTC is the only University laboratory providing comprehensive facilities to the tune of 20 Crores in the automotive domain in India.

Amrita Automotive Research and Technology Centre (AARTC) is a clear manifestation of the university's focus on research and innovation that would enhance the quality of teaching and learning experience of faculty, researchers and students. The centre would also enable the automotive industry to get valuable data on their products and facilitate decision-making on performance and target improvements.

AARTC facilitates the Doctoral, Graduate and Undergraduate students of the university to gain hands-on experience by giving them an opportunity to participate in live research projects aimed at developing new technologies.

The facilities at Amrita Automotive Research and Technology centre includes

- Chassis Dynamometer which provides simulated road driving conditions in a controlled laboratory environment for a range of vehicles up to an SUV
- Transient Dynamometer with a maximum power of 168 kW and Torque of 353 Nm can operate up to 10000 rpm. It is equipped with fuel, oil, coolant, intake air conditioning systems, Fast Response Flame ionisation detector HFR 500 with the Nanoparticle measurement system.
- Thermal Shock system that facilitates cooling of a hot engine very quickly to place the material under maximum stress.
- Eddy Current Dynamometer with a maximum power of 500 kW and Torque of 2000 Nm can operate up to 4000 rpm. It is equipped with an exhaust backpressure controller, intercooler, signal conditioning system and Blows by Meter
- Utilities comprise of a fully automated system for temperature control with chillers, air handling systems and cooling towers.
- Facilities for experimental Modal testing and analysis of full vehicle, power train components, tyres, wheel rim and seat assemblies.

Academic projects carried out at AARTC

- Performance and emission characteristics of low heat rejection engine fuelled with Biodiesel
- Experimental Investigation on performance and emission characteristics of DI diesel engine fuel blended with tyre pyrolysis oil and Diphenyl ether
- Design and Analysis of Engine Mount System for a Formula Student Vehicle
- Experimental study on the performance and emission characteristics of SI engine with ethers
- Experimental investigation of a diesel engine fuelled with cottonseed oil and anti NOx agents.
- Performance and emission characteristics of fuel from plastic waste
- Effect of Antioxidants on the performance and emission characteristics of a CI engine fuelled by waste cooking biodiesel
- Heat release rate analysis of diesel water emulsion
- Investigation on performance, emission of RCCI duel fuel combustion by direct injection
- An experimental study on PCCI-DI engine fuelled with diesel and biodiesel blends
- Obstacle warning system via camera module
- Assessment and improvising driver seat comfort in a farm equipment
- Emission modelling of commercial vehicle engines
- Determination of Acoustic Performance for different types of Expansion Chamber
- The novel ignition system for lean-burn combustion engines
- Comparison of performance and emission attributes of Neem-Ethanol-Diesel blends with and without EGR in a single cylinder diesel engine using pilot injection
- Influence of variable injection pressure and split injection on combustion and emission behavior of an engine with diesel-biodiesel blends
- Engine test cell noise measurement and attenuation
- Vibration analysis of coiled springs
- Machine learning approach for prediction of diesel engine performance using artificial neural network.
- Effect of EGR and injection timing on performance and emission characteristics of a CI engine using methanol diesel blends
- Design and fabrication of EGR and optimization of the emission characteristics of a single cylinder CI engine.
- Thermodynamic analysis on the performance of EGR valve of a DI engine using biodiesel
- Effect of psychoacoustic analysis in vehicle exhaust noise

b) Amrita-Robert Bosch Automotive Electronics Laboratory

The Amrita- Robert Bosch Automotive Electronics Laboratory Lab was inaugurated and established at the Coimbatore campus of Amrita Vishwa Vidyapeetham on November 20, 2014. The lab supports the students pursuing their degree in engineering disciplines, viz., Electronics and Communication Engineering, Electrical and Electronics Engineering, Mechanical Engineering, Automotive Engineering, Automotive Electronics and Electronics & Instrumentation Engineering.

The state-of-art laboratory facility is part of the Department of Mechanical Engineering at the campus. From its inception, this laboratory fosters inter-disciplinary research, thereby helping the students and researchers to understand and bridge the gap between academia and industry.

Robert Bosch Engineering and Business Solutions (RBEI) experts provide help to fine-tune the research work so that they match with the real-time problems faced by the automotive industry. Embedded System Development Kit powered with Freescale™ processor with sensors and actuators provides an actual ECU environment for the experiments conducted in the laboratory.

Academic projects carried out at the laboratory:

1. Fuel injection control in a Reactivity Controlled Compression Ignition (RCCI) for improving the performance and emission.
2. GPIO configuration for reading the controlling sensors and actuators.
3. Timer configuration for synchronizing the channels.
4. ADC and DAC configuration for analogue signal processing
5. PWM (Pulse Width Modulation) configuration for speed control of motors

B. Industry Involvement in the Program Design and Curriculum

- Detailed feedback is obtained from the companies which are coming for placement after their recruitment process. They inform us of the needs of the industry, expectations from the engineers and our student performance. These feedbacks are addressed during the curriculum revision process.
- The following companies are involved in the program design and curriculum.
  - M/s. ELGI Equipments Ltd., Coimbatore
  - M/s. ROOTS Industries India Ltd., Coimbatore
  - M/s. Robert Bosch, Coimbatore
  - M/s. BHEL, Trichy

C. Industry involvement in partial delivery of any regular courses for students

The following industry experts have handled the following courses for the students as shown in Table 2.9.

S.No.	Name of the expert	Name of the Industry	Name of the course	Duration	
				From	To
1.	Dr. Raju Ananth	Senior Consultant, Structural Integrity Associates Inc, Windsor Way, SAN JOSE	Theory of Vibration	01.12.2016	30.04.2017
2.	Mr.SabariRagavan Mr. Venkataraman Sundaram Midhun Babu	L&T, Coimbatore	Design Thinking (30 students)	10.07.2017	13.07.2017
	Mr. Logesan Mr. Sathayamoorthy	Roots Industries India Limited, Coimbatore.			
3.	Dr. Venu Madhav	Elgi Equipments, Coimbatore	Heat Power Engineering	16.08.2018	18.10.2018

Table 2.9. Industry involvement in partial delivery of regular courses

2.2.5 Initiatives related to industry internship/summer training (10)

Institute Marks : 10.00

Students are encouraged to take up internships and industry training during winter/summer vacation periods. The list of students along with company name and duration is given in Table 2.10.

Industrial /internship /summer training of more than two weeks

Sl.No.	Student Name	Company	From	To
Internships - 2015-19 : 2015-16				
1	ESHWAR SRINIVAS M	JANATICS India Pvt. Ltd., SIDCO Industrial Estate, Coimbatore	24.05.2016	24.06.2016
2	RAGAV P	Shanthi Gears Limited, Coimbatore	13.06.2015	25.06.2016
3	ASHWIN A	Shanthi Gears Limited, Coimbatore	13.06.2016	25.06.2016
2016-17				
1	PATIBANDLA AKUL SAI	Steel Plant, Visakapatnam	19.06.2017	30.06.2017
2	P H V PAVAN KUMAR	Steel Plant, Visakapatnam	05.06.2017	24.06.2017
3	GOTTUMUKKALA H V S SAI RAM VARMA	Steel Plant, Visakapatnam	12.06.2017	28.06.2017
4	PENKEY NAGENDRA GANAPATHI VARA PRASAD	Steel Plant, Visakapatnam	19.06.2017	30.06.2017
5	CHANDRU P	DECCAN Pumps Private Limited, Coimbatore	13.06.2017	17.06.2017
6	KARRI GUNA SEKHAR	Steel Plant, Visakapatnam	19.06.2017	30.06.2017
7	MADALLAPALLI PRUDHVIRAJ	Steel Plant, Visakapatnam	19.06.2017	30.06.2017
8	MATUKUMALLI RATNA PHANEENDRA	Steel Plant, Visakapatnam	19.06.2017	30.06.2017
9	PALADUGULA VENKATA SAI PRADEEP	Steel Plant, Visakapatnam	19.06.2017	30.06.2017
10	SATYANARAYANA REDDY	Ruchi Soya Industries, Kakinada, Andhra	15.06.2017	30.06.2017
2017-18				
1	NAGA MADHU HITESH PENJURU	South Central Railway, Lallaguda	09.06.2017	24.06.2017
2	NAVEEN KUMAR V	Bull Construction Equipment, Sulur, Coimbatore	02.05.2018	02.06.2018
3	SIDDHARTH S S	Indira Gandhi Centre for Atomic Research, Kalpakkam	01.06.2017	30.06.2017
4	SIDDHARTH S S	Indira Gandhi Centre for Atomic Research, Kalpakkam	01.05.2018	05.06.2018
5	VIJEYKUMAR S	Roots, Ganapathy, Coimbatore	28.11.2017	10.12.2017
6	GOWTHAM M	Rabwin Industries Private Limited	29.11.2017	10.12.2017
7	ABILAASH K R	Larsen & Toubro Limited, Coimbatore	08.07.2017	10.10.2017
8	ASHWATH KRISHNAMURTHY	Flowserve India Controls Pvt. Ltd.,	03.05.2018	31.05.2018
9	BADHUSHA MOHAIDEEN	Flowserve India Controls Pvt. Ltd.,	03.05.2018	31.05.2018
10	FAHIM AHAMED S A	India yamaha motors pvt. Ltd., chennai	29.11.2017	09.12.2017
11	FAHIM AHAMED S A	Integral Coach Factory ICF, Chennai	15.05.2018	29.05.2018
12	SANTHOSH ROSHAN M	FLSmidh PVT. LTD.,	01.06.2017	30.06.2017
13	TONY K VARGHESE	Air India Engineering Services, Trivandrum	19.06.2017	07.07.2017
14	NITHIN SUBBIAH M	NTU - India Connect Internship Programme, Nanyang Technological University (NTU), Singapore	30.05.2017	01.08.2017
15	VYYURU RAGHUNATHA REDDY	Project Internship - Mohan Spintex India Limited, Krishna,AP	Sep-17	Sep-17

Sl.No.	Student Name	Company	From	To
16	KARTHIK KUMAR P	Ashok Leyland	04.01.2018	15.05.2018
17	S.SIDDHARTH	Roots, Ganapathy, Coimbatore	01.05.2017	30.06.2017
2018-19				
1	ARJUN PANICKER	Rinac India Limited, Bangalore	24.11.2018	09.11.2018
2	DON ANTONY THALIATH	Rinac India Limited, Bangalore	24.11.2018	09.11.2018
3	KOLLURI GUNA SHEKAR	Rinac India Limited, Bangalore	24.11.2018	09.11.2018
4	SHIVARAM SRIKANTH	Schwing Stetter (India) Private Limited	01.12.2018	01.03.2019
5	AKSHAY NAIDU	Flowserve India Private Limited	03.05.2018	31.05.2018
6	TONY K VARGHESE	Rinac India Limited, Bangalore	24.10.2018	09.11.2018
Internships - 2014-18 Batch: 2014-15				
1	HARIPRASAD.S	MRPL, Mangalore, Kuthethoor, P.O. 575030	03.06.2015	12.06.2015
2	ALLAN DOJO	Arabian Automobiles CO. LLC., U.A.E.	14.06.2015	25.06.2015
3	GIRI PRASADH R	MRPL, Mangalore, Kuthethoor, P.O. 575030	03.06.2015	12.06.2015
4	RAMKUMAR R	MRPL, Mangalore, Kuthethoor, P.O. 575030	03.06.2015	12.06.2015
2015-16				
1	ROHIT V	L & T Construction	24.05.2016	21.06.2016
2	ANIRUDH PANDALAI	SANKALP - The learning centre, No.4, Sathalwar street, Mogappair west, Chennai - 600037, PH:044 26520662	14.12.2015	23.12.2015
3	ANIRUDH PANDALAI	Royal Enfield, Tiruvottiyur High Road, Tiruvottiyur, Chennai – 600019	06.06.2016	17.06.2016
4	BHAVESH PRAVEEN	Cochin Shipyard Ltd, Po.Box, No. - 1653, Perumanoor po, Kochi	25.05.2016	04.06.2016
5	KIRUTHIKA S	Caterpillar india Pvt. Ltd., Melnallathur, Tiruvallur, Tamilnadu - 602004, Phone:91-44-27241085	30.05.2016	23.06.2016
6	GURU VISHNU KAVALI	Research centre IMARAT, Hyderabad	12.12.2015	31.12.2015
7	POVENDHAN A P	LGB Rubber Processing Machinery	06.07.2015	13.07.2015
8	ESHWAR SRINIVAS M	Janatics, Ianalics E-25, Sidco Industrial Estate, Kurichi, Coimbatore - 641021, Tel: 0422-2672800	24.05.2016	24.06.2016
9	RAGAV P	Shanthi Gears Limited	13.06.2016	25.06.2016
10	ASHWIN A	Shanthi Gears Limited	13.06.2016	25.06.2016
2016-17				
1	DHINESH KUMAR M	HR Manager, AVTEC Limited, Poonapalli Village, Mathagondapalli Post, Hosur, 635114, TN	19.12.2016	06.01.2017
2	PACHCHIPULUSU PRUDHVI SAI	Bharath Heavy Electricals Limited, Visakhapatnam – 530012	02.06.2016	01.07.2016
3	PRUDHVI SAI PACHCHIPULUSU	Bharath Heavy Electricals Limited, Visakhapatnam – 530012	05.06.2017	15.06.2017
4	EASWARAMOORTHY NAREN	Renault Nissan Automotive Limited	12.06.2017	30.06.2017
5	HARISH S	Bharath Heavy Electricals Limited, Visakhapatnam – 530012	02.06.2016	01.07.2016
6	SUGANTHAN T	NLC India Limited, Neyveli	17.03.2017	24.03.2017
7	ANANDA KRISHNAN V	Y.K.Almoayyed& Sons, Bahrain	07.06.2016	04.07.2016

Sl.No.	Student Name	Company	From	To
8	ASVIN KUMAR S	NLC India Limited, Neyveli	17.03.2017	24.03.2017
9	ATLURI VENKATA SAI JYOTHISH	NagarajunaFertiliters and Chemicals Limited, (NFCL), Kakinada, AP	07.06.2016	07.07.2016
10	MANISH KUMAR C	EZENITH	16.07.2016	20.07.2016
11	RITHIN K R	NLC India Limited, Neyveli	26.12.2016	02.01.2017
12	SASIDHARAN S	BEML, Kolar gold fields - 563115, Karnataka	28.06.2016	09.07.2016
2017-18				
1	NITHIN SUBBIAH M	NTU - India Connect Internship Programme, Nanyang Technological University (NTU), Singapore	30.05.2017	01.08.2017
2	VYYURU RAGHUNATHA REDDY	Project Internship - Mohan Spintex India Limited, Krishna,AP	Sep-17	Sep-17
3	KARTHIK KUMAR P	Ashok Leyland, Hosur	04.01.2018	15.05.2018
4	S.SIDDHARTH	Roots Industries India Limited, Coimbatore	01.05.2017	30.06.2017
Internships - 2013-17 Batch 2014-15				
1	KAUSHAL KAARTHIK R	EDU2020, Intellectual Industrial Visit (IV 2), Chennai	27.02.2015	27.02.2015
2	KAUSHAL KAARTHIK R	EDU2020, Intellectual Industrial Visit (IV 1), CHENNAI	14.03.2015	15.03.2015
3	MARELLA MURALI KRISHNA	Visakhapatnam Steel Plant	22.06.2015	04.07.2015
4	RAM PRASAD R	SMC Pneumatics Limited, Mahindra city, Kattankulathur, Chennai	08.07.2014	10.07.2014
5	SWARNAVA MUKHERJEE	SMC Pneumatics Limited, Mahindra city, Kattankulathur, Chennai	08.07.2014	10.07.2014
6	SWARNAVA MUKHERJEE	Caterpillar India Pvt. Ltd., Melnallathur, Tiruvallur, Tamilnadu - 602004,	10.06.2015	30.06.2015
7	KHUSHAL A BHATIJA	Pricol Private Limited, Coimbatore	22.12.2014	24.12.2014
8	NARNE ANOOP SAI	Visakhapatnam Steel Plant	08.06.2015	27.06.2015
9	ANIRUDH A	Nissan Ashok Leyland Limited, Chennai:17	11.12.2014	26.12.2014
10	KIRTHIC GOUTHEM B	IP Rings Ltd., Industrial Estate, Kanchipuram-603209	22.06.2015	26.06.2015
2015-16				
1	P V SAI ANURAG	Rashtriya ISPAT Nigam Limited, Visakhapatnam Steel Plant, Visakhapatnam, Andhara Pradesh	14.12.2015	26.12.2015
2	ARAVINDH V	Rashtriya ISPAT Nigam Limited, Visakhapatnam Steel Plant, Visakhapatnam, Andhara Pradesh	14.12.2015	26.12.2015
3	ARAVINDH V	Indo Shell Cast Pvt Ltd., Malumichampatti, Coimbatore	19.06.2015	30.06.2015
4	KABILAN V S	Integral Coach Factory, Chennai - 600038	09.12.2015	22.12.2015
5	KRISHNA KUMAR M	Sakthi Gear Products, Coimbatore	19.06.2015	07.07.2015
6	MADHUBALAN A	Rashtriya ISPAT Nigam Limited, Visakhapatnam Steel Plant, Visakhapatnam, Andhara Pradesh	14.12.2015	26.12.2015
7	M.P.T.HARISH	Visakhapatnam Steel Plant	22.06.2015	04.07.2015

Sl.No.	Student Name	Company	From	To
8	MITILESH RN	ZF Wind Power Coimbatore Pvt. Ltd., Coimbatore	22.05.2015	09.07.2015
9	NALLANA AKHIL	Rashtriya ISPAT Nigam Limited, Visakhapatnam Steel Plant, Visakhapatnam, Andhara Pradesh	22.06.2015	04.07.2015
10	PALANATI KARTHIK	Rashtriya ISPAT Nigam Limited, Visakhapatnam Steel Plant, Visakhapatnam, Andhara Pradesh	22.06.2015	04.07.2015
11	PARVATHAM BHUVANACHANDRA REDDY	Visakhapatnam Steel Plant	22.06.2015	04.07.2015
12	PULLAGUJJU VENKATESH	Visakhapatnam Steel Plant	22.06.2015	04.07.2015
13	RAJASAKTHIKUMAR R	MM Gears, Coimbatore- 641004 / GEM Motors, Coimpatore / Aditya Maruti Suzuki, Coimbatore - 641006	25.05.2015	09.06.2015
14	RAMESH T	GEM Precision Tool (P)Ltd., Coimbatore	25.05.2015	09.06.2015
15	ROOPESH U	Venkatalakshmi Precision Tools, Chinavedampatti, Coimbatore	01.07.2015	07.07.2015
16	SADANAND T D	Rashtriya ISPAT Nigam Limited, Visakhapatnam Steel Plant, Visakhapatnam, Andhara Pradesh	14.12.2015	26.12.2015
17	SANESH K	Integral Coach Factory, Chennai - 600038	07.12.2015	21.12.2015
18	SAURABH PANIGRAHI	Schwing Stetter India Pvt. Ltd., Tamilnadu - 602117	09.12.2015	21.12.20215
19	SURESH BABU K	GEM Equipments Pvt. Ltd.	25.05.2015	09.06.2015
20	VADLAMUDI VENKAT KAUSHIK	Rashtriya ISPAT Nigam Limited, Visakhapatnam Steel Plant, Visakhapatnam, Andhara Pradesh	22.06.2015	04.07.2015
21	NUNNA VIKAS SAI GIRIDHAR	Nagarjuna Fertiligers and Chemicals Ltd, Kakinada - 533003	25.05.2015	08.06.2015
22	PRABHAT BALAKRISHNAN	Mobis India Limited,Chennai, Tamilnadu – 602117	25.06.2015	09.07.2015
23	TANGI HEMANTH	Rashtriya ISPAT Nigam Limited, Visakhapatnam Steel Plant, Visakhapatnam, Andhara Pradesh	22.06.2015	04.07.2015
24	BALAKUMHAREN AP	L & Rubber Processing Machinery	06.07.2015	13.07.2015
25	BHARATH KUMAR S	ZF WindpowerAcoimbatore, No.3 Aspen SEZ Karumathampatti, Coimbatore	04.5.2016	21.06.2016
26	KIRTHIC GOUTHEM B	Hosur CNC Application Pvt. Ltd, Hosur – 216	14.12.2015	27.12.2015
27	MIDUN KUMAR S S	Prakash Gears, Coimbatore	22.06.2015	14.07.2015
28	VIVEK SAINI	DCM Shriram Rayons, Srriramnagar,M Koto - Rajasthan – 324001	08.12.2015	25.12.2015
29	TANGI HEMANTH	Rashtriya ISPAT Nigam Limited, Visakhapatnam Steel Plant, Visakhapatnam, Andhara Pradesh	22.06.2015	04.07.2015
30	PULLAGUJJU VENKATESH	Rashtriya ISPAT Nigam Limited, Visakhapatnam Steel Plant, Visakhapatnam, Andhara Pradesh	22.06.2015	04.07.2015
2016-17				
1 HARISH KRISHNA R		L.G. Balakrishnan & Bros Limited	27.06.2016	12.07.2016

Table 2.10. Industrial /internship /summer training of more than two weeks

Internship interviews and offers are also arranged. Students apply to companies for internship projects in their final year as given in Table 2.11.

Approved list of students under Fast Track Course from the department: 2018-2019-Even semester

Sl. No.	Reg. No.	Student Name	Company / Higher education – Abroad.
1	CB.EN.U4MEE15008	AVINASH KUMAR	tu Munich, Germany (Student Exchange Program)
2	CB.EN.U4.MEE15012	GAUTHAM.S	BAJA SAE Events at Indore and Pune
3	CB.EN.U4.MEE15133	LOKRAM.P	
4	CB.EN.U4.MEE15502	KIRUTIGA.S	IIT Bombay
5	CB.EN.U4.MEE15017	KOLLRI GUNA SHEKAR	Northern Illinois University, USA (Student Exchange Program)
6	CB.EN.U4.MEE15047	SHIVARAM SRIKANTH	Schwing Stetter (India) Pvt. Ltd., Irungattukottai, Tamilnadu.
7	CB.EN.U4.MEE15050	SIDDHARTH.S.S	IGCAR. Kalpakkam.
8	CB.EN.U4.MEE15116	ESHWAR SRINIVAS.M	University of Auckland, New Zealand.
9	CB.EN.U4.MEE15214	CHAND SWAROOP.C.B	Politechnico DI Milano, Italy (Student Exchange Program)
10	CB.EN.U4.MEE15204	ABIRAM ANBU	Darmstadt University, Darmstadt, Germany. (Student Exchange Program)
11	CB.EN.U4.MEE15028	NAVIN SHANKAR.S	
12	CB.EN.U4.MEE15024	MEGHNA NAIR	IIT Bombay

Approved list of students under Fast Track Course from CIR: 2018-2019-Even semester

Sl. No.	Reg. No.	Student Name	Company / Higher education – Abroad.
13	CB.EN.U4MEE15010	B DHARSAN	The MathCompany
14	CB.EN.U4MEE15015	GUHAN S	TCS Digital
15	CB.EN.U4MEE15032	PATIBANDLAAKUL SAI	DRDL, Kanchanbagh, Huderabad
16	CB.EN.U4MEE15042	SAI TEJABALABHADRAPATRUNI	
17	CB.EN.U4MEE15126	GUNTUPALLI SAI GOWTHAM	
18	CB.EN.U4MEE15163	YALLALA BHARAT KUMAR REDDY	

Approved list of students under Fast Track Course from the department: 2017-2018-Even semester

Sl. No.	Reg. No.	Student Name	Company / Higher education – Abroad.
1	CB.EN.U4.MEE14055	VAIDYANATHAN.B	AMPO India Pvt. Ltd., Arasur, Coimbatore A.I.Optics Limited. Ashok Leyland – Chennai
2	CB.EN.U4.MEE14054	THARUN KUMAR.A	
3	CB.EN.U4.MEE14009	BALAJI.J	
4	CB.EN.U4.MEE14008	ARAVINTH.B	
5	CB.EN.U4.MEE14210	ASWIN KUMAR.S	Northern Illinois University, USA.
6	CB.EN.U4.MEE14522	SASIDHARAN.S	University of New Mexico, USA.
7	CB.EN.U4.MEE14148	SHRADHA PRASAD	IIT Guwahati, Assam, India.
8	CB.EN.U4.MEE14110	BALAMURUGAN.G	
9	CB.EN.U4.MEE14110	ARAVIND.V.K	
10	CB.EN.U4.MEE14152	SRIRAM.S	

Sl. No.	Reg. No.	Student Name	Company / Higher education – Abroad.
11	CB.EN.U4.MEE14102	ALLAN DOJO ALIAS JOESPH	Mercedes Benz R&D India Pvt. Ltd., Bangalore
12	CB.EN.U4.MEE14040	ROSHAN BALU.T.M.B	Mahindra & Mahindra – R & D
13	CB.EN.U4.MEE14049	SRIRANGANATHAN.K	Tredence Analytics
14	CB.EN.U4.MEE14219	HARIKRISHNA.R	Midhani Group, Hyderabad.
15	CB.EN.U4.MEE14141	RAHUL GOPINATH	
16	CB.EN.U4.MEE14201	ADABALA SHASHAANK	
17	CB.EN.U4.MEE14250	SREERAG RAJEEVAN	
18	CB.EN.U4.MEE14106	ANIRUDH PANDALAI	Blue Star India Pvt. Ltd., Mubai.
19	CB.EN.U4.MEE14028	KARTHIK KUMAR.P	Ashok Leyland, Chennai
20	CB.EN.U4.MEE14111	ASHWIN MENON	Cochin International Airport Limited.
21	CB.EN.U4.MEE14502	VIGNESH.S	University of Applied Science, Darmstadt, Germany

Approved list of students under Fast Track Course from CIR: 2017-2018-Even semester

Sl. No.	Reg. No.	Student Name	Company / Higher education – Abroad.
1	CB.EN.U4.MEE13206	AKSHAY RAJAN	Politechnico DI Milano, Italy.
2	CB.EN.U4.MEE13046 CB.EN.U4.MEE13054 CB.EN.U4.MEE13059	RAHUL SURESH SARANG DEV.A SRIJIT KRISHNAN	Apollo Tyres, Kochi
3	CB.EN.U4.MEE13128	HARISH KRISHNA.R	L.G.Balakrishnan Brothers Ltd., Coimbatore
4	CB.EN.U4.MEE13230	KARTHICK SRINIVASAN	A.I.Optics Limited.
5	CB.EN.U4.MEE13215	ASHISH GUHAN.B	Ashok Leyland – Chennai
6	CB.EN.U4.MEE13049	R.RAMPRASAD	TU Munich, Germany
7	CB.EN.U4.MEE13034	NEERAJ.R.R	IIT-Madras

Table 2.11. Approved list of students under Fast Track Course from the department and CIR

3 COURSE OUTCOMES AND PROGRAM OUTCOMES (175)

Total Marks 175.00

Define the Program specific outcomes

:

PSO1	Apply knowledge acquired in the field of Design, Manufacturing, Thermal, and Fluid sciences to solve real-world engineering problems using emerging technologies
PSO2	Extend and implement innovative thinking on product design and development with the aid of modern tools
PSO3	Apply the Science and Engineering knowledge for materials design, and processing for development and improvement of products and processes

3.1 Establish the correlation between the courses and the Program Outcomes (POs) & Program Specific Outcomes (25)

Total Marks 25.00

Institute Marks : 25.00

No. of Core Courses : 8	**C2 :** 3	**C3 :** 3	**C4 :** 2

Note : Number of Outcomes for a Course is expected to be around 6.

Course Name :	C2 01	Course Year :	2016-2017

Course Name	Statements
C2 01.1	Apply the principles of equilibrium, superposition, and compatibility to estimate the stress-strain behavior of linear elastic solids under axial and torsional loading
C2 01.2	Construct shear force and bending moment diagrams, to estimate the deflection and stress distribution in beams of various cross sections
C2 01.3	Analyze stresses at inclined planes and construct Mohr's circle to predict the principal and maximum shear planes
C2 01.4	Determine longitudinal and circumferential stresses in thin and thick cylinders subjected to internal and external pressures
C2 01.5	Apply Euler's and Rankine's formulae to determine the buckling load of columns under different end conditions

Course Name :	C2 15	Course Year :	2016-2017

Course Name	Statements
C2 15.1	Solve practical problems involving fluid properties and hydrostatic pressure, and predict the stability of floating bodies
C2 15.2	Evaluate fluid kinematic properties to classify types of fluid flow using flow visualization techniques
C2 15.3	Apply the governing equations for mass, momentum and energy based on Reynolds Transport Theorem and utilize them in practical problems
C2 15.4	Estimate the pumping power by considering major and minor losses in flow through pipes
C2 15.5	Apply dimensional analysis for fluid problems based on Buckingham-Pi Theorem and utilize it for model testing of fluid machineries
C2 15.6	Analyze the performance characteristics of centrifugal pumps and hydraulic turbines

Course Name :	C2 17	Course Year :	2016-2017

Course Name	Statements
C2 17.1	Classify mechanisms and Solve for mobility
C2 17.2	Perform kinematic analysis of mechanisms
C2 17.3	Construct cam profiles for a given motion
C2 17.4	Analyze different types of gear trains
C2 17.5	Develop and perform kinematic analysis of mechanisms using software

Course Name :	C3 02	Course Year :	2017-2018

Course Name	Statements
C3 02.1	Analyze mechanisms using the principles of statics and dynamics and determining joint forces and torques.
C3 02.2	Estimate the magnitude and position of balancing masses for unbalanced rotating and reciprocating parts.
C3 02.3	Construct turning moment diagrams for two and four stroke engines to evaluate the flywheel mass.
C3 02.4	Analyze the effect of gyroscopic couple on automobiles, ships, and airplanes.

C3 02.5	Analyze and design centrifugal governors

Course Name :	**C3 04**	**Course Year :**	**2017-2018**

Course Name	Statements
C3 04.1	Choose the various processes of machining and select the appropriate machine based on the shape of any given component
C3 04.2	Analyse the mechanism of chip formation in machining and solve simple problems related to the calculation of machining time, tool life etc.
C3 04.3	Evaluate the various machining processes such as turning, drilling, boring, shaping, slotting, milling, grinding and calculate the machining time
C3 04.4	Choose the appropriate method of manufacture of gears depending on their geometry, application and quantity
C3 04.5	Compare CNC with conventional machines and create simple CNC manual programs
C3 04.6	Choose the appropriate Rapid Prototyping methods by understanding their capabilities and limitations

Course Name :	**C3 14**	**Course Year :**	**2017-2018**

Course Name	Statements
C3 14.1	Analyze one-dimensional heat conduction in solids for different geometries involving heat generation
C3 14.2	Solve one-dimensional steady and unsteady heat conduction problems to obtain the temperature distributions and rate of heat transfer
C3 14.3	Analyze extended surfaces, and assess how efficiently and effectively they enhance heat transfer
C3 14.4	Evaluate heat transfer coefficient associated with forced and free convection using established empirical correlations
C3 14.5	Analyze heat exchangers based on Logarithmic Mean Temperature Difference (LMTD) and Effectiveness-NTU methods
C3 14.6	Determine radiation heat transfer between diffuse and gray surfaces

Course Name :	**C4 04**	**Course Year :**	**2018-2019**

Course Name	Statements
C4 04.1	Classify different types of vibrations and develop mathematical models of vibrating systems
C4 04.2	Analyze free and forced vibrations of single degree of freedom systems
C4 04.3	Estimate the natural frequencies and mode shapes of multi degree of freedom systems
C4 04.4	Design of vibration isolators and absorbers to control vibrations

Course Name :	**C4 15**	**Course Year :**	**2018-2019**

Course Name	Statements
C4 15.1	Formulate operations research models to optimize resources and maximize profit
C4 15.2	Formulate and solve the transportation and assignment problems and infer solutions
C4 15.3	Analyze the project with appropriate technique to manage the resources and minimize the cost
C4 15.4	Solve operational problems by applying different decision making methods
C4 15.5	Evaluate the performance of various queuing and sequencing models

C4 15.6	Choose the appropriate inventory models to optimize inventory

Course Articulation Matrix :

1 . course name : C201

Course	Statements	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C201.1	Apply the p	3	3	2	1	-	-	-	-	-	-	-	1
C201.2	Construct s	3	3	2	1	-	-	-	-	-	-	-	1
C201.3	Analyze str	3	3	2	1	-	-	-	-	-	-	-	1
C201.4	Determine l	3	3	2	1	-	-	-	-	-	-	-	1
C201.5	Apply Euler	3	3	2	1	-	-	-	-	-	-	-	1
Average		**3**	**3**	**2**	**1**								**1**

2 . course name : C215

Course	Statements	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C215.1	Solve pract	3	3	-	1	-	-	-	-	-	-	-	1
C215.2	Evaluate flu	3	3	1	1	-	-	-	-	-	-	-	1
C215.3	Apply the g	3	3	1	1	-	-	-	-	-	-	-	1
C215.4	Estimate th	3	3	1	1	-	-	-	-	-	-	-	1
C215.5	Apply dime	3	3	1	1	-	-	-	-	-	-	-	1
C215.6	Analyze the	3	3	1	1	-	1	1	-	-	-	-	1
Average		**1.64**	**1.64**	**0.5**	**0.55**		**1**	**1**					**0.55**

3 . course name : C217

Course	Statements	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C217.1	Classify me	3	3	2	1	-	-	-	-	-	-	-	1
C217.2	Perform kin	3	3	2	2	3	-	-	-	2	-	-	1
C217.3	Construct c	3	3	2	2	2	-	-	-	2	-	-	-
C217.4	Analyze diff	3	3	2	2	-	-	-	-	-	-	-	1
C217.5	Develop an	3	3	2	2	3	-	-	-	3	-	-	-
Average		**0.94**	**0.94**	**0.67**	**0.56**	**2.67**	**0**	**0**		**2.33**			**0.21**

4 . course name : C302

Course	Statements	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C302.1	Analyze me	3	3	2	1	-	-	-	-	-	-	-	1
C302.2	Estimate th	3	3	2	1	-	-	-	-	-	-	-	1

C302.3	Construct t	3	3	2	1	-	-	-	-	-	-	-	1
C302.4	Analyze the	3	3	3	1	-	-	-	-	-	-	-	1
C302.5	Analyze an	3	3	2	1	-	-	-	-	-	-	-	1
Average		**0.71**	**0.71**	**0.55**	**0.24**	**0**	**0**	**0**		**0**			**0.26**

5 . course name : C304

Course	Statements	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C304.1	Choose the	3	2	-	-	-	-	-	-	1	-	-	1
C304.2	Analyse th	3	2	-	1	-	-	-	-	-	-	-	1
C304.3	Evaluate th	3	1	-	1	-	-	-	-	-	-	-	2
C304.4	Choose the	2	-	-	-	-	-	-	-	-	-	-	1
C304.5	Compare C	2	2	-	-	-	-	-	-	1	-	-	1
C304.6	Choose the	2	-	-	-	-	-	-	-	1	-	-	1
Average		**0.56**	**0.28**	**0**	**0.09**	**0**	**0**	**0**		**0.5**			**0.28**

6 . course name : C314

Course	Statements	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C314.1	Analyze on	3	3	3	2	-	1	-	-	-	-	-	-
C314.2	Solve one-(	3	3	3	3	-	1	-	-	-	-	-	-
C314.3	Analyze ex	3	3	3	3	-	1	-	-	-	-	-	1
C314.4	Evaluate he	3	3	3	3	-	1	-	-	-	-	-	1
C314.5	Analyze he	3	3	3	3	-	1	-	-	-	-	-	1
C314.6	Determine	3	3	3	3	-	1	-	-	-	-	-	1
Average		**0.55**	**0.58**	**0.69**	**0.59**	**0**	**0.86**	**0**		**0**			**0.14**

7 . course name : C404

Course	Statements	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C404.1	Classify diff	3	3	2	2	-	-	-	-	-	-	-	1
C404.2	Analyze fre	3	3	2	2	1	-	-	-	-	-	-	1
C404.3	Estimate th	3	3	2	2	1	-	-	-	-	-	-	1
C404.4	Design of v	3	3	2	2	1	-	-	-	-	-	-	1
Average		**0.32**	**0.34**	**0.27**	**0.24**	**0.5**	**0**	**0**		**0**			**0.12**

8 . course name : C415

Course	Statements	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C415.1	Formulate (	3	2	2	-	-	-	-	-	-	1	2	3

C415.2	Formulate a	3	2	2	-	-	-	-	-	-	1	2	3
C415.3	Analyze the	3	2	2	-	-	-	-	-	-	1	2	3
C415.4	Solve opera	3	2	2	-	-	-	-	-	-	1	2	3
C415.5	Evaluate th	3	2	2	-	-	-	-	-	-	1	2	3
C415.6	Choose the	3	2	2	-	-	-	-	-	-	1	2	3
Average		**0.42**	**0.29**	**0.33**	**0**	**0**	**0**	**0**		**0**	**1**	**2**	**0.46**

1 . Course Name : C201

Course	PSO1	PSO2	PSO3
C201.1	3	1	1
C201.2	3	1	1
C201.3	3	1	1
C201.4	3	1	1
C201.5	3	1	1
Average	**3**	**1**	**1**

2 . Course Name : C215

Course	PSO1	PSO2	PSO3
C215.1	3	-	-
C215.2	3	-	-
C215.3	3	-	-
C215.4	3	-	-
C215.5	3	-	-
C215.6	3	-	-
Average	**3**	**0**	**0**

3 . Course Name : C217

Course	PSO1	PSO2	PSO3
C217.1	2	-	1
C217.2	3	-	1
C217.3	3	-	-
C217.4	3	-	-
C217.5	2	-	1
Average	**2.6**	**0**	**1**

4 . Course Name : C302

Course	PSO1	PSO2	PSO3
C302.1	3	1	-
C302.2	3	1	-
C302.3	3	1	-
C302.4	3	1	-
C302.5	3	1	-
Average	**3**	**1**	**0**

5 . Course Name : C304

Course	PSO1	PSO2	PSO3
C304.1	-	1	-
C304.2	-	2	-
C304.3	-	2	-
C304.4	-	2	-
C304.5	-	2	-
C304.6	-	1	-
Average	**0**	**1.67**	**0**

6 . Course Name : C314

Course	PSO1	PSO2	PSO3
C314.1	3	-	-
C314.2	3	-	-
C314.3	3	-	-
C314.4	3	-	-
C314.5	3	-	-
C314.6	3	-	-
Average	**3**	**0**	**0**

7 . Course Name : C404

Course	PSO1	PSO2	PSO3
C404.1	3	-	-
C404.2	3	-	-
C404.3	3	-	-
C404.4	3	-	-
Average	**3**	**0**	**0**

8 . Course Name : C415

Course	PSO1	PSO2	PSO3
C415.1	3	1	-
C415.2	3	1	-
C415.3	3	1	-
C415.4	3	1	-
C415.5	3	1	-
C415.6	3	1	-
Average	**3**	**1**	**0**

Program Articulation Matrix :

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C101	PO1	PO2	PO3	PO4	PO5	PO6	PO7	2	2	3	PO11	2
C102	3	3	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	1
C103	1.75	1.25	2.5	PO4	2.5	PO6	PO7	3	3	3	PO11	PO12
C104	2.5	2.5	1	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	1
C105	3	3	2.67	2.34	3	2	PO7	PO8	PO9	3	PO11	3
C106	PO1	PO2	PO3	PO4	PO5	2	3	3	2	3	2	2
C107	3	2.33	2.33	PO4	PO5	PO6	PO7	3	2.5	3	PO11	1
C108	2	2	2	2	2	1	PO7	PO8	PO9	PO10	PO11	PO12
C109	2.5	2.25	1	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	1
C110	3	3	2	1	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C111	1.25	2	1.66	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C112	3	3	2.8	2	PO5	PO6	PO7	PO8	PO9	PO10	PO11	1
C113	PO1	PO2	PO3	PO4	PO5	2	3	3	2	3	2	2
C114	3	2.8	1	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C115	2	1.5	1	PO4	1	PO6	PO7	PO8	2	1	PO11	1
C116	1	1.75	2	PO4	1	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C117	3	3	3	2	PO5	2	PO7	PO8	PO9	3	PO11	3
C201	3	3	2	1	PO5	PO6	PO7	PO8	PO9	PO10	PO11	1
C202	2.67	1.4	1	PO4	1	PO6	PO7	PO8	1.5	PO10	PO11	PO12
C203	3	2.5	2.67	1	1	1.33	PO7	1	2	1	PO11	1.75
C204	3	3	1	1	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C205	2.5	2.67	PO3	1.5	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C206	2.5	2.33	1	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	2
C207	3	PO2	PO3	PO4	PO5	PO6	PO7	PO8	2	1	PO11	1
C208	2.66	3	1	2	3	PO6	PO7	PO8	1	2	PO11	3
C209	PO1	PO2	PO3	PO4	PO5	2.8	PO7	3	3	2	PO11	3
C210	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	2	2	PO11	PO12
C211	PO1	PO2	PO3	PO4	PO5	3	3	2	2.67	2.25	1	1.67
C212	PO1	2	3	1	1	PO6	2	2.33	2	3	3	2.33
C213	PO1	PO2	PO3	PO4	PO5	2	PO7	PO8	2	3	1	2
C214	PO1	1	1	PO4	PO5	1	1	1	1	1	1	3
C215	3	3	1	1	PO5	1	1	PO8	PO9	PO10	PO11	1
C216	2.33	2.16	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C217	3	3	2	1.8	2.67	PO6	PO7	PO8	2.33	PO10	PO11	1

C218	2.75	PO2	1	PO4	PO5	PO6	1	PO8	PO9	PO10	PO11	1.75
C219	3	2	3	3	1	2	2	PO8	2	3	PO11	PO12
C220	3	1.67	PO3	PO4	PO5	1	1	PO8	1	PO10	PO11	1
C221	3	2.25	1.75	PO4	PO5	PO6	1	PO8	PO9	PO10	PO11	PO12
C222	PO1	PO2	PO3	PO4	PO5	2.8	PO7	3	3	2	PO11	3
C223	3	PO2	PO3	PO4	PO5	PO6	PO7	PO8	2	1	PO11	1
C224	PO1	3	PO3	3	PO5	PO6	PO7	2	2.67	3	PO11	3
C301	3	2	2	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	1
C302	3	3	2.22	1	PO5	PO6	PO7	PO8	PO9	PO10	PO11	1
C303	3	3	1	1	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C304	2.5	1.75	PO3	1	PO5	PO6	PO7	PO8	1	PO10	PO11	1.5
C305	3	2	1	2	3	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C306	2	2.33	2.33	2	1.33	PO6	PO7	PO8	PO9	PO10	PO11	2.33
C307	3	3	1	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	2
C308	3	3	1.6	1.20	2.80	PO6	PO7	PO8	PO9	PO10	PO11	1
C309	3	2.75	1.5	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C310	2.5	2.25	2.25	2	1.5	1.75	1	2.5	2.75	2	1.75	3
C311	PO1	3	PO3	2	PO5	PO6	PO7	2	2.67	3	PO11	3
C312	2.33	2.55	2.13	1.33	3	2.25	2.83	1.67	2.92	2.85	2.75	2
C313	3	1.25	1.75	1.5	1	PO6	PO7	PO8	2	PO10	PO11	1.5
C314	3	3	3	3	PO5	1	PO7	PO8	PO9	PO10	PO11	1
C315	3	1.6	2.4	1.8	2.33	PO6	PO7	PO8	2.33	PO10	PO11	2
C316	3	PO2	PO3	PO4	2	PO6	PO7	PO8	PO9	1	PO11	2
C317	3	1.25	PO3	PO4	PO5	PO6	PO7	PO8	PO9	1	PO11	PO12
C318	3	2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	1	PO11	PO12
C319	3	PO2	PO3	PO4	1	PO6	PO7	PO8	PO9	PO10	PO11	2
C320	3	1	PO3	PO4	1	PO6	PO7	PO8	PO9	1	PO11	1
C321	3	3	2.75	2.5	PO5	PO6	PO7	PO8	PO9	PO10	PO11	1.75
C322	3	3	1	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C323	2.2	2.16	2	1.75	3	1	1.25	PO8	PO9	2	2	3
C324	3	2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	2	2
C325	2.75	2	2.75	2.25	1	1	1.5	1	2	3	1.5	1
C326	PO1	3	PO3	2	PO5	PO6	PO7	2	3	3	PO11	2.6
C401	3	3	3	2.33	PO5	1	1	PO8	PO9	PO10	PO11	1
C402	3	2.25	1.25	1	2	PO6	PO7	PO8	2.25	PO10	PO11	1
C403	2.83	2.67	2.75	3	3	2	2	PO8	3	2.5	2.5	PO12
C404	3	3	2	2	1	PO6	PO7	PO8	PO9	PO10	PO11	1
C405	1	1	1	1	PO5	2	3	2.5	1	2	PO11	1

C406	1.75	1.5	2	PO4	2	PO6	PO7	PO8	1	2	PO11	PO12
C407	2.4	1	PO3	1	PO5	PO6	PO7	PO8	1	PO10	PO11	1
C408	2	1.33	1.33	1.66	1	PO6	PO7	PO8	2	PO10	PO11	1
C409	3	2	3	2	3	PO6	PO7	PO8	2.33	3	PO11	PO12
C410	2.8	2.6	3	PO4	3	2.5	2.75	2	3	2.6	2.83	2.5
C411	3	3	2	2.5	2.33	1	1	1	1	1	PO11	1
C412	1.67	3	3	1.67	PO5	2	PO7	2	PO9	PO10	3	2
C413	2	1.33	1	1	PO5	PO6	PO7	PO8	PO9	1	1	2
C414	2.6	2.2	2.2	1.5	2	PO6	PO7	PO8	3	1	1	2.2
C415	3	2	2	PO4	PO5	PO6	PO7	PO8	PO9	1	2	3
C416	3	3	3	3	2.33	2.5	3	2.33	3	3	3	2
C417	1.8	2.4	2	1.4	2.33	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C418	1	1	2.6	2.2	2	1.75	1.25	1	2	2	2.5	2.4
C419	1.5	2.25	2.5	2	1.5	PO6	PO7	PO8	2.25	PO10	PO11	PO12
C420	1.8	2.2	2	PO4	PO5	PO6	PO7	2	PO9	PO10	PO11	PO12
C421	2	2	2	1.33	1	1	1	PO8	2	1	PO11	1.5

Course	PSO1	PSO2	PSO3
C101	PSO1	PSO2	PSO3
C102	PSO1	PSO2	PSO3
C103	PSO1	PSO2	PSO3
C104	PSO1	PSO2	PSO3
C105	2	2	2
C106	PSO1	PSO2	PSO3
C107	PSO1	PSO2	PSO3
C108	PSO1	PSO2	PSO3
C109	PSO1	PSO2	PSO3
C110	PSO1	PSO2	PSO3
C111	3	2	PSO3
C112	PSO1	PSO2	PSO3
C113	PSO1	PSO2	PSO3
C114	PSO1	PSO2	PSO3
C115	1	1	PSO3
C116	3	2	PSO3
C117	2	2	2
C201	3	1	1
C201	PSO1	PSO2	PSO3
C202	PSO1	PSO2	PSO3

C202	PSO1	PSO2	PSO3
C203	2	2	PSO3
C203	PSO1	PSO2	PSO3
C204	PSO1	PSO2	PSO3
C204	3	PSO2	PSO3
C205	PSO1	PSO2	PSO3
C205	PSO1	PSO2	PSO3
C206	PSO1	PSO2	PSO3
C206	3	PSO2	1
C207	3	PSO2	PSO3
C207	PSO1	PSO2	PSO3
C208	PSO1	PSO2	PSO3
C208	2	PSO2	PSO3
C209	PSO1	PSO2	PSO3
C209	PSO1	PSO2	PSO3
C210	PSO1	PSO2	PSO3
C211	PSO1	PSO2	PSO3
C212	PSO1	PSO2	PSO3
C213	PSO1	PSO2	PSO3
C214	PSO1	PSO2	PSO3
C215	3	PSO2	PSO3
C216	PSO1	PSO2	PSO3
C217	2.6	PSO2	1
C218	2	PSO2	1
C219	1	PSO2	PSO3
C220	1.75	PSO2	PSO3
C221	1.8	PSO2	1.8
C222	PSO1	PSO2	PSO3
C223	3	PSO2	PSO3
C224	PSO1	PSO2	PSO3
C301	3	1	1
C302	3	1	PSO3
C303	3	PSO2	PSO3
C304	PSO1	1.67	PSO3
C305	3	3	PSO3
C306	1.5	PSO2	2
C307	3	PSO2	PSO3
C308	2.4	2	PSO3

C309	2.75	PSO2	PSO3
C310	PSO1	2.5	2.25
C311	PSO1	PSO2	PSO3
C312	PSO1	PSO2	PSO3
C313	1	PSO2	PSO3
C314	3	PSO2	PSO3
C315	3	2.2	PSO3
C316	2	PSO2	PSO3
C317	3	PSO2	PSO3
C318	3	PSO2	PSO3
C319	2	PSO2	PSO3
C320	1	PSO2	PSO3
C321	3	2	1
C322	3	1	PSO3
C323	2.67	PSO2	PSO3
C324	3	PSO2	1
C325	2.75	PSO2	2.5
C326	PSO1	PSO2	PSO3
C401	3	PSO2	PSO3
C402	1	1	1.75
C403	2	2.33	2.33
C404	3	PSO2	PSO3
C405	PSO1	PSO2	PSO3
C406	1.5	1.5	PSO3
C407	2	1	PSO3
C408	1	1	1
C409	3	2	PSO3
C410	PSO1	PSO2	PSO3
C411	3	2	1
C412	1	PSO2	PSO3
C413	2	PSO2	1
C414	2.2	PSO2	PSO3
C415	3	1	PSO3
C416	2.6	2.33	3
C417	1	1.5	PSO3
C418	PSO1	PSO2	PSO3
C419	1.5	2	PSO3
C420	PSO1	PSO2	PSO3

C421	2	1	1.33

3.2 Attainment of Course Outcomes (75) Total Marks 75.00

Institute Marks : 10.00

3.2.1. Describe the assessment tools and processes used to gather the data upon which the evaluation of Course Outcome is based (10)

The CO attainment is computed at Amrita School of Engineering, Coimbatore using the **Inpods Software**. The following procedure is followed to do the computation.

Step 1: Faculty sets the assessment question paper with CO mapping, BTL mapping and marks for each question.

Step 2: Faculty enters the step 1 data in Inpods software and the bundle number is generated. Bundle Number is a unique number (Spread sheet) for an exam offered for a particular course for a particular class.

Step 3: The answer paper is evaluated by the faculty and is shared with the students for verification.

Step 4: The front sheet of the answer paper which contains the question wise mark is torn and collected back by the faculty.

Step 5: Faculty sends those front sheet along with bundle number generated in step 2 to the data entry team

Step 6: Data entry team enters the marks of each students, question wise, in the Inpods software with the help of bundle number (spread sheet).

Step 7: The entry will be done by the faculty for assignment and quiz in Inpods.

Step 8: Step 1 to Step 6 will be followed for Periodical 1, Periodical 2 and End Semester.

Step 9: The Course Attainment-Direct is computed by the Inpods software.

The process followed at Amrita School of Engineering, Coimbatore for CO computation in a theory course is given in Figure 3.1. In the CO attainment calculation for a course, 80% is contributed through direct and 20% through Indirect. As per the university regulation, 50% of the direct is contributed by Cumulative Internal Examination (CIE) and 50% from Semester End Examinations (SEE) for theory courses. In the CIE, the weightages for Periodical 1, Periodical 2 and Continuous Assessment are 15%, 15% and 20% respectively. For Lab courses, 80% and 20% is contributed by continuous assessment and end semester examinations respectively to the direct attainment.

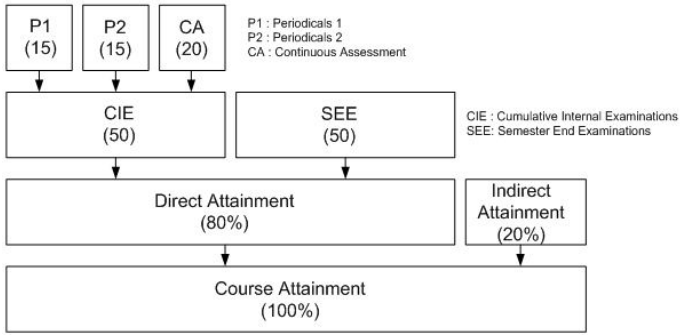
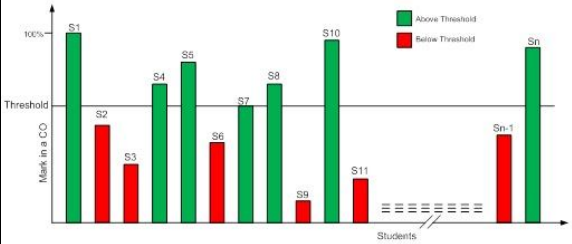


Figure 3.1 CO attainment for theory courses

Attainment computations

Direct	The direct part of the CO attainment is computed through Continuous Internal Examinations (CIE) & Semester End Examination (SEE). For every CO, percentage of students in the class who scored more than threshold percentage of marks is the attainment level for that CO defined for the course.  $CO\ Attainment, \% = \frac{No.\ of\ students\ scored\ above\ threshold\ value}{Total\ no.\ of\ students} \times 100$

Indirect	The in-direct part of the CO attainment is computed through surveys For indirect assessments, we use formula of rating for each option of the course end survey question. CO attainment is computed for each question (which is mapped to a CO), by using the formula as: Total count of students in the class = *n* Count of students who choose an option = *o* Rating of question: Option 1 = 5; Option 2 = 4;Option 3 = 3;Option 4 = 2;Option 5 = 1; $CO\ Attainment, \% = \frac{[(o \times 5) + (o \times 4) + (o \times 3) + (o \times 2) + (o \times 1)]}{5 * n}$

3.2.2 Record the attainment of Course Outcomes of all courses with respect to set attainment levels (65)

Institute Marks : 65.00

The process of calculating final attainment level for each CO from the marks obtained by the students through Periodical test, Continuous Assessments and from Semester End Examinations are explained below:

Measuring CO attainment through Cumulative Internal Examinations (CIE)

After completion of the Periodical test, attainment calculations are done for the mapped CO. In the attainment calculation, threshold for the theory and lab courses are fixed as 50% and 70% respectively. The target for the CO attainment for the theory and lab course is fixed as 50% and 60% respectively.CIE components for theory courses include periodical tests 1, 2 and Continuous Assessment (CA) components. For lab courses, CIE component include viva-voce, records/reports, mid semester assessments, project etc.,. For lab integrated courses, both theory CA and lab CA components are included for computing the CIE. For Project phase I, CIE is computed based on three internal reviews. For Project phase II, CIE is computed based on four internal reviews.

Measuring CO attainment through Semester End Examinations (SEE)

After the publication of results, SEE attainment level is computed. CO attainment is computed for the set threshold value. The course outcomes attained through semester end examinations (SEE) and cumulative internal examinations (CIE) are given below.

	COs	CIE		SEE		Direct		Indirect		Final		Target	Att.
		Att.	Level	Att.	Level	Att.	Level	Att.	Level	Att.	Level	(%)	Yes/No
C101	CO1	79.20	3	73.84	3	77.08	3.00	92.31	3	80.13	3.00	50	Yes
	CO2	94.64	3	73.84	3	95.18	3.00	92.31	3	94.61	3.00	50	Yes
	CO3	95.18	3	73.84	3	95.18	3.00	92.31	3	94.61	3.00	50	Yes
	CO4	65.46	3	73.84	3	71.24	3.00	92.31	3	75.45	3.00	50	Yes
	CO5	65.46	3	73.84	3	71.24	3.00	92.31	3	75.45	3.00	50	Yes
C102	CO1	80.14	3	62.70	2	68.50	2.50	82.24	3	65.79	2.47	50	Yes
	CO2	70.13	3	62.70	2	64.81	2.50	82.24	3	62.84	2.47	50	Yes
	CO3	60.61	3	62.70	2	62.17	2.50	82.24	3	60.73	2.47	50	Yes
C103	CO1	88.77	3	90.91	3	88.77	3.00	76.15	3	86.25	3.00	60	Yes
	CO2	85.56	3	90.91	3	92.53	3.00	75.84	3	89.19	3.00	60	Yes
	CO3	87.17	3	90.91	3	88.24	3.00	75.60	3	85.71	3.00	60	Yes
	CO4	84.48	3	90.91	3	86.62	3.00	75.85	3	84.46	3.00	60	Yes
C104	CO1	76.22	3	72.61	3	73.03	3.00	73.76	3	73.17	2.87	50	Yes
	CO2	88.36	3	72.61	3	82.59	3.00	73.76	3	80.83	2.87	50	Yes
	CO3	94.15	3	72.61	3	84.17	3.00	73.76	3	82.09	2.87	50	Yes
	CO4	76.12	3	72.61	3	75.11	3.00	73.76	3	74.84	2.87	50	Yes
	CO5	81.42	3	72.61	3	79.39	3.00	73.76	3	78.26	2.87	50	Yes
	CO6	86.79	3	72.61	3	83.12	3.00	73.76	3	81.24	2.87	50	Yes
C105	CO1	62.79	3	49.78	1	54.43	2.00	87.00	3	60.94	2.63	55	Yes
	CO2	62.79	3	49.78	1	58.09	2.00	87.00	3	63.87	2.63	55	Yes
	CO3	62.79	3	49.78	1	54.43	2.00	87.00	3	60.94	2.63	55	Yes
	CO4	62.79	3	49.78	1	58.09	2.00	87.00	3	63.87	2.63	55	Yes
	CO5	62.79	3	49.78	1	54.43	2.00	87.00	3	60.94	2.63	55	Yes
	CO6	62.79	3	49.78	1	54.43	2.00	87.00	3	60.94	2.63	55	Yes
C106	CO1	91.01	3	75.57	3	83.29	3.00	80.00	3	82.63	3.00	50	Yes
	CO2	95.77	3	75.57	3	85.67	3.00	80.00	3	84.53	3.00	50	Yes
	CO3	90.57	3	75.57	3	83.07	3.00	80.00	3	82.46	3.00	50	Yes
	CO4	96.84	3	75.57	3	86.21	3.00	80.00	3	84.97	3.00	50	Yes
	CO5	97.36	3	75.57	3	86.47	3.00	80.00	3	85.17	3.00	50	Yes
C107	CO1	93.69	3	43.04	1	68.37	2.00	80.41	3	70.77	3.00	60	Yes
	CO2	93.69	3	43.04	1	68.37	2.00	80.41	3	70.77	3.00	60	Yes
	CO3	93.69	3	43.04	1	68.37	2.00	80.41	3	70.77	3.00	60	Yes

	CO4	93.69	3	43.04	1	68.37	2.00	80.41	3	70.77	3.00	60	No
C108	CO1	98.43	3	90.55	3	98.43	3.00	86.48	3	96.04	3.00	60	Yes
	CO2	98.43	3	90.55	3	98.43	3.00	86.48	3	96.04	3.00	60	Yes
	CO3	98.43	3	90.55	3	98.43	3.00	86.48	3	96.04	3.00	60	Yes
C109	CO1	76.95	3	39.73	1	58.34	2.00	76.88	3	62.05	2.20	50	Yes
	CO2	81.66	3	39.73	1	60.70	2.00	76.88	3	63.93	2.20	50	Yes
	CO3	74.32	3	39.73	1	57.03	2.00	76.88	3	61.00	2.20	50	Yes
	CO4	64.91	3	39.73	1	52.32	2.00	76.88	3	57.23	2.20	50	Yes
	CO5	92.15	3	39.73	1	65.94	2.00	76.88	3	68.13	2.20	50	Yes
	CO6	92.15	3	39.73	1	65.94	2.00	76.88	3	68.13	2.20	50	Yes
C110	CO1	76.37	3	54.27	2	65.32	2.50	64.96	3	65.25	2.60	50	Yes
	CO2	85.62	3	54.27	2	69.94	2.50	64.96	3	68.95	2.60	50	Yes
	CO3	85.62	3	54.27	2	69.94	2.50	64.96	3	68.95	2.60	50	Yes
C111	CO1	90.54	3	31.03	1	54.77	2.00	76.15	3	59.05	2.20	50	Yes
	CO2	76.85	3	31.03	1	53.19	2.00	75.84	3	57.72	2.20	50	Yes
	CO3	84.19	3	31.03	1	54.23	2.00	75.60	3	58.51	2.20	50	Yes
	CO4	81.05	3	31.03	1	49.48	2.00	75.85	3	54.75	2.20	50	Yes
C112	CO1	93.16	3	53.61	2	85.79	2.50	95.33	3	87.70	2.60	50	Yes
	CO2	79.44	3	53.61	2	73.08	2.50	95.33	3	77.53	2.60	50	Yes
	CO3	70.93	3	53.61	2	62.05	2.50	95.33	3	68.70	2.47	50	Yes
	CO4	100.00	3	53.61	2	83.11	2.50	95.33	3	85.56	2.60	50	Yes
	CO5	100.00	3	53.61	2	66.77	2.50	95.33	3	72.48	2.60	50	Yes
C113	CO1	86.78	3	81.00	3	86.24	3.00	80.00	3	68.99	2.60	50	Yes
	CO2	91.53	3	81.00	3	85.22	3.00	80.00	3	68.17	2.60	50	Yes
	CO3	85.79	3	81.00	3	86.84	3.00	80.00	3	69.48	2.60	50	Yes
	CO4	92.07	3	81.00	3	92.59	3.00	80.00	3	74.07	2.60	50	Yes
	CO5	93.13	3	81.00	3	87.33	3.00	80.00	3	69.87	2.60	50	Yes
C114	CO1	84.06	3	52.46	2	68.26	2.50	75.83	3	69.78	2.6	60	Yes
	CO2	84.06	3	52.46	2	68.26	2.50	75.83	3	69.78	2.6	60	Yes
	CO3	84.06	3	52.46	2	68.26	2.50	75.83	3	69.78	2.6	60	Yes
	CO4	84.06	3	52.46	2	68.26	2.50	75.83	3	69.78	2.6	60	Yes
	CO5	84.06	3	52.46	2	68.26	2.50	75.83	3	69.78	2.6	60	Yes
C115	CO1	73.56	3	69.29	3	71.42	3.00	86.00	3	74.34	3.00	70	Yes
	CO2	80.84	3	51.88	2	66.36	2.50	85.25	3	70.14	2.60	70	Yes
	CO3	90.29	3	44.78	2	67.53	2.50	86.88	3	71.40	2.60	70	Yes
	CO4	81.89	3	45.72	2	62.81	2.50	86.00	3	68.24	2.60	70	Yes
C116	CO1	49.41	2	53.11	2	51.26	2.00	55.00	2	52.01	2.00	60	No
	CO2	49.41	2	53.11	2	51.26	2.00	64.00	3	53.81	2.20	60	No
	CO3	49.41	2	53.11	2	51.26	2.00	62.00	3	53.41	2.20	60	No
	CO4	49.41	2	53.11	1	51.26	1.50	55.00	2	52.01	1.60	60	No
C117	CO1	71.52	3	50.79	2	61.16	2.50	74.67	3	63.86	2.60	55	Yes
	CO2	71.52	3	50.79	2	61.16	2.50	74.67	3	63.86	2.60	55	Yes

	CO3	71.52	3	50.79	2	61.16	2.50	74.67	3	63.86	2.60	55	Yes
	CO4	71.52	3	50.79	2	61.16	2.50	74.67	3	63.86	2.60	55	Yes
	CO5	71.52	3	50.79	2	61.16	2.50	74.67	3	63.86	2.60	55	Yes
	CO6	71.52	3	50.79	2	61.16	2.50	74.67	3	63.86	2.60	55	Yes
C201	CO1	59.17	2	37.92	1	48.54	1.50	82.33	3	55.30	1.80	50	Yes
	CO2	69.50	3	37.92	1	53.71	2.00	82.33	3	59.43	2.20	50	Yes
	CO3	92.70	3	37.92	1	65.31	2.00	82.33	3	68.71	2.20	50	Yes
	CO4	92.70	3	37.92	1	65.31	2.00	82.33	3	68.71	2.20	50	Yes
	CO5	92.70	3	37.92	1	65.31	2.00	83.00	3	68.85	2.20	50	Yes
C202	CO1	50.36	2	34.18	1	42.27	1.50	77.67	3	49.35	1.80	50	No
	CO2	53.62	2	56.07	2	54.85	2.00	77.67	3	59.41	2.20	50	Yes
	CO3	53.62	2	56.07	2	54.85	2.00	77.67	3	59.41	2.20	50	Yes
	CO4	56.77	2	56.07	2	56.42	2.00	77.67	3	60.67	2.20	50	Yes
	CO5	65.73	3	34.18	1	49.95	2.00	77.67	3	55.50	2.20	50	Yes
C203	CO1	88.34	3	83.59	3	85.97	3.00	86.00	3	85.97	3.00	70	Yes
	CO2	86.25	3	83.59	3	84.92	3.00	86.00	3	85.14	3.00	70	Yes
	CO3	76.19	3	83.59	3	79.89	3.00	86.00	3	81.11	3.00	70	Yes
	CO4	80.94	3	83.59	3	82.27	3.00	86.00	3	83.01	3.00	70	Yes
C204	CO1	59.68	2	11.10	1	35.39	1.50	80.00	3	44.31	1.80	50	No
	CO2	72.09	3	42.44	2	57.27	2.50	80.00	3	61.81	2.60	50	Yes
	CO3	78.42	3	-	-	39.21	1.50	80.00	3	47.37	1.80	50	No
	CO4	75.18	3	61.34	3	68.26	3.00	80.00	3	70.61	3.00	50	Yes
	CO5	65.07	3	31.94	1	48.50	2.00	82.00	3	55.20	2.20	50	Yes
	CO6	100.00	3	12.80	1	56.40	2.00	80.00	3	61.12	2.20	50	Yes
C205	CO1	26.99	1	15.16	1	21.07	1.00	85.28	3	33.92	1.40	50	No
	CO2	28.29	1	13.37	1	20.83	1.00	85.58	3	33.78	1.40	50	No
	CO3	28.29	1	13.37	1	20.83	1.00	85.28	3	33.72	1.40	50	No
	CO4	23.55	1	13.37	1	18.46	1.00	84.51	3	31.67	1.40	50	No
	CO5	24.59	1	15.16	1	19.87	1.00	85.01	3	32.90	1.40	50	No
	CO6	24.61	1	15.16	1	19.89	1.00	85.18	3	32.95	1.40	50	No
C206	CO1	68.99	3	69.86	3	69.43	3.00	74.33	3	70.41	3.00	50	Yes
	CO2	74.18	3	75.15	3	74.66	3.00	74.33	3	74.60	3.00	50	Yes
	CO3	81.92	3	77.40	3	79.66	3.00	74.33	3	78.59	3.00	50	Yes
	CO4	92.21	3	71.46	3	81.84	3.00	74.33	3	80.34	3.00	50	Yes
C207	CO1	58.55	2	60.22	3	58.89	2.50	78.67	3	62.84	2.36	70	No
	CO2	56.88	2	60.22	3	57.55	2.50	78.67	3	61.77	2.36	70	No
	CO3	58.06	2	60.22	3	58.49	2.50	78.67	3	62.53	2.36	70	No
C208	CO1	77.48	3	83.40	3	80.44	3.00	85.00	3	81.35	3.00	70	Yes
	CO2	79.44	3	83.40	3	81.42	3.00	85.00	3	82.14	3.00	70	Yes
C209	CO1	97.33	3	83.60	3	90.46	3.00	87.60	3	89.89	3.00	50	Yes
	CO2	97.33	3	83.60	3	90.46	3.00	87.60	3	89.89	3.00	50	Yes
	CO3	97.33	3	83.60	3	90.46	3.00	87.60	3	89.89	3.00	50	Yes

	CO4	98.94	3	83.60	3	91.27	3.00	87.60	3	90.53	3.00	50	Yes
	CO5	98.94	3	83.60	3	91.27	3.00	87.60	3	90.53	3.00	50	Yes
C210	CO1	100	3	82.35	3	100	3	92.36	3	98.47	3	50	Yes
	CO2	100	3	82.35	3	100	3	92.36	3	98.47	3	50	Yes
	CO3	100	3	82.35	3	100	3	92.36	3	98.47	3	50	Yes
	CO4	100	3	82.35	3	94.11	3	92.36	3	93.77	3	50	Yes
	CO5	100	3	82.35	3	100	3	92.36	3	98.47	3	50	Yes
	CO6	100	3	82.35	3	94.11	3	92.36	3	93.77	3	50	Yes
C211	CO1	99.26	3	95.16	3	97.21	3.00	81.00	3	93.97	3.00	50	Yes
	CO2	100.00	3	95.16	3	97.58	3.00	81.00	3	94.26	3.00	50	Yes
	CO3	100.00	3	95.16	3	97.58	3.00	81.00	3	94.26	3.00	50	Yes
	CO4	100.00	3	95.16	3	97.58	3.00	81.00	3	94.26	3.00	50	Yes
C212	CO1	66.67	3	90.48	3	78.57	3.00	80.00	3	78.86	3.00	50	Yes
	CO2	98.41	3	90.48	3	94.44	3.00	80.00	3	91.56	3.00	50	Yes
	CO3	98.41	3	90.48	3	94.44	3.00	80.00	3	77.16	3.00	50	Yes
C213	CO1	45.95	2	-	-	45.95	2.00	88.00	3	54.36	2.04	50	Yes
	CO2	45.95	2	-	-	45.95	2.00	88.00	3	54.36	2.04	50	Yes
	CO3	45.95	2	-	-	45.95	2.00	88.00	3	54.36	2.04	50	Yes
	CO4	45.95	2	56.76	2	37.84	2.00	88.00	3	47.87	2.20	50	No
	CO5	45.95	2	-	-	45.95	2.00	88.00	3	54.36	2.04	50	Yes
C214	CO1	69.70	3	69.70	3	69.70	3.00	81.00	3	71.96	3.00	50	Yes
	CO2	77.37	3	69.70	3	73.53	3.00	81.00	3	75.03	3.00	50	Yes
	CO3	87.69	3	69.70	3	78.69	3.00	81.00	3	79.15	3.00	50	Yes
	CO4	87.69	3	69.70	3	78.69	3.00	81.00	3	79.15	3.00	50	Yes
C215	CO1	81.52	3	50.46	2	65.99	2.50	80.00	3	68.79	2.60	50	Yes
	CO2	75.34	3	74.33	3	74.84	3.00	80.00	3	75.87	3.00	50	Yes
	CO3	75.32	3	65.32	3	70.32	3.00	80.00	3	72.25	3.00	50	Yes
	CO4	98.39	3	39.54	1	68.97	2.00	80.00	3	71.17	2.20	50	Yes
	CO5	98.39	3	47.31	2	72.85	2.50	80.00	3	74.28	2.60	50	Yes
	CO6	98.39	3	35.50	1	66.95	2.00	80.00	3	69.56	2.20	50	Yes
C216	CO1	64.57	3	26.37	1	45.47	2.00	85.28	3	53.43	2.20	50	Yes
	CO2	65.34	3	40.30	2	52.82	2.50	85.58	3	59.37	2.60	50	Yes
	CO3	65.34	3	44.78	2	55.06	2.50	85.28	3	61.10	2.60	50	Yes
	CO4	77.61	3	40.30	2	58.96	2.50	84.51	3	64.07	2.60	50	Yes
	CO5	84.58	3	30.85	1	57.71	2.00	85.01	3	63.17	2.20	50	Yes
	CO6	84.58	3	26.37	1	55.47	2.00	85.18	3	61.41	2.20	50	Yes
C217	CO1	61.85	3	59.83	2	60.84	2.50	86.00	3	65.87	2.60	50	Yes
	CO2	49.67	2	17.62	1	33.65	1.50	86.00	3	44.12	1.80	50	No
	CO3	76.77	3	60.81	3	68.79	3.00	86.00	3	72.23	3.00	50	Yes
	CO4	70.02	3	56.52	2	63.27	2.50	86.00	3	67.82	2.60	50	Yes
	CO5	86.73	3	-	-	86.73	3.00	86.00	3	85.98	3.00	50	Yes
C218	CO1	83.70	3	64.97	3	74.34	3.00	83.00	3	76.07	3.00	50	Yes

	CO2	83.77	3	70.61	3	77.19	3.00	83.00	3	78.35	3.00	50	Yes
	CO3	90.92	3	73.52	3	82.22	3.00	83.00	3	82.38	3.00	50	Yes
	CO4	89.17	3	69.56	3	79.36	3.00	83.00	3	80.09	3.00	50	Yes
C219	CO1	46.03	2	66.67	3	56.35	2.50	80.00	3	61.08	2.60	50	Yes
	CO2	56.35	2	48.81	2	52.58	2.00	80.00	3	58.06	2.20	50	Yes
	CO3	51.98	2	23.81	1	37.90	1.50	80.00	3	46.32	1.80	50	No
	CO4	40.48	2	59.52	2	50.00	2.00	80.00	3	56.00	2.20	50	Yes
	CO5	66.07	3	25.00	1	45.54	2.00	80.00	3	52.43	2.20	50	Yes
	CO6	100.00	3	21.53	1	60.77	2.00	80.00	3	64.61	2.20	50	Yes
	CO7	100	3	59.52	2	79.76	2.50	80.00	3	79.81	2.60	50	Yes
C220	CO1	72.10	3	75.37	3	73.74	3.00	85.00	3	75.99	3.00	50	Yes
	CO2	78.73	3	57.71	2	68.22	2.50	85.00	3	71.58	2.60	50	Yes
	CO3	85.82	3	65.30	3	75.56	3.00	85.00	3	77.45	3.00	50	Yes
	CO4	97.01	3	58.21	2	77.61	2.50	85.00	3	79.09	2.60	50	Yes
C221	CO1	66.37	3	53.95	2	60.16	2.50	83.00	3	64.73	2.60	50	Yes
	CO2	58.99	2	38.82	1	48.91	1.50	83.00	3	55.72	1.80	50	Yes
	CO3	59.65	2	63.16	3	61.41	2.50	83.00	3	65.72	2.60	50	Yes
	CO4	67.77	3	27.89	1	47.83	2.00	83.00	3	54.86	2.20	50	Yes
	CO5	56.58	2	51.32	2	53.95	2.00	83.00	3	59.76	2.20	50	Yes
C22	CO1	83.30	3	72.88	3	78.09	3.00	92.71	3	81.02	3.00	50	Yes
	CO2	82.52	3	72.88	3	77.70	3.00	92.71	3	80.70	3.00	50	Yes
	CO3	91.03	3	72.88	3	81.95	3.00	92.71	3	84.11	3.00	50	Yes
	CO4	84.49	3	72.88	3	78.69	3.00	92.71	3	81.49	3.00	50	Yes
	CO5	81.08	3	72.88	3	76.98	3.00	92.71	3	80.13	3.00	50	Yes
C223	CO1	70.80	3	63.45	3	69.33	3.0	83.67	3	72.20	3.00	70	Yes
	CO2	47.71	2	63.45	3	50.86	2.2	83.67	3	57.42	2.36	70	No
	CO3	54.53	2	63.45	3	56.31	2.2	83.67	3	61.78	2.36	70	No
	CO4	66.18	3	63.45	3	65.63	3.0	83.67	3	69.24	3.00	70	No
C224	CO1	97.40	3	--	--	48.70	1.50	77.97	3	54.55	1.80	50	Yes
	CO2	97.40	3	--	--	48.70	1.50	77.59	3	54.48	1.80	50	Yes
	CO3	97.40	3	22.24	1	59.82	2.00	76.04	3	63.06	2.20	50	Yes
	CO4	97.40	3	22.24	1	59.82	2.00	72.53	3	62.36	2.20	50	Yes
	CO5	97.40	3	22.24	1	59.82	2.00	76.38	3	63.13	2.20	50	Yes
	CO6	97.40	3	22.24	1	59.82	2.00	76.62	3	63.18	2.20	50	Yes
C301	CO1	69.51	3	75.17	3	72.34	3.00	84.83	3	74.84	3.00	50	Yes
	CO2	70.26	3	70.66	3	70.46	3.00	84.83	3	73.34	3.00	50	Yes
	CO3	69.91	3	40.99	2	55.45	2.50	84.83	3	61.33	2.60	50	Yes
	CO4	58.55	2	52.36	2	55.46	2.00	84.83	3	61.33	2.20	50	Yes
	CO5	64.37	3	52.52	2	58.45	2.50	84.83	3	63.72	2.60	50	Yes
C302	CO1	77.60	3	65.16	3	71.38	3.00	82.67	3	73.64	3.00	50	Yes
	CO2	67.68	3	82.41	3	75.05	3.00	82.67	3	76.57	3.00	50	Yes
	CO3	92.60	3	86.08	3	89.34	3.00	82.67	3	88.01	3.00	50	Yes

	CO4	93.72	3	90.41	3	92.07	3.00	82.67	3	90.19	3.00	50	Yes
	CO5	97.35	3	74.33	3	85.84	3.00	82.67	3	85.21	3.00	50	Yes
C303	CO1	56.63	2	11.10	1	33.87	1.50	82.50	3	43.59	1.80	50	No
	CO2	76.67	3	32.44	1	54.55	2.00	82.50	3	60.14	2.20	50	Yes
	CO3	72.96	3	38.20	1	55.58	2.00	82.50	3	60.96	2.20	50	Yes
	CO4	67.63	3	61.34	3	64.48	3.00	82.50	3	68.08	3.00	50	Yes
	CO5	62.78	3	20.70	1	41.74	2.00	82.50	3	49.89	2.20	50	No
	CO6	100.00	3	12.23	1	56.11	2.00	82.50	3	61.39	2.20	50	Yes
C304	CO1	64.23	3	33.61	1	48.92	2.00	87.33	3	56.60	2.20	50	Yes
	CO2	72.58	3	22.35	1	47.46	2.00	87.33	3	55.44	2.20	50	Yes
	CO3	63.95	3	58.59	2	61.27	2.50	87.33	3	66.48	2.60	50	Yes
	CO4	76.87	3	83.35	3	80.11	3.00	87.33	3	81.56	3.00	50	Yes
	CO5	100.00	3	65.82	3	82.91	3.00	87.33	3	83.80	3.00	50	Yes
	CO6	100.00	3	45.69	2	72.85	2.50	87.33	3	75.74	2.60	50	Yes
C305	CO1	66.67	3	53.73	2	60.20	2.50	85.28	3	65.22	2.60	50	Yes
	CO2	68.33	3	67.16	3	67.74	3.00	85.58	3	71.31	3.00	50	Yes
	CO3	64.84	3	70.65	3	67.74	3.00	85.28	3	71.25	3.00	50	Yes
	CO4	72.14	3	67.16	3	69.65	3.00	84.51	3	72.62	3.00	50	Yes
	CO5	92.04	3	57.21	2	74.63	2.50	85.01	3	76.70	2.60	50	Yes
C306	CO1	60.87	3	82.79	3	71.83	3.00	83	3.00	74.06	3.00	70	Yes
	CO2	86.15	3	82.79	3	84.47	3.00	83	3.00	84.18	3.00	70	Yes
	CO3	86.27	3	82.79	3	84.53	3.00	83	3.00	84.22	3.00	70	Yes
	CO4	86.12	3	82.79	3	84.45	3.00	83	3.00	84.16	3.00	70	Yes
C307	CO1	54.54	2	36.27	1	45.41	1.50	86.00	3	53.53	1.80	70	No
	CO2	50.36	2	36.27	1	43.32	1.50	86.00	3	51.85	1.80	70	No
	CO3	42.06	2	36.27	1	39.17	1.50	86.00	3	48.53	1.80	70	No
	CO4	45.77	2	36.27	1	41.02	1.50	86.00	3	50.02	1.80	70	No
C308	CO1	74.29	3	77.14	3	75.71	3.00	93.00	3	79.17	3.00	50	Yes
	CO2	78.58	3	57.14	2	67.86	2.50	93.00	3	72.89	2.60	50	Yes
	CO3	82.86	3	62.86	3	72.86	3.00	93.00	3	76.89	3.00	50	Yes
	CO4	88.57	3	54.29	2	71.43	2.50	93.00	3	75.74	2.60	50	Yes
	CO5	82.86	3	54.29	2	68.58	2.50	93.00	3	73.46	2.60	50	Yes
C309	CO1	74.56	3	38.16	1	56.36	2.00	88.00	3	62.69	2.20	50	Yes
	CO2	78.07	3	36.84	1	57.46	2.00	88.00	3	63.56	2.20	50	Yes
	CO3	73.16	3	57.02	2	65.09	2.50	88.00	3	69.67	2.60	50	Yes
	CO4	97.37	3	67.54	3	82.46	3.00	88.00	3	83.56	3.00	50	Yes
C310	CO1	62.00	3	54.06	2	58.03	2.50	84.50	3	63.32	2.60	50	Yes
	CO2	61.00	3	28.29	1	44.65	2.00	84.50	3	52.62	2.20	50	Yes
	CO3	67.45	3	30.50	1	48.97	2.00	84.50	3	56.08	2.20	50	Yes
	CO4	74.49	3	30.14	1	52.32	2.00	84.50	3	58.75	2.20	50	Yes
C311	CO1	93.72	3	-	-	46.86	1.50	74.12	3	52.31	1.80	50	Yes
	CO2	93.72	3	-	-	46.86	1.50	76.43	3	52.77	1.80	50	Yes

	CO3	93.72	3	7.38	1	50.55	2.00	75.66	3	55.57	2.20	50	Yes
	CO4	93.72	3	7.38	1	50.55	2.00	73.30	3	55.10	2.20	50	Yes
	CO5	93.72	3	7.38	1	50.55	2.00	76.00	3	55.64	2.20	50	Yes
	CO6	93.72	3	7.38	1	50.55	2.00	76.65	3	55.77	2.20	50	Yes
C312	CO1	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO2	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO3	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO4	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO5	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO6	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO7	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO8	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO9	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO10	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO11	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO12	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO13	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
C313	CO1	76.88	3	68.77	3	72.83	3.00	86.00	3	75.46	3.00	50	Yes
	CO2	97.30	3	70.75	3	84.03	3.00	86.00	3	84.42	3.00	50	Yes
	CO3	95.68	3	66.21	3	80.94	3.00	86.00	3	81.95	3.00	50	Yes
	CO4	83.21	3	84.32	3	83.77	3.00	86.00	3	84.21	3.00	50	Yes
C314	CO1	69.04	3	48.60	2	58.82	2.50	80.00	3	63.06	2.60	50	Yes
	CO2	60.45	3	68.88	3	64.67	3.00	80.00	3	67.73	3.00	50	Yes
	CO3	62.75	3	15.38	1	39.06	2.00	80.00	3	47.25	2.20	50	No
	CO4	68.48	3	41.77	2	55.13	2.50	80.00	3	60.10	2.60	50	Yes
	CO5	97.39	3	74.61	3	86.00	3.00	80.00	3	84.80	3.00	50	Yes
	CO6	97.39	3	55.54	2	76.47	2.50	80.00	3	77.17	2.60	50	Yes
C315	CO1	62.20	3	32.25	1	47.22	2.00	86.00	3	54.98	2.20	50	Yes
	CO2	68.57	3	38.67	1	53.62	2.00	86.00	3	60.10	2.20	50	Yes
	CO3	69.17	3	44.22	2	56.69	2.50	86.00	3	62.56	2.60	50	Yes
	CO4	63.41	3	52.30	2	57.85	2.50	86.00	3	63.48	2.60	50	Yes
	CO5	48.32	2	46.81	2	47.56	2.00	86.00	3	55.25	2.20	50	Yes
C316	CO1	73.01	3	-	-	36.51	1.50	83.00	3	45.80	1.80	50	No
	CO2	74.74	3	66.04	3	70.39	3.00	83.00	3	72.91	3.00	50	Yes
	CO3	80.64	3	68.47	3	74.55	3.00	83.00	3	76.24	3.00	50	Yes
	CO4	81.02	3	71.62	3	76.32	3.00	83.00	3	77.66	3.00	50	Yes
	CO5	95.27	3	72.60	3	83.93	3.00	83.00	3	83.75	3.00	50	Yes
	CO6	95.27	3	61.40	3	78.33	3.00	83.00	3	79.27	3.00	50	Yes
C317	CO1	62.86	3	34.38	1	48.62	2.00	86.33	3	56.16	2.20	70	No
	CO2	64.16	3	34.38	1	49.27	2.00	86.33	3	56.68	2.20	70	No
	CO3	63.88	3	34.38	1	49.13	2.00	86.33	3	56.57	2.20	70	No
	CO4	61.66	3	34.38	1	48.02	2.00	86.33	3	55.68	2.20	70	No

C318	CO5	59.31	2	23.91	1	41.61	1.50	83.00	3	49.89	1.80	70	No
C319	CO1	70.79	3	75.77	3	73.28	3.00	86.00	3	75.82	3.00	70	Yes
	CO2	72.25	3	75.77	3	74.01	3.00	86.00	3	76.41	3.00	70	Yes
	CO3	73.24	3	75.77	3	74.50	3.00	86.00	3	76.80	3.00	70	Yes
C320	CO1	87.11	3	63.74	3	75.43	3.00	86.00	3	77.54	3.00	70	Yes
	CO2	84.65	3	63.74	3	74.19	3.00	86.00	3	76.55	3.00	70	Yes
	CO3	80.51	3	63.74	3	72.13	3.00	86.00	3	74.90	3.00	70	Yes
	CO4	89.01	3	63.74	3	76.38	3.00	86.00	3	78.30	3.00	70	Yes
C321	CO1	82.54	3	80.95	3	81.75	3.00	90.00	3	83.40	3.00	50	Yes
	CO2	80.95	3	76.19	3	78.57	3.00	90.00	3	80.86	3.00	50	Yes
	CO3	76.19	3	57.14	2	66.67	2.50	90.00	3	71.33	2.60	50	Yes
	CO4	100.00	3	80.95	3	90.48	3.00	90.00	3	90.38	3.00	50	Yes
C322	CO1	78.57	3	89.29	3	83.93	3.00	80.00	3	83.14	3.00	50	Yes
	CO2	67.86	3	64.29	3	66.08	3.00	80.00	3	68.86	3.00	50	Yes
	CO3	53.57	2	85.71	3	69.64	2.50	80.00	3	71.71	2.60	50	Yes
	CO4	50.00	2	64.29	3	57.15	2.50	80.00	3	61.72	2.60	50	Yes
	CO5	71.43	3	64.29	3	67.86	3.00	80.00	3	70.29	3.00	50	Yes
	CO6	78.57	3	75.00	3	76.79	3.00	80.00	3	77.43	3.00	50	Yes
C323	CO1	63.58	3	61.11	3	62.35	3.00	94.00	3	69.00	3.00	50	Yes
	CO2	69.45	3	61.11	3	65.28	3.00	94.00	3	71.02	3.00	50	Yes
	CO3	66.67	3	66.67	3	66.67	3.00	94.00	3	72.13	3.00	50	Yes
	CO4	100.00	3	-	-	50.00	1.50	94.00	3	58.80	1.80	50	Yes
	CO5	93.34	3	64.44	3	78.89	3.00	94.00	3	81.91	3.00	50	Yes
	CO6	100.00	3	50.00	2	75.00	2.50	94.00	3	78.80	2.60	50	Yes
C324	CO1	77.25	3	77.83	3	77.54	3.00	86.50	3	79.33	3.00	50	Yes
	CO2	60.97	3	61.50	3	61.23	3.00	86.50	3	66.29	3.00	50	Yes
	CO3	75.08	3	64.38	3	69.73	3.00	86.50	3	73.09	3.00	50	Yes
	CO4	77.83	3	63.58	3	70.70	3.00	86.50	3	73.86	3.00	50	Yes
C325	CO1	96.67	3	95.00	3	95.83	3.00	85.33	3	93.73	3.00	50	Yes
	CO2	90.00	3	95.00	3	92.50	3.00	85.33	3	91.07	3.00	50	Yes
	CO3	92.78	3	97.50	3	95.14	3.00	85.33	3	93.18	3.00	50	Yes
	CO4	100.00	3	97.50	3	98.75	3.00	85.33	3	96.07	3.00	50	Yes
C326	CO1	48.37	2	-	-	24.19	1.00	77.60	3	34.87	1.40	50	No
	CO2	48.37	2	-	-	24.19	1.00	78.20	3	34.99	1.40	50	No
	CO3	48.37	2	30.29	1	39.33	1.50	73.80	3	46.22	1.80	50	No
	CO4	48.37	2	30.29	1	39.33	1.50	72.80	3	46.02	1.80	50	No
	CO5	48.37	2	30.29	1	39.33	1.50	78.20	3	47.10	1.80	50	No
	CO6	48.37	2	30.29	1	39.33	1.50	78.80	3	47.22	1.80	50	No
C401	CO1	57.47	2	71.30	3	64.38	2.50	85.00	3	68.51	2.60	50	Yes
	CO2	46.97	2	65.17	3	56.07	2.50	85.00	3	61.86	2.60	50	Yes
	CO3	78.85	3	73.10	3	75.97	3.00	85.00	3	77.78	3.00	50	Yes
	CO4	72.66	3	63.00	3	67.83	3.00	85.00	3	71.26	3.00	50	Yes

	CO5	81.18	3	69.76	3	75.47	3.00	85.00	3	77.38	3.00	50	Yes
	CO6	78.45	3	13.07	1	45.76	2.00	85.00	3	53.61	2.20	50	Yes
C402	CO1	75.12	3	47.31	2	61.21	2.50	81.00	3	65.17	2.60	50	Yes
	CO2	66.97	3	46.75	2	56.86	2.50	81.00	3	61.69	2.60	50	Yes
	CO3	67.72	3	54.34	2	61.03	2.50	81.00	3	65.03	2.60	50	Yes
	CO4	92.46	3	50.18	2	71.32	2.50	81.00	3	73.26	2.60	50	Yes
C403	CO1	77.55	3	90.00	3	83.77	3.00	84.32	3	83.88	3.00	50	Yes
	CO2	75.83	3	78.67	3	77.25	3.00	84.32	3	78.66	3.00	50	Yes
	CO3	66.78	3	50.67	2	58.72	2.50	84.32	3	63.84	2.60	50	Yes
	CO4	74.67	3	89.33	3	82.00	3.00	84.32	3	82.46	3.00	50	Yes
	CO5	86.00	3	88.33	3	87.17	3.00	84.32	3	86.60	3.00	50	Yes
	CO6	92.67	3	20.33	1	56.50	2.00	84.32	3	62.06	2.20	50	Yes
C404	CO1	61.93	3	44.79	2	53.36	2.50	87.60	3	60.21	2.60	50	Yes
	CO2	60.41	3	43.01	2	51.71	2.50	87.60	3	58.89	2.60	50	Yes
	CO3	89.42	3	57.74	2	73.58	2.50	87.60	3	76.38	2.60	50	Yes
	CO4	61.63	3	23.43	1	42.53	2.00	87.60	3	51.54	2.20	50	Yes
C405	CO1	87.28	3	41.71	1	64.49	2.00	85.00	3	68.59	2.47	50	Yes
	CO2	82.98	3	56.41	2	69.70	2.50	84.67	3	72.69	2.73	50	Yes
	CO3	60.63	3	79.60	3	70.12	3.00	85.00	3	73.10	2.87	50	Yes
	CO4	73.21	3	60.13	2	66.68	2.50	84.67	3	70.28	2.73	50	Yes
C406	CO1	85.97	3	63.85	3	74.91	3.00	83.13	3	76.55	3.00	70	Yes
	CO2	85.60	3	52.63	2	69.12	2.50	81.69	3	71.63	2.60	70	Yes
	CO3	82.73	3	58.51	2	70.62	2.50	82.5	3	73.00	2.60	70	Yes
	CO4	83.94	3	74.82	3	79.38	3.00	83.88	3	80.28	3.00	70	Yes
C407	CO1	80.56	3	66.45	3	73.50	3.00	86.00	3	76.00	3.00	70	Yes
	CO2	77.54	3	66.45	3	71.99	3.00	86.33	3	74.86	3.00	70	Yes
	CO3	73.72	3	66.45	3	70.08	3.00	86.33	3	73.33	3.00	70	Yes
	CO4	65.20	3	66.45	3	65.82	3.00	85.00	3	69.66	3.00	70	No
	CO5	75.52	3	66.45	3	70.98	3.00	85.00	3	73.79	3.00	70	Yes
C408	CO1	73.83	3	59.63	2	66.73	2.50	86.00	3	70.59	2.60	70	Yes
	CO2	66.70	3	59.63	2	63.17	2.50	86.00	3	67.73	2.60	70	No
	CO3	72.82	3	59.63	2	66.22	2.50	86.00	3	70.18	2.60	70	Yes
C409	CO1	86.00	3	-	-	68.80	3.00	85.30	3	72.10	3.00	70	Yes
	CO2	64.67	3	-	-	51.73	2.00	85.30	3	58.45	2.00	70	No
	CO3	79.67	3	-	-	63.73	3.00	85.30	3	68.05	3.00	70	No
	CO4	53.00	2	-	-	42.40	2.00	85.30	3	50.98	2.00	70	No
C410	CO1	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO2	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO3	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO4	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO5	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO6	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes

	CO7	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO8	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO9	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO10	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
	CO11	100.00	3	100.00	3	100.00	3.00	80.00	3	96.00	3.00	70	Yes
C411	CO1	94.45	3	77.78	3	86.11	3.00	89.00	3	86.69	3.00	50	Yes
	CO2	81.48	3	100.00	3	90.74	3.00	91.00	3	90.79	3.00	50	Yes
	CO3	77.78	3	66.67	3	72.22	3.00	91.00	3	75.98	3.00	50	Yes
	CO4	74.09	3	88.89	3	81.49	3.00	91.00	3	83.39	3.00	50	Yes
C412	CO1	84.62	3	71.88	3	78.25	3.00	82.00	3	79.00	3.00	50	Yes
	CO2	74.40	3	71.88	3	73.14	3.00	82.00	3	74.91	3.00	50	Yes
	CO3	33.33	1	71.88	3	52.61	2.00	82.00	3	58.49	2.20	50	Yes
C413	CO1	74.17	3	45.00	2	59.58	2.50	87.71	3	65.21	2.60	50	Yes
	CO2	72.50	3	85.00	3	78.75	3.00	87.71	3	80.54	3.00	50	Yes
	CO3	--	--	50.00	2	50.00	2.00	87.71	3	57.54	2.20	50	Yes
	CO4	80.00	3	50.00	2	65.00	2.50	87.71	3	69.54	2.60	50	Yes
	CO5	--	-	77.00	3	77.00	3.00	87.71	3	79.14	3.00	50	Yes
	CO6	66.67	3	37.00	1	51.84	2.00	87.71	3	59.01	2.20	50	Yes
C414	CO1	57.70	2	67.31	3	62.50	2.50	82.00	3	66.40	2.60	50	Yes
	CO2	62.82	3	30.77	1	46.80	2.00	82.00	3	53.84	2.20	50	Yes
	CO3	71.15	3	34.62	1	52.89	2.00	82.00	3	58.71	2.20	50	Yes
	CO4	74.04	3	30.77	1	52.41	2.00	82.00	3	58.32	2.20	50	Yes
	CO5	80.77	3	61.54	3	71.16	3.00	82.00	3	73.32	3.00	50	Yes
C415	CO1	65.53	3	55.34	2	60.43	2.50	84.25	3	65.20	2.60	50	Yes
	CO2	73.73	3	67.81	3	70.77	3.00	84.25	3	73.47	3.00	50	Yes
	CO3	73.43	3	80.71	3	77.07	3.00	84.25	3	78.51	3.00	50	Yes
	CO4	92.74	3	88.81	3	90.78	3.00	84.25	3	89.47	3.00	50	Yes
	CO5	92.74	3	59.77	2	76.26	2.50	84.25	3	77.86	2.60	50	Yes
	CO6	71.85	3	75.94	3	73.90	3.00	84.25	3	75.97	3.00	50	Yes
C416	CO1	81.45	3	68.83	3	78.93	3.00	85.30	3	80.20	3.00	70	Yes
	CO2	81.94	3	62.49	3	78.05	3.00	85.30	3	79.50	3.00	70	Yes
	CO3	82.48	3	70.02	3	79.99	3.00	85.30	3	81.05	3.00	70	Yes
	CO4	86.49	3	69.34	3	83.06	3.00	85.30	3	83.51	3.00	70	Yes
	CO5	83.05	3	64.19	3	73.62	3.00	85.30	3	75.96	3.00	70	Yes
C417	CO1	56.00	2	84.00	3	70.00	2.50	80.00	3	72.00	2.60	50	Yes
	CO2	36.00	1	84.00	3	60.00	2.00	80.00	3	64.00	2.20	50	Yes
	CO3	38.00	1	92.00	3	65.00	2.00	80.00	3	68.00	2.20	50	Yes
	CO4	70.00	3	92.00	3	81.00	3.00	80.00	3	80.80	3.00	50	Yes
	CO5	72.00	3	92.00	3	82.00	3.00	80.00	3	81.60	3.00	50	Yes
C418	CO1	80.40	3	59.20	2	69.80	2.50	89.25	3	73.69	2.60	50	Yes
	CO2	52.67	2	59.20	2	55.93	2.00	89.25	3	62.60	2.20	50	Yes
	CO3	64.44	3	59.20	2	61.82	2.50	89.25	3	67.31	2.60	50	Yes

	CO4	64.00	3	59.20	2	61.60	2.50	88.00	3	66.88	2.60	50	Yes
	CO5	100.00	3	59.20	2	79.60	2.50	88.00	3	81.28	2.60	50	Yes
C419	CO1	58.34	2	91.67	3	75.00	2.50	81.75	3	76.35	2.60	50	Yes
	CO2	66.67	3	91.67	3	79.17	3.00	79.50	3	79.24	3.00	50	Yes
	CO3	66.67	3	25.00	1	45.83	2.00	79.50	3	52.57	2.20	50	Yes
	CO4	62.50	3	58.33	2	60.42	2.50	79.50	3	64.23	2.60	50	Yes
C420	CO1	62.69	3	68.66	3	65.67	3.00	27.43	1	58.02	2.60	50	Yes
	CO2	56.22	2	68.66	3	62.44	2.50	83.20	3	66.59	2.20	50	Yes
	CO3	56.22	2	68.66	3	62.44	2.50	82.30	3	66.41	2.20	50	Yes
	CO4	58.21	2	68.66	3	63.43	2.50	80.00	3	66.75	2.20	50	Yes
	CO5	71.64	3	68.66	3	70.15	3.00	81.50	3	72.42	2.60	50	Yes
C421	CO1	81.40	3	79.00	3	80.20	3.00	87.00	3	81.56	3.00	50	Yes
	CO2	65.05	3	79.00	3	72.03	3.00	87.00	3	75.02	3.00	50	Yes
	CO3	88.37	3	79.00	3	83.69	3.00	87.00	3	84.35	3.00	50	Yes
	CO4	82.68	3	79.00	3	80.84	3.00	87.00	3	82.07	3.00	50	Yes

3.3 Attainment of Program Outcomes and Program Specific Outcomes (75) Total Marks 75.00

3.3.1 Describe assessment tools and processes used for measuring the attainment of each Program Outcome and Program Specific Outcomes (10)

Institute Marks : 10.00

The PO/PSO attainment is computed through direct and indirect methods. The direct part is computed through the attainment of COs from all courses, using the Course Articulation Matrix (CAM). The indirect attainments of the POs are computed through survey among stakeholders as shown in Figure 3.2. Direct attainment level of PO/PSO is determined by taking average across all the courses addressing the PO/PSO. Indirect attainment level of a PO/PSO is determined based on the student exit survey and alumni feedback. The weightage for direct attainment is considered as 80% and indirect attainment is 20%.

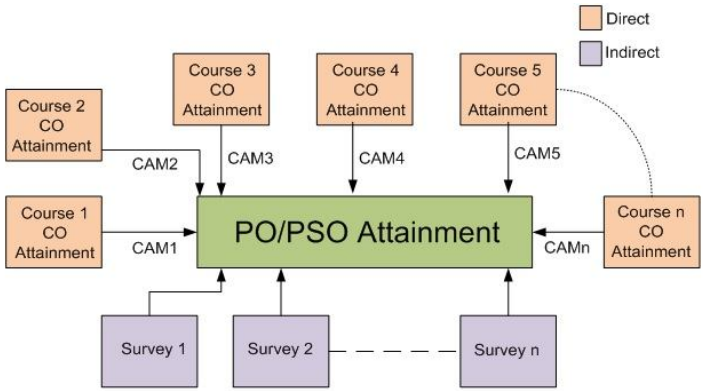


Figure 3.2. PO/PSO attainment

PO/PSO Attainment is computed based on the following expressions

Direct	**Attainment of PO/PSO through a Course:** PO_{ij} Attainment $= \frac{\sum_{k=1}^{COmax} CA_k \times CAM_{ik}}{\sum_{k=1}^{COmax} CAM_{ik}}$ Where, 'PO_{ij}' is the attainment of 'i^{th}' PO through the course 'j' 'CO_{max}' is the maximum number of COs in the course 'j' CA is Course Attainment CAM_{ik} is the Course Articulation matrix for the 'i' th PO for the course 'j' with 'k' COs **Attainment of PO/PSO through all courses** POi Attainment = Average across all courses addressing that particular POs/PSOs
Indirect	The indirect part of the PO attainment is computed through graduate exit and alumni surveys For indirect assessments, we use formula of rating for each option of the course end survey question. PO attainment is computed for each question (which is mapped to a PO), by using the formula as: Total count of students in the class = *n* Count of students who choose an option = *o* Rating of question: Option 1 = 5; Option 2 = 4; Option 3 = 3; Option 4 = 2; Option 5 = 1; $PO\ Attainment, \% = \frac{[(o \times 5) + (o \times 4) + (o \times 3) + (o \times 2) + (o \times 1)]}{5 * n}$

3.3.2 Provide results of evaluation of each PO & PSO (65)

Institute Marks : 65.00

PO Attainment

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C101	PO1	PO2	PO3	PO4	PO5	PO6	PO7	3	3	3	PO11	3
C102	2.47	2.47	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	2.47
C103	3	3	3	PO4	3	PO6	PO7	3	3	3	PO11	PO12
C104	2.87	2.87	2.87	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	2.87
C105	2.62	2.62	2.62	2.62	2.62	2.62	PO7	PO8	PO9	2.62	PO11	2.62
C106	PO1	PO2	PO3	PO4	PO5	2.46	2.46	2.46	2.46	2.46	2.46	2.46
C107	2.79	2.79	2.79	PO4	PO5	PO6	PO7	2.79	2.79	2.79	PO11	2.79
C108	3	3	3	3	3	3	PO7	PO8	PO9	PO10	PO11	PO12
C109	2.47	2.47	2.47	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	2.47
C110	2.67	2.67	2.67	2.67	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C111	2.2	2.2	2.2	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C112	2.57	2.57	2.57	2.57	PO5	PO6	PO7	PO8	PO9	PO10	PO11	2.57
C113	PO1	PO2	PO3	PO4	PO5	2.6	2.6	2.6	2.6	2.6	2.6	2.6
C114	2.84	2.84	2.84	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C115	2.69	2.72	2.73	PO4	2.73	PO6	PO7	PO8	2.69	2.69	PO11	2.68
C116	2.15	2.14	2.15	PO4	2.25	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C117	2.95	2.95	2.95	2.95	PO5	2.95	PO7	PO8	PO9	2.95	PO11	2.95
C201	2.41	2.41	2.41	2.41	PO5	PO6	PO7	PO8	PO9	PO10	PO11	2.41
C202	1.99	1.97	1.93	PO4	PO5	PO6	PO7	PO8	1.99	PO10	PO11	PO12
C203	3	3	3	3	3	3	PO7	3	3	3	PO11	3
C204	1.64	1.64	1.71	1.64	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C205	1.4	1.4	PO3	1.4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C206	2.96	2.96	2.87	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	2.97
C207	2.66	PO2	PO3	PO4	PO5	PO6	PO7	PO8	2.66	2.66	PO11	2.73
C208	2.89	2.89	2.89	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	2.79
C209	PO1	PO2	PO3	PO4	PO5	2.87	PO7	2.87	2.87	2.87	PO11	2.87
C210	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	2.6	2.6	PO11	PO12
C211	PO1	PO2	PO3	PO4	PO5	3	3	3	3	3	3	3
C212	PO1	3	3	3	3	PO6	3	3	3	3	3	3
C213	PO1	PO2	PO3	PO4	PO5	2.2	PO7	PO8	2.12	2.04	2.04	2.04
C214	PO1	3	3	PO4	PO5	3	3	3	3	3	3	3
C215	2.64	2.64	2.64	2.64	PO5	2.47	2.60	PO8	PO9	PO10	PO11	2.64

C216	2.25	2.29	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C217	2.31	2.31	2.31	2.26	2.03	PO6	PO7	PO8	2.07	PO10	PO11	2.33
C218	2.93	PO2	2.87	PO4	PO5	PO6	3	PO8	PO9	PO10	PO11	2.89
C219	2.26	2.26	2.26	2.26	2.26	2.26	2.26	PO8	2.26	2.26	PO11	PO12
C220	2.8	2.76	PO3	PO4	PO5	2.80	2.8	PO8	2.8	PO10	PO11	3
C221	2.28	2.24	2.26	PO4	PO5	PO6	2.6	PO8	PO9	PO10	PO11	PO12
C222	PO1	PO2	PO3	PO4	PO5	3	PO7	3	3	3	PO11	3
C223	2.63	PO2	PO3	PO4	PO5	PO6	PO7	PO8	2.63	2.63	PO11	2.75
C224	PO1	2.68	PO3	2.68	PO5	PO6	PO7	2.52	2.58	2.62	PO11	2.62
C301	2.63	2.63	2.63	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	2.63
C302	2.97	2.97	2.98	2.97	PO5	PO6	PO7	PO8	PO9	PO10	PO11	2.97
C303	2.33	2.33	2.41	2.33	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C304	2.54	2.47	PO3	2.47	PO5	PO6	PO7	PO8	2.51	PO10	PO11	2.54
C305	2.83	2.83	2.83	2.83	2.73	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C306	2.79	2.95	2.95	2.95	2.95	PO6	PO7	PO8	PO9	PO10	PO11	2.95
C307	2.04	2.04	2.20	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	2.02
C308	2.76	2.76	2.75	2.80	2.74	PO6	PO7	PO8	PO9	PO10	PO11	2.76
C309	2.50	2.45	2.47	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C310	2.28	2.24	2.24	2.25	2.30	2.26	2.25	2.24	2.27	2.25	2.20	2.25
C311	PO1	2.68	PO3	2.68	PO5	PO6	PO7	2.52	2.58	2.62	PO11	2.62
C312	3	3	3	3	3	3	3	3	3	3	3	3
C313	2.83	2.87	2.87	2.84	2.8	PO6	PO7	PO8	2.87	PO10	PO11	2.82
C314	2.6	2.6	2.6	2.6	PO5	2.6	PO7	PO8	PO9	PO10	PO11	2.57
C315	1.79	1.72	1.76	1.72	1.71	PO6	PO7	PO8	1.71	PO10	PO11	1.72
C316	2.76	PO2	PO3	PO4	2.76	PO6	PO7	PO8	PO9	2.76	PO11	2.76
C317	2.52	2.52	PO3	PO4	PO5	PO6	PO7	PO8	PO9	2.52	PO11	PO12
C318	1.04	1.22	PO3	PO4	PO5	PO6	PO7	PO8	PO9	1.04	PO11	PO12
C319	2.93	PO2	PO3	PO4	2.79	PO6	PO7	PO8	PO9	PO10	PO11	2.89
C320	2.89	2.89	PO3	PO4	2.89	PO6	PO7	PO8	PO9	2.89	PO11	2.89
C321	2.9	2.9	2.89	2.88	PO5	PO6	PO7	PO8	PO9	PO10	PO11	2.89
C322	2.89	2.89	2.89	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C323	2.6	2.69	2.6	2.37	2.47	2.8	3	PO8	PO9	2.9	2.8	2.73
C324	2.95	2.95	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	2.95	2.95
C325	3	3	3	3	3	3	3	3	3	3	3	3
C326	PO1	2.04	PO3	2.04	PO5	PO6	PO7	1.88	1.93	1.98	PO11	2.01
C401	2.58	2.58	2.58	2.60	PO5	2.87	2.87	PO8	PO9	PO10	PO11	2.58
C402	2.6	2.6	2.6	2.6	2.6	PO6	PO7	PO8	2.6	PO10	PO11	2.6
C403	2.76	2.75	2.64	2.56	2.56	2.2	2.20	PO8	2.20	2.31	2.52	PO12

C404	2.33	2.33	2.33	2.33	2.33	PO6	PO7	PO8	PO9	PO10	PO11	2.33
C405	2.73	2.47	2.73	2.47	PO5	2.47	2.7	2.79	2.87	2.7	PO11	2.7
C406	2.65	2.59	2.65	PO4	2.68	PO6	PO7	PO8	2.68	2.68	PO11	2.59
C407	2.32	2.19	PO3	2.19	PO5	PO6	PO7	PO8	2.19	PO10	PO11	2.01
C408	2.68	2.68	2.68	2.68	2.68	PO6	PO7	PO8	2.68	PO10	PO11	2.68
C409	2.59	2.68	2.68	2.68	2.68	PO6	PO7	PO8	2.28	1.93	PO11	PO12
C410	3	3	3	PO4	3	3	3	3	3	3	3	3
C411	3	3	3	3	3	3	3	3	3	3	PO11	3
C412	2.68	2.73	2.73	2.68	PO5	2.73	PO7	2.73	PO9	PO10	2.73	2.73
C413	2.27	2.3	2.47	2.30	PO5	PO6	PO7	PO8	PO9	2.80	2.47	2.27
C414	2.34	2.4	2.4	2.5	2.2	PO6	PO7	PO8	2.6	2.4	2.4	2.4
C415	2.87	2.87	2.87	PO4	PO5	PO6	PO7	PO8	PO9	2.87	2.87	2.87
C416	2.95	2.95	2.97	2.97	2.97	2.97	2.95	2.7	2.84	2.35	3	2.97
C417	2.13	1.97	2.12	2.11	2.06	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C418	2.6	2.47	2.51	2.49	2.6	2.49	2.52	2.6	2.6	2.5	2.52	2.53
C419	2.67	2.64	2.6	2.6	2.6	PO6	PO7	PO8	2.64	PO10	PO11	PO12
C420	2.69	2.71	2.68	PO4	PO5	PO6	PO7	3	PO9	PO10	PO11	PO12
C421	3	3	3	3	3	3	3	PO8	3	3	PO11	3

PO Attainment Indirect

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Exit Survey	3	3	3	3	3	3	3	3	3	3	3	3
Alumni Fee	3	3	3	3	3	3	3	3	3	3	3	3

PO Attainment Level

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
InDirect Attainment	3	3	3	3	3	3	3	3	3	3	3	3
Direct Attainment	2.73	2.73	2.73	2.84	3	2.73	2.46	2.62	2.62	2.62	2.46	2.57

PSO Attainment

Course	PSO1	PSO2	PSO3
C101	PSO1	PSO2	PSO3
C102	PSO1	PSO2	PSO3
C103	PSO1	PSO2	PSO3
C104	PSO1	PSO2	PSO3
C105	2.62	2.62	2.62
C106	PSO1	PSO2	PSO3
C107	PSO1	PSO2	PSO3
C108	PSO1	PSO2	PSO3
C109	PSO1	PSO2	PSO3

C110	PSO1	PSO2	PSO3
C111	2.2	2.2	PSO3
C112	PSO1	PSO2	PSO3
C113	PSO1	PSO2	PSO3
C114	PSO1	PSO2	PSO3
C115	2.76	2.73	PSO3
C116	2.15	2.15	PSO3
C117	2.95	2.95	2.95
C201	2.41	2.41	2.41
C202	PSO1	PSO2	PSO3
C203	3	3	PSO3
C204	1.64	PSO2	PSO3
C205	PSO1	PSO2	PSO3
C206	2.97	PSO2	3
C207	2.66	PSO2	PSO3
C208	2.89	PSO2	PSO3
C209	PSO1	PSO2	PSO3
C210	PSO1	PSO2	PSO3
C211	PSO1	PSO2	PSO3
C212	PSO1	PSO2	PSO3
C213	PSO1	PSO2	PSO3
C214	PSO1	PSO2	PSO3
C215	2.64	PSO2	PSO3
C216	PSO1	PSO2	PSO3
C217	2.31	2.12	PSO3
C218	2.9	PSO2	2.8
C219	2.26	PSO2	PSO3
C220	2.83	PSO2	PSO3
C221	2.24	PSO2	2.24
C222	PSO1	PSO2	PSO3
C223	2.63	PSO2	PSO3
C224	PSO1	PSO2	PSO3
C301	2.63	2.63	2.63
C302	2.97	2.97	PSO3
C303	2.33	PSO2	PSO3
C304	PSO1	2.63	PSO3
C305	2.81	2.73	PSO3
C306	2.8	PSO2	2.95
C307	2.04	PSO2	PSO3
C308	2.72	2.72	PSO3

C309	2.45	PSO2	PSO3
C310	PSO1	2.22	2.18
C311	PSO1	PSO2	PSO3
C312	PSO1	PSO2	PSO3
C313	3	PSO2	PSO3
C314	2.6	PSO2	PSO3
C315	1.79	1.78	PSO3
C316	2.76	PSO2	PSO3
C317	2.52	PSO2	PSO3
C318	1.04	PSO2	PSO3
C319	2.93	PSO2	PSO3
C320	2.89	PSO2	PSO3
C321	2.9	2.9	2.9
C322	2.89	2.89	PSO3
C323	2.7	2.6	2.6
C324	2.95	PSO2	2.95
C325	3	PSO2	3
C326	PSO1	PSO2	PSO3
C401	2.58	PSO2	PSO3
C402	2.6	2.6	2.6
C403	2.67	2.54	2.79
C404	2.33	PSO2	PSO3
C405	PSO1	PSO2	PSO3
C406	PSO1	2.64	PSO3
C407	2.26	2.19	PSO3
C408	2.68	2.68	2.68
C409	2.59	1.93	PSO3
C410	PSO1	PSO2	PSO3
C411	3	3	3
C412	2.73	PSO2	PSO3
C413	2.3	PSO2	2.3
C414	2.15	2.15	PSO3
C415	2.87	2.87	PSO3
C416	2.82	2.97	2.96
C417	2	2.4	PSO3
C418	PSO1	PSO2	PSO3
C419	2.47	2.55	PSO3
C420	PSO1	PSO2	PSO3
C421	3	3	3

PSO Attainment Indirect

Survey	PSO1	PSO2	PSO3
Exit Survey Feedback	3	3	3
Alumni Feedback	3	3	3

PSO Attainment Level

Course	PSO1	PSO2	PSO3
Direct Attainment	2.62	2.62	2.62
InDirect Attainment	3	3	3

4 STUDENTS' PERFORMANCE (100) Total Marks 85.13

Institute Marks :

Table 4.1

Item (Information to be provided cumulatively for all the shifts with explicit headings, wherever applicable)	2019-20 (CAY)	2018-19 (CAYm1)	2017-18 (CAYm2)	2016-17 (CAYm3)	2015-16 (CAYm4)	2014-15 (CAYm5)	2013-14 (CAYm6)
Sanctioned intake of the program(N)	180	180	240	180	180	180	180
Total number of students admitted in first year minus number of students migrated to other programs/ institutions plus No. of students migrated to this program (N1)	158	188	241	192	190	181	208
Number of students admitted in 2nd year in the same batch via lateral entry (N2)	0	0	0	0	0	0	0
Separate division students, If applicable (N3)	0	0	0	0	0	0	0
Total number of students admitted in the programme(N1 + N2 + N3)	158	188	241	192	190	181	208

Table 4.2

Year of entry	Total No of students admitted in the program (N1 + N2 + N3)	Number of students who have successfully graduated without backlogs in any semester/ year of study (Without Backlog means no compartment or failures in any semester/ year of study)			
		I year	II year	III year	IV year
2019-20 (CAY)	158				
2018-19 (CAYm1)	188	144			
2017-18 (CAYm2)	241	188	169		
2016-17 (CAYm3)	192	163	136	134	
2015-16 (LYG)	190	152	108	102	101
2014-15 (LYGm1)	181	118	114	113	112
2013-14 (LYGm2)	208	149	123	117	116

Table 4.3

Year of entry	Total No of students admitted in the program (N1 + N2 + N3)	Number of students who have successfully graduated in stipulated period of study) [Total of with Backlog + without Backlog]			
		I year	II year	III year	IV year
2019-20 (CAY)	158				
2018-19 (CAYm1)	188	188			
2017-18 (CAYm2)	241	241	241		
2016-17 (CAYm3)	192	192	191	190	
2015-16 (LYG)	190	190	189	188	156
2014-15 (LYGm1)	181	181	181	177	159
2013-14 (LYGm2)	208	208	208	207	193

4.1 Enrolment Ratio (20)

Total Marks 20.00

Institute Marks : 20.00

	N (From Table 4.1)	N1 (From Table 4.1)	Enrollment Ratio [(N1/N)*100]
2019-20 (CAY)	180	158	87.78
2018-19 (CAYm1)	180	188	104.44
2017-18 (CAYm2)	240	241	100.42

Average [(ER1 + ER2 + ER3) / 3] : 97.55

Assessment : 20.00

4.2 Success Rate in the stipulated period of the program (20) Total Marks 12.93

4.2.1 Success rate without backlogs in any semester / year of study (15) Institute Marks : 8.55

Item	Latest Year of Graduation, LYG (2015-16)	Latest Year of Graduation minus 1, LYGm1 (2014-15)	Latest Year of Graduation minus 2 LYGm2 (2013-14)
X Number of students admitted in the corresponding First year + admitted in 2nd year via lateral entry and seperated division, if applicable	190.00	181.00	208.00
Y Number of students who have graduated without backlogs in the stipulated period	104.00	112.00	115.00
Success Index [SI = Y / X]	0.55	0.62	0.55

Average SI [(SI1 + SI2 + SI3) / 3] : 0.57

Assessment [15 * Average SI] : 8.55

4.2.2 Sucess rate in stipulated period (5) Institute Marks : 4.38

Item	Latest Year of Graduation, LYG (2015-16)	Latest Year of Graduation minus 1, LYGm1 (2014-15)	Latest Year of Graduation minus 2 LYGm2 (2013-14)
X Number of students admitted in the corresponding First year + admitted in 2nd year via lateral entry and seperated division, if applicable	190.00	181.00	208.00
Y Number of students who have graduated in the stipulated period	156.00	159.00	193.00
Success Index [SI = Y / X]	0.82	0.88	0.93

Average SI[(SI1 + SI2 + SI3) / 3]: 0.88

Assessment [5 * Average SI] : 4.38

Note : If 100% students clear without any backlog then also total marks scored will be 40 as both 4.2.1 & 4.2.2 will be applicable simultaneously.

4.3 Academic Performance in Second Year (10) Total Marks 10.00

Institute Marks : 10.00

Academic Performance	CAYm2 (2017-18)	CAYm3 (2016-17)	LYG (2015-16)
Mean of CGPA or mean percentage of all successful students(X)	7.41	7.43	6.94
Total number of successful students (Y)	241.00	191.00	189.00
Total number of students appeared in the examination (Z)	241.00	192.00	190.00
API [X * (Y/Z)]	7.41	7.39	6.90

Average API [(AP1 + AP2 + AP3)/3] : 7.23

Assessment [1.5 * AverageAPI] : 10.85

4.4 Placement, Higher Studies and Entrepreneurship (30) Total Marks 22.20

Institute Marks : 22.20

Item	LYG(2015-16)	LYGm1(2014-15)	LYGm2(2013-14)
Total No of Final Year Students(N)	188.00	177.00	207.00
No of students placed in the companies or goverment sector(X)	77.00	92.00	146.00
No of students admitted to higher studies with valid qualifying scores(GATE or equivalent State or National Level tests, GRE, GMAT etc.) (Y)	40.00	31.00	34.00
No of students turned enterpreneur in engineering/technology (Z)	4.00	2.00	1.00
Placement Index [(X+Y+Z)/N] :	0.64	0.71	0.87

Average Placement [(P1 + P2 + P3)/3] : 0.74

Assessment [30 * Average Placement] : 22.20

Program Name : Mechanical Engg.
Assessment Year : 2018-19 (CAYm1)

S.No	Student Name	Enrollment No	Employee Name	Appointment No
1	Ajay Vyshnave C C	CBENU4MEE15002	Wipro	Ref: ID card No: 20102172
2	Akaash V	CBENU4MEE15003	Lakshmi Machine Works	Ref: HRD/Offer/2019, Date: 15.5.2019
3	Arun K	CBENU4MEE15006	Sapura Energy	Ref: SCNC/HR/P_Appt/2019/029, Dt: 1.7.2019
4	Ashish Kumar Singh	CBENU4MEE15007	TCS	Date: Sept 17, 2018
5	Avinash Kumar	CBENU4MEE15008	Cognizant	Date: Sep 19, 2018
6	Bollina Harsha Vardhan	CBENU4MEE15009	Infosys	Ref: HRD/3T/19-20/12676852, Candidate ID: 12676852
7	B Dharsan	CBENU4MEE15010	The Math Company	Date: 09 August 2018
8	Gayathri M	CBENU4MEE15013	Caterpillar	Ref: Date: 9.4.2019
9	Guhan S	CBENU4MEE15015	TCS Digital	Date: Sept 17, 2018
10	Madha Yogith	CBENU4MEE15022	Cognizant	Date: Sep 19, 2018
11	Mamilla Sai Charan	CBENU4MEE15023	Infosys	Date: September 15, 2018

12	Monish J	CBENU4MEE15025	Cognizant	Date: Sep 19, 2018
13	Naga Madhu Hitesh Penjuru	CBENU4MEE15026	ACC Ltd	Date: 8.5.2019
14	S Navin Shankar	CBENU4MEE15028	Cognizant	Date: Sep 19, 2018
15	Patibandla Akul Sai	CBENU4MEE15032	Infosys	Date: September 15, 2018
16	Poongkundran T	CBENU4MEE15033	Cognizant	Date: Sep 19, 2018
17	Potturu Bharath Kumar	CBENU4MEE15034	Daimler	Date: Friday, February 1, 2019
18	Pranav Raja R S	CBENU4MEE15036	Infosys	Date: September 15, 2018
19	Rohan N	CBENU4MEE15038	GMMCO	Ref: Date: March 26, 2019
20	Roshan Prasad	CBENU4MEE15039	Infosys	Date: September 15, 2018
21	Sai Teja Balabhadrapatruni	CBENU4MEE15042	Cognizant	Ref: Candidate ID: 12420401, Dt: 5.11.2018
22	Sharath K M	CBENU4MEE15046	Infosys	Date: September 15, 2018
23	ShyamSundar S	CBENU4MEE15049	ACC Ltd	Ref: Date: 8.5.2019
24	Sunkara Venkata Siva S Surya Subhash	CBENU4MEE15053	Cognizant	Ref: Candidate ID: 12420438, Dt: 5.11.2018, Emp ID: 805980
25	Vigneshvar V	CBENU4MEE15059	Mu Sigma	Ref: Date: 9.4.2019
26	Vijeykumar S	CBENU4MEE15060	Bosch	Ref: Employee No: 33407750
27	Aakash S P	CBENU4MEE15101	Cognizant	Date: Sep 19, 2018
28	Ajay P	CBENU4MEE15103	Wipro	Date: October 30, 2018
29	Ajit Balakrishnan	CBENU4MEE15104	Force Motors	Date: 16, Sep, 2019
30	R Aravind Kumar	CBENU4MEE15106	Wipro	Date: October 30, 2018
31	Aravindh R	CBENU4MEE15108	Daimler	Ref: DICV/HR/LOI/2055/2019
32	Darshan R	CBENU4MEE15113	CUMI	Date: 12th January 2019
33	G Deepal	CBENU4MEE15114	Oracle Solution Engg	Date: Dec 26, 2018
34	Gokul E S	CBENU4MEE15121	TCS	Ref: TCSL/DT20184638441/1150751/Chennai
35	Gokul S	CBENU4MEE15122	Datayaan	Ref: Email Date: 10/31/2019
36	Gowtham M	CBENU4MEE15124	CAMERON	Ref: CIN: U29120TZ2001PT009632
37	Kaushal S SPakala	CBENU4MEE15131	Dassault Systems	Date: 14th Aug 2018
38	Lokram P	CBENU4MEE15133	Infosys	Date: September 15, 2018
39	Narenthiran N	CBENU4MEE15134	Lakshmi Machine Works	Date: February 8, 2019
40	P Prasanna	CBENU4MEE15137	Cognizant	Date: Sep 19, 2018
41	Praveen Ram N	CBENU4MEE15138	Cognizant	Date: Sep 19, 2018
42	Ragav P	CBENU4MEE15139	Siemens Gamesa Renewable Power Pvt Ltd	Ref: Date: May 6, 2019
43	Rahul Sree Kumar	CBENU4MEE15142	Sundram Fasteners	Date: June 4, 2019
44	Raveen V Reddy	CBENU4MEE15145	Infosys	Date: September 15, 2018
45	Rogith P S	CBENU4MEE15149	Daimler	Date: Friday, February 1, 2019
46	Santhosh K	CBENU4MEE15150	Infosys	Date: September 15, 2018,
47	A Sujeeth Selvam	CBENU4MEE15157	Infosys	Date: September 15, 2018
48	Varun Joseph Chettupuzha	CBENU4MEE15160	Oracle Solution Engg	Date: Dec 26, 2018
49	Akshay Naidu	CBENU4MEE15207	Daimler	Date: Friday, February 1, 2019
50	M S Anbumanivel	CBENU4MEE15208	TCS	Date: Sept 17, 2018
51	Ashwin A	CBENU4MEE15211	Titan	Date: December 17, 2018

52	Badhusha Mohaideen S	CBENU4MEE15212	GMMCO	Date March 26, 2019
53	Burra Sai Viswanath Saket	CBENU4MEE15213	Cognizant	Date: Sep 19, 2018
54	Dinesh Kumar P	CBENU4MEE15219	Infosys	Date: September 15, 2018
55	Fahim Ahamed S A	CBENU4MEE15221	CUMI	Date: 12th January 2019
56	HariLakshman R B	CBENU4MEE15223	Cognizant	Ref: Candidate ID – 12419935, 05-Nov-2018
57	Harsha Bharath K	CBENU4MEE15225	TCS	Date: Sept 17, 2018
58	Karri Guna Sekhar	CBENU4MEE15227	Wipro	Date: October 30, 2018
59	Madallapalli Prudhviraj	CBENU4MEE15230	Infosys	Date.: September 15, 2018
60	Matukumalli Ratna Phaneendra	CBENU4MEE15233	Infosys	Ref: HRD/3T/19-20/12676932, Date: 6.9.2019
61	Mithun R	CBENU4MEE15235	Cognizant	Date: Sep 19, 2018
62	Monish S	CBENU4MEE15236	Cognizant	Date: Sep 19, 2018
63	C Pranav	CBENU4MEE15242	CUMI	Date: 12th January 2019
64	Rajesh R	CBENU4MEE15243	GMMCO	Ref: Email Date March 26, 2019
65	B Ramprakash	CBENU4MEE15245	Wipro	Date: October 30, 2018
66	Sanjay Balaji R	CBENU4MEE15248	Robert Bosch	Date: August 8, 2018
67	Santhosh Roshan M	CBENU4MEE15249	Mu Sigma	Date: July 23, 2018
68	Sarang Chandran	CBENU4MEE15251	Cognizant	Date: Sep 19, 2018
69	Shashank Prakash Nair	CBENU4MEE15253	Infosys	Date.: September 15, 2018
70	R Srinath	CBENU4MEE15256	TCS	Date: Sept 17, 2018
71	B Sriram	CBENU4MEE15257	Titan	Ref: OL/55039, 13.7.2019
72	Suresh G	CBENU4MEE15259	SEFPRO	Ref: Emp No: 600861
73	Thirnesh R	CBENU4MEE15260	Cognizant	Date: Sep 19, 2018
74	Virubakshan M	CBENU4MEE15263	Robert Bosch	Date: August 8, 2018
75	Tony K Varghese	CBENU4MEE15501	Wipro	Ref: Date: 14.5.2019
76	Hari Sankar S	CBENU4MEE15511	Carborundum Universal Limited	Date: 12th January 2019
77	Kousik Bimal N	CBENU4MEE15512	Carborundum Universal Limited	Date: 12th January 2019

Assessment Year : 2017-18 (CAYm2)

S.No	Student Name	Enrollment No	Employee Name	Appointment No
1	Adithian. A	CBENU4MEE14002	Accenture	Candidate ID: 131123, Date: Oct 6, 2017
2	Anish Kalyan T	CBENU4MEE14005	TCS	Ref: TCSL/CT20172177189, Date: 6.10.2017
3	Annapareddy Jayanth Kumar Reddy	CBENU4MEE14006	Sefpro	Date: Feb 26, 2018
4	Aravindha Ramakrishnan C	CBENU4MEE14007	Trivikram Flow tech	Ref: Linkedin
5	Aravinth B	CBENU4MEE14008	TCS	Ref: TCSL/CT20172177271, Emp ID: 60944, Date: 6.10.2017
6	Dinesh Kumar M	CBENU4MEE14011	Scania	Ref: ID card, Emp ID: 46244
7	D Dhrishaj	CBENU4MEE14012	Infosys	Date: Sep 11, 2017
8	Gautam	CBENU4MEE14015	Infosys	Date: Sep 11, 2017
9	Hariprasad S	CBENU4MEE14017	TCS	Ref: CT20172177158, Date: Sep 24, 2017
10	C Jayakarthick	CBENU4MEE14019	Renault Nissan	Ref: Date: May 11, 2018
11	N Muthu Narayanan	CBENU4MEE14023	GMMCO	Ref: Employee ID: 6110
12	Pachchipulusu Prudhvi Sai	CBENU4MEE14026	Mahindra & Mahindra	Ref: Email Date: May 3, 2018
13	Pokala Karthik Kumar	CBENU4MEE14028	TCS	Ref: CT20172177192, Date: Sep 24, 2017

14	Potha pragada Chaitanya	CBENU4MEE14030	3DPLM	Ref: 3D PLM/ HRD/2017-18/3649, Date: 05-Jun-18
15	Pravin E	CBENU4MEE1403	Altran	Ref: Emp No: 341828
16	Pudipeddi Sai Bharadwaj	CBENU4MEE14033	Accenture	Candidate ID: 131147, Date: Oct 6, 2017
17	Rahul R	CBENU4MEE14035	TCS	Ref: CT20172177122, Date: Sep 24, 2017
18	Rohan Paul Philip	CBENU4MEE14037	TCS	Ref: CT20172177116, Date: Sep 24, 2017
19	Rohit V	CBENU4MEE14038	Infosys	Date: Sep 11, 2017
20	Rohith Sreekumar	CBENU4MEE14039	Supplier Quality Engineer at Hitachi Automotive Systems Ltd	Ref: Linkedin
21	Roshan Balu T M B	CBENU4MEE14040	Infosys	Date: Sep 11, 2017
22	Saravanan G	CBENU4MEE14042	GMMCO	Date: April 30, 2017
23	Shiramsetty Venkat Sai Praneeth Reddy	CBENU4MEE14043	Infosys	Date: Sep 11, 2017
24	J V V S D Sri Vishnu	CBENU4MEE14047	TCS	Ref: DT20174000709, Date: Sep 24, 2017
25	Sriranganathan K	CBENU4MEE14049	Tredence	Date: Aug 11, 2017
26	Vaidyanathan Ramakrishnan	CBENU4MEE14055	Hyundai Mobis IN	Ref: Aug 8, 201
27	Yarasi Sai Vineeth	CBENU4MEE14058	Accenture	Candidate ID: 131192, Date: Oct 6, 2017
28	D Kishore	CBENU4MEE14059	Infosys	Date: Sep 11, 2017
29	Allan Dojo Joseph	CBENU4MEE14102	Mechanical Engineer at Outsourcing Technology	Ref: Linkedin
30	B Anirudh Narayanan	CBENU4MEE14105	Robert Bosch	Ref: 9450017104685, Date: July 25, 2017
31	Baswanth Chowdary Vegunta	CBENU4MEE14115	Infosys	Ref: HRD/3T/18-19/12014229, Date: 25.4.2018
32	Bhavesh Praveen	CBENU4MEE14116	HTL Aircon Pvt. Ltd	Ref: Linkedin
33	Busam Subba Rao	CBENU4MEE14118	TCS	Ref: CT20172301107, Date: Sep 24, 2017
34	L Girish	CBENU4MEE14122	FLSMIDTH	Date: March 24, 2018
35	Hamsani Bhanu Venkata Swaroop	CBENU4MEE14124	Accenture	Candidate ID: 131214, Date: Oct 6, 2017
36	Harikrishna D	CBENU4MEE14126	Accenture	Candidate ID: 131171, Date: Oct 6, 2017
37	S Harish	CBENU4MEE14128	TCS	Ref: CT20172301114, Date: Sep 24, 2017
38	Joe Joseph	CBENU4MEE14129	Accenture	Candidate ID: 131182, Date: Oct 6, 2017
39	Kiruthika S	CBENU4MEE14131	Titan	Date: Jun 23, 2017
40	Madipalli Manideep	CBENU4MEE14134	Accenture	Candidate ID: 131201, Date: Oct 6, 2017
41	Narayan Sai Kiran	CBENU4MEE14136	CTS	Ref: Candidate ID: 12076835, Date: 22.Nov.2018
42	Narendar K	CBENU4MEE14137	Daimler	Ref: DICV/HR/L01/2048/2018, Date: 21-06-18, ID card
43	Santhosh Krishna S	CBENU4MEE14144	ACC Ltd	Date: 08th June 201
44	Shradha Prasad	CBENU4MEE14148	Titan - TEAL	Ref: AO/04072018/5015097
45	Shyam Prasad S	CBENU4MEE14149	FL Smidth	Date: March 24, 2018
46	S Siddharth	CBENU4MEE14150	Infosys	Date: Sep 11, 2017
47	Suganthan T	CBENU4MEE14153	Shapoorji Pallonji	Date: 23,August 201 7
48	Vignesh P	CBENU4MEE14156	Bibox	Date: Jun 21, 2018
49	Vignesh Ram Kumar R	CBENU4MEE14157	Infosys	Date: Sep 11, 2017
50	Yeshwanth G	CBENU4MEE14158	Infosys	Date: Sep 11, 2017
51	Anish B	CBENU4MEE1416	BYJU's	Date: Dec 13, 2017
52	Adabala Shashaank	CBENU4MEE14201	Accenture	Candidate ID: 131205, Date: Oct 6, 201
53	Allam Hari Hara Naga Sai	CBENU4MEE14202	Cognizant	Ref: Candidate ID –12067022 Date: 19-06-2018

54	Ameet Krishnan	CBENU4MEE14204	Accenture	Candidate ID: 131216, Date: Oct 6, 2017
55	Ananda Krishnan	CBENU4MEE14205	TCS	Ref: DT20174000339, Date: Sep 24, 2017
56	Aravindh P Nair	CBENU4MEE14207	TCS	Ref: CT20172177242, Date: Sep 24, 2017
57	Arvind Krishna	CBENU4MEE14208	Bibox	Date: Jun 21, 2018
58	Charan Aswanth S S	CBENU4MEE14213	Infosys	Date: Sep 11, 2017
59	Dawood Sheriff A	CBENU4MEE14214	TCS	Ref: CT20172177233, Date: Sep 24, 2017
60	Giri Prasadh R	CBENU4MEE1421	TCS	Ref: CT20172177150, Date: Sep 24, 201
61	Gokulan S	CBENU4MEE14216	GMMCO	Ref: Date: April 30, 2018
62	Guru Vishnu	CBENU4MEE14217	Detroit Engineered Products	Ref: Linkedin
63	Hari Haran R.B	CBENU4MEE14218	ELGI	Ref: Employee code: 102114
64	Harikrishnan S Nair	CBENU4MEE14222	Infosys	Date: Sep 11, 2017
65	Jeyaprakash G	CBENU4MEE14224	Saint-Gobain	Ref: Employee ID - 14179
66	Kamireddy Teja	CBENU4MEE14225	TCS	Ref: CT20172301028, Date: Sep 24, 2017
67	Kishen B	CBENU4MEE14229	Infosys	Ref: Employee ID - 798058
68	C Manish Kumar	CBENU4MEE14232	TCS	Ref: CT20172301073, Date: Sep 24, 2017
69	Nikhilesh K	CBENU4MEE14233	Renault Nissan	Ref: Employee ID - RN10593
70	Niranjan N	CBENU4MEE14234	Infosys	Ref: HRD/3T/18-19/12013016, Date: April 25, 2018
71	Perumalla Sandeep	CBENU4MEE14236	TCS	Ref: Card No: 35079
72	Priyadarshuan A	CBENU4MEE14238	TCS	Ref: Employee ID - 1430701, Card No: 40022
73	Raahesh S	CBENU4MEE14239	CRI Pumps	Ref: Linkedin
74	Raghunandan J C	CBENU4MEE14240	Accenture	Candidate ID: 131222, Date: Oct 6, 2017
75	Ramkumar R	CBENU4MEE14241	Infosys	Ref: Employee ID - 798005
76	Rithin K R	CBENU4MEE14242	TCS	Ref: CT20172177224, Date: Sep 24, 2017
77	L R Rudresh	CBENU4MEE14243	Infosys	Date: Sep 11, 2017
78	Sadagoban S	CBENU4MEE14244	ELGI	Ref: Date: September 27, 2017
79	Sathya Sai Chandar N S	CBENU4MEE14247	GGS	Ref: Employee No: 5678
80	A Shriram	CBENU4MEE14248	TCS	Ref: CT20172303361, Date: Sep 24, 2017
81	Sreeragrajeevan	CBENU4MEE14250	Midhani	Ref: Linkedin
82	M Tharun Sai	CBENU4MEE14251	TCS	Ref: CT20172301086, Date: Sep 24, 2017
83	Vinayak C M	CBENU4MEE14256	Bibox	Date: Jun 21, 2018
84	Vishal Venugopal	CBENU4MEE14257	Haymarket SAC Publishing (India) Private Limited	Ref: Linkedin
85	Visnu Sasindran	CBENU4MEE14258	BYJU's	Date: Dec 13, 2017
86	Karthik Shailendar S	CBENU4MEE14501	SEFPRO	Ref: Emp No: 600713
87	Vignesh S	CBENU4MEE14502	Infosys	Date: Sep 11, 2017
88	Sudarshan S V	CBENU4MEE14503	TCS	Ref: Card no: 33704, Associate No: 1430576
89	K B Arjun	CBENU4MEE14504	Renault Nissan	Date: Mar 20, 2018
90	Sreenath C R	CBENU4MEE14505	Infosys	Date: Sep 11, 2017
91	Pozhilan C	CBENU4MEE14511	SEFPRO	Ref: Emp No: 600715
92	E C Yuvaraju	CBENU4MEE14521	Renault Nissan	Ref: Employee ID - RN10731

Assessment Year : 2016-17 (CAYm3)

S.No	Student Name	Enrollment No	Employee Name	Appointment No
1	Abhilash J	CBENU4MEE13001	Infosys	Ref: Employee ID Number: 787963
2	Abhimanyu P	CBENU4MEE13002	infor india Pvt ltd	Ref: Hyd/HR/R&S/OL/18/436, Emp No: 4222
3	Aravindh V	CBENU4MEE13004	Robert Bosch	Date: July 29, 2016
4	L.B. Dheepakram	CBENU4MEE13007	Carborundum Universal Limited	Date: 15.2.2017
5	Golive Sai Venkata Santosh	CBENU4MEE13008	TCS	Ref: TCSL/CT20162081304/Chennai, Date: 07/12/2016
6	Gopikrishnan S	CBENU4MEE13009	CTS	Ref: Candidate ID 9514067 Date: 08-12-2016
7	S Guruprasad	CBENU4MEE13011	TCS	Ref: TCSL/CT20162081360/Chennai, Date: 07/12/2016
8	Hemanth S	CBENU4MEE13012	Infosys	Date: Sep 20, 2016
9	Kabilan V S	CBENU4MEE13013	Saint-Gobain	Ref: HR-PM-RC-FOR-10-F00418(16)
10	Karnati Santosh	CBENU4MEE13014	Magna International	Ref: Linkedin
11	Karthik R	CBENU4MEE13016	CTS	Date: Sep 22, 2016
12	Kashyap Sundara Rajan	CBENU4MEE13017	CTS	Date: Sep 22, 2016
13	B K Kishore	CBENU4MEE13020	L&T Construction	Ref: CHR: GET2017.B3-P:AIT Coimbatore: Mech, Date: 8.6.2017
14	Koutham S	CBENU4MEE13021	CTS	Date: Sep 22, 2016
15	Krishnakumaaran R G	CBENU4MEE13023	CTS	Date: Sep 22, 2016
16	Mahesh Kanna M	CBENU4MEE13026	Tech Mahindra	Date: 31.01.2017
17	Manibharathi N M	CBENU4MEE13027	Amazon-CS	Date: 7.12.2016
18	Marella Murali Krishna	CBENU4MEE13028	I-Exceed	Date: 7.12.2016
19	Mathireddi Phani Taraka Harish	CBENU4MEE13029	Tech Mahindra	Date: 31.01.2017
20	Midhun Pradeep	CBENU4MEE13031	Thermax Limited	Ref: Linkedin
21	Mitilesh R N	CBENU4MEE13032	TCS	Ref: TCSL/CT20162080871/Chennai, Date: 07/12/2016
22	Nallana Akhil	CBENU4MEE13033	TCI Tech	Date: May 3, 2017
23	Neeraj R R	CBENU4MEE13034	Tech Mahindra	Date: 31.01.2017
24	Nithesh R	CBENU4MEE13037	CTS	Ref: Candidate ID: 9514087
25	Nivethan S	CBENU4MEE13039	Robert Bosch	Date: July 29, 2016
26	Palakollu Venkata Sai Anurag	CBENU4MEE13040	TCS	Ref: TCSL/CT20162080834/Chennai, Date: 07/12/2016
27	Palanati Karthik	CBENU4MEE13041	Tech Mahindra	Date: 31.01.2017
28	Pranav Nithin R	CBENU4MEE13043	CTS	Date: Sep 22, 2016
29	Praveen M	CBENU4MEE13044	Sanmar Engineering	Date: Sep 20, 2016
30	Pullagujju Venkatesh	CBENU4MEE13045	TCS	Ref: TCSL/CT20162081341/Chennai, Date: 07/12/2016
31	Rahul Suresh	CBENU4MEE13046	Renault Nissan	Ref: HR/11201/Jan 18, Date: 17.01.2018
32	Ramesh T	CBENU4MEE13048	CTS	Date: Sep 22, 2016
33	R Ramprasad	CBENU4MEE13049	TCS	Ref: TCSL/CT20162081344/Chennai, Date: 07/12/2016
34	Roopesh U	CBENU4MEE13050	CTS	Date: Sep 22, 2016
35	Sachin C Rajagopal	CBENU4MEE13051	Infosys	Date: Sep 20, 2016
36	T D Sadanand	CBENU4MEE13052	Larsen & Toubro	Ref: CHR: GET2017.B3-P:AIT Coimbatore: Mech, Date: 8.6.2017
37	Sanesh K	CBENU4MEE13053	Hyundai	Date: 22.Nov.2016
38	Sarang Dev A	CBENU4MEE13054	CTS	Date: Sep 22, 2016
39	Sashildath A	CBENU4MEE13055	AQ - TBA	Date: 07/12/2016

40	Saurabh Panigrahi	CBENU4MEE13056	Robert Bosch	Date: July 29, 2016
41	Shanmugapriyan M	CBENU4MEE13057	Assistant Project Engineer, Oriental	Ref: Linkedin
42	Shiam Sunder S	CBENU4MEE13058	TCS	Ref: TCSL/CT20162081279/Chennai, Date: 07/12/2016
43	Srijit Krishnan	CBENU4MEE13059	Tech Mahindra	Date: 31.01.2017
44	Subbu Rathinam C	CBENU4MEE13060	Robert Bosch	Date: July 29, 2016
45	Subhassh M	CBENU4MEE13061	GMMCO	Date: 08-Dec-2016
46	K Sureshbabu	CBENU4MEE13062	TCS	Ref: TCSL/CT20162079973/Chennai, Date: 07/12/2016
47	Swarnava Mukherjee	CBENU4MEE13063	Daikin Airconditioning	Date: 21.4.2017
48	Vadlamudi Venkat Kaushik	CBENU4MEE13065	CTS	Date: Sep 22, 2016
49	Vignesh N	CBENU4MEE13067	Vdart	Date: Sep 22, 2016
50	Vignesh S	CBENU4MEE13068	Larsen & Toubro	Ref: CHR: GET2017.B3-P:AIT Coimbatore: Mech, Date: 8.6.2017
51	Vivek V	CBENU4MEE13070	Infosys	Date: Sep 20, 2016
52	Yegateela Sujay	CBENU4MEE13071	CTS	Date: Sep 22, 2016
53	Aadharsh M	CBENU4MEE13101	CTS	Date: Sep 22, 2016
54	Abhiram Balaji	CBENU4MEE13102	Business Consultant at Infor	Ref: Linkedin
55	Abhiram E	CBENU4MEE13103	CTS	Date: Sep 22, 2016
56	Adithya Venugopal V	CBENU4MEE13105	FIITJEE	Date: March 28, 2017
57	Aditya Muralidharan	CBENU4MEE13107	Samir Odeh Group	Ref: Linkedin
58	Aravind G	CBENU4MEE13110	TCS	Ref: TCSL/CT20162080676/Chennai, Date: 07/12/2016
59	S Aravind	CBENU4MEE13111	CTS	Date: Sep 22, 2016
60	Aravindha Vishnu Vardhanan K	CBENU4MEE13112	Mahindra & Mahindra	Date: 22.5.2017
61	Arun Raja	CBENU4MEE13113	Hindustan Unilever Ltd	Ref: Emp ID
62	Arun	CBENU4MEE13114	Amazon	Ref: Emp ID
63	Ashok P	CBENU4MEE13115	Larsen & Toubro	Ref: CHR:GET2017:B3-P:AIT Coimbatore: Mech, Date: 8.6.2017
64	Ashwin Asokan	CBENU4MEE13116	Tech Mahindra	Date: 31.01.2017
65	Ashwin Kumar N	CBENU4MEE13117	CTS	Ref: Candidate ID: 9514129, Emp code: 680895
66	Balaji V	CBENU4MEE13119	TCS	Ref: TCSL/CT20162080604/Chennai, Date: 07/12/2016
67	Botsa Amruth Malleswar	CBENU4MEE13120	Infosys	Date: Sep 20, 2016
68	Dhinesh G	CBENU4MEE13122	TCS	Ref: TCSL/CT20162080769/Chennai, Date: 07/12/2016
69	Gavva Deepak	CBENU4MEE13123	CTS	Date: Sep 22, 2016
70	N G Gopinath	CBENU4MEE13124	CTS	Ref: Candidate ID–9514136 Date: 08-12-2016
71	E Gowtham	CBENU4MEE13125	CTS	Ref: Candidate ID–9514137,Emp ID: 670390
72	Gowtham S	CBENU4MEE13126	Larsen & Toubro	Ref: CHR:GET2017:B3-P:AIT Coimbatore: Mech, Date: 8.6.2017
73	Har Govind K	CBENU4MEE13127	Tech Mahindra	Date: 31.01.2017
74	Hemanth kumar E	CBENU4MEE13129	Infosys	Date: Sep 20, 2016
75	Hitish Srivastav	CBENU4MEE13130	Robert Bosch	Date: July 29, 2016
76	Jawahar Chandra C	CBENU4MEE13132	FLSmidth	Date: Jan 11, 2017
77	Somisetty Kamalesh Sreeram Sanjeev	CBENU4MEE13133	CTS/ Indian Navy	Date: Sep 22, 2016
78	Khushal A Bhatija	CBENU4MEE13134	Tata Technology	Date: 3.6.2017
79	Mahesh Krishna Hari	CBENU4MEE13136	Vdart	Date: Sep 22, 2016

80	Manigandan S	CBENU4MEE13138	TCS	Ref: TCSL/CT20162080682/Chennai, Date: 07/12/2016
81	Narne Anoop Sai	CBENU4MEE13142	TCS	Ref: TCSL/CT20162081537/Chennai, Date: 07/12/2016
82	Neeraj P	CBENU4MEE13145	Robert Bosch	Date: July 29, 2016
83	Nithin Alistar J	CBENU4MEE13147	TCS	Ref: TCSL/CT20162081217/Chennai, Date: 07/12/2016
84	Nunavath Venkat Nikhil Kumar	CBENU4MEE13148	Tech Mahindra	Date: 31.01.2017
85	Nunna Vikas Sai Giridhar	CBENU4MEE13149	TCS	Card No: 512983, Associate No: 1366763
86	Prabhat Balakrishnan	CBENU4MEE13150	BYJU's	Emp ID No: TNL21830537
87	Puneet J	CBENU4MEE13153	Mahindra & Mahindra	Ref: HR/GET/2017231, Date: 22.5.2017,Token No: 25100241
88	Rahul S	CBENU4MEE13154	TCS	Ref: TCSL/CT20162081648/Chennai, Date: 07/12/2016
89	Ram Kumar T A	CBENU4MEE13155	CTS	Date: Sep 22, 2016
90	Rohan R	CBENU4MEE13156	Amazon-CS	Date: 7.12.2016
91	R SaalaiThenagan	CBENU4MEE13158	Tata Technology	Ref: Date: 3.6.2017, Emp ID 915363
92	Sai Krishna S	CBENU4MEE13159	CTS	Date: Sep 22, 2016
93	Sai Swaroop J	CBENU4MEE13160	TCS	Ref: TCSL/CT20162081224/Chennai, Date: 07/12/2016
94	Tangi Hemanth	CBENU4MEE13167	TCS	Ref: TCSL/CT20162081198/Chennai, Date: 07/12/2016
95	Thanga Sivaram @ Bharath B	CBENU4MEE13168	FIITJEE	Date: March 28, 2017
96	Thokala Rakesh	CBENU4MEE13169	Infosys	Date: Sep 20, 2016
97	Vishnu Alagappan V	CBENU4MEE13170	Tech Mahindra	Ref: 1488068/ELTP/2017, Date: 31.01.2017
98	Aalim Akbar	CBENU4MEE13201	Infosys	Date: Sep 20, 2016
99	Adithya Rajeev Nair	CBENU4MEE13202	Tech Mahindra	Date: 31.01.2017
100	Aditya Rajeevan	CBENU4MEE13203	CTS	Date: Sep 22, 2016
101	Akash Sreekumar	CBENU4MEE13204	Carborundum Universal Limited	Date: 15.2.2017
102	Akhil R	CBENU4MEE13205	CTS	Date: Sep 22, 2016
103	Anirhudhan R D	CBENU4MEE13207	TCS	Ref: TCSL/CT20162079973/Chennai, Date: 07/12/2016
104	A Anirudh	CBENU4MEE13208	Infosys	Date: Sep 20, 2016
105	Aravinth S	CBENU4MEE13210	CTS	Ref: Candidate ID –9514124 Date: 08-12-16
106	Arjunbarath G	CBENU4MEE13212	Sanmar Engineering	Date: Sep 20, 2016
107	Arun Kaarthic L V	CBENU4MEE13213	3dPLM Software	Date: 17.8.2016
108	Arvindram A	CBENU4MEE13214	TCS	Ref: TCSL/CT20162079302/Chennai, Date: 07/12/2016
109	Ashish Guhan B	CBENU4MEE13215	Sanmar Engineering	Date: Sep 20, 2016
110	Badiginti Laxmi Prasad	CBENU4MEE13216	Infosys	Date: Sep 20, 2016
111	Balakumharen A P	CBENU4MEE13217	TCS	Ref: TCSL/CT20162079966/Chennai, Date: 07/12/2016
112	S Bharath Kumar	CBENU4MEE13219	Robert Bosch	Date: July 29, 2016
113	D S N Sunil Varma	CBENU4MEE13220	Daikin Airconditioning	Date: 21.4.2017
114	Dasari Satya Praneeth	CBENU4MEE13221	CTS	Date: Sep 22, 2016
115	Debin Dennis	CBENU4MEE13222	SK Engineering & Construction Co. Ltd	Ref: Linkedin
116	R Deepak	CBENU4MEE13223	CTS	Date: Sep 22, 2016
117	Deepak Tiwari	CBENU4MEE13224	Genpact	Date: 07/12/2016
118	Eshwanth A	CBENU4MEE13225	Infosys	Date: Sep 20, 2016
119	Gopikrishnan P	CBENU4MEE13226	Entuple Technologies Pvt Ltd	Ref: Linkedin

120	Gowtham Shankar S	CBENU4MEE13227	First Engineering Limited	Ref: Linkedin
121	Harsh Ravivarapu	CBENU4MEE13228	CTS	Date: Sep 22, 2016
122	Karthick Srinivasan	CBENU4MEE13230	CTS	Date: Sep 22, 2016
123	Kartik Sriram K	CBENU4MEE13231	FLSmidth	Date: Jan 11, 2017
124	K Kaushik Ayyar	CBENU4MEE13232	GMMCO	Ref: Candidate ID –9514124, 08-Dec-2016
125	Kotha Liketh Dheeraj	CBENU4MEE13236	Infosys	Date: Sep 20, 2016
126	Midun Kumar S S	CBENU4MEE13238	TCS	Ref: TCSL/CT20162080626/Chennai, Date: 07/12/2016
127	Muralidharan K	CBENU4MEE13242	Tech Mahindra	Date: 31.01.2017
128	Muthu Raman A	CBENU4MEE13243	FLSmidth	Ref: Employee ID : 126908
129	Raghul S	CBENU4MEE13249	CTS	Date: Sep 22, 2016
130	Raj Saravanan S	CBENU4MEE13250	Infosys	Date: Sep 20, 2016
131	Ramkumar S	CBENU4MEE13251	TCS	Ref: TCSL/CT20162079606/Chennai, Date: 07/12/2016
132	Sai Charan K	CBENU4MEE13253	CTS	Date: Sep 22, 2016
133	S Sai Venkatesh	CBENU4MEE13255	TCS	Ref: TCSL/CT20162079882/Chennai, Date: 07/12/2016
134	Sakthivel T	CBENU4MEE13256	Talent Acquisition at Anzy Careers	Ref: Linkedin
135	Shibin Raj Nair	CBENU4MEE13258	TCS	Ref: TCSL/CT20162081550/Chennai, Date: 07/12/2016
136	Shiva Deep K	CBENU4MEE13259	Daikin Airconditioning	Date: 21.4.2017
137	Shri Hari S	CBENU4MEE13260	Tech Mahindra	Date: 31.01.2017
138	Siddharth C S K	CBENU4MEE13261	Daikin Airconditionin	Ref: DAIKIN/LOI/CHE, Date: 21.4.2017
139	J Srinaath	CBENU4MEE13262	CTS	Date: Sep 22, 2016
140	M S Ubanish Lahari	CBENU4MEE13263	TCS	Ref: TCSL/CT20162079287/Chennai, Date: 07/12/2016
141	Vaishnav B	CBENU4MEE13264	Renault Nissan	Ref: Letter Dated: 22.5.2017
142	Varada Krishna Chaitanya	CBENU4MEE13265	TCS	Ref: TCSL/CT20162080985/Chennai, Date: 07/12/2016
143	Vignesh G	CBENU4MEE13266	Mahindra & Mahindra	Date: 22.5.2017
144	Vignesh S R	CBENU4MEE13267	Daikin Airconditioning	Date: 21.4.2017
145	Vivek Saini	CBENU4MEE13269	FIITJEE	Ref: Chemistry/2017004156, Date: 28.3.2017
146	Vooda Nikhil Kumar	CBENU4MEE13270	Tech Mahindra	Ref: 1488007/ELTP/2017, Date: 31.01.2017

4.5 Professional Activities (20) Total Marks 20.00

4.5.1 Professional societies/chapters and organizing engineering events (5)

Institute Marks : 5.00

The following professional societies / technical clubs are active in the department.

- ACME - Association of Mechanical Engineering
- SAEINDIA - Society of Automotive Engineers India

ACME – Association of Mechanical Engineering

ACME – Association of Mechanical Engineering is a departmental professional association formed with the goal of organizing professional activities like seminars, workshops, industrial and inter-institute interactions, and other technical events for the benefit of students, to enhance their professional, organizational, and leadership skills. All the students belonging to the department are members of the association, and the executive committee team comprises of student office bearers and faculty advisors/conveners.

Vision

To organize student-level professional competitions and events to motivate the mechanical engineering students to imbibe, apply, and enhance their professional skills towards the benefit of society

Activities &Agenda

Organize

- Student Induction Programs
- Workshops
- Invited Lecture Series
- Seminars
- Competitions – Paper / Poster / Project / Idea presentations / Quizzes
- Promote Mission and Vision of Amrita University
- Skill Development – Organizational & Professional
- Membership in Professional Bodies

SAEINDIA - Society of Automotive Engineers India

SAEINDIA is a professional society with the goal of knowledge dissemination and skill development of mobility professionals – students and faculty. We have an SAEINDIA Chapter which contains student members and an expert faculty group who actively participate in automotive design & development, and participate in technical events organized within the country and abroad. Amrita chapter has won several prizes and accolades in events conducted in the country over the past several years. Professional societies / Chapters& Engineering events organized by the department are listed in Annexure 4.1.

ANNEXURE 4.1

Professional societies / Chapters& Organizing Engineering Events

A. Professional Societies/ Chapters

S.No.	Name of the professional societies / Chapter	No. members of the professional societies / Chapter	Office Bearers

S.No.	Name of the professional societies / Chapter	No. members of the professional societies / Chapter	Office Bearers
1.	ACME – Association of Mechanical Engineering	All students & staff of the Mechanical Engineering Department	**CAY – 2019-20** **Faculty Advisory Committee:** Dr. Ajith Ramesh (Convener) Mr. Arun A Mr. S.Prabhu Dr. R.Sakthivel Dr. Thirugnanasambantham K. G. **Student office bearers:** President: Mr. R. Sangeeth Raj Secretary: Mr. Ajith Krishnan G. Treasurer: Mr. Sachin K. S. R. Joint Secretaries: 1. Mr. M. V. Raja Arvind 2. Mr. G. S. Gokul Executive Committee members: 1. Mr. Subrammaniyam V. 2. Mr. S. Hariecharran 3. Mr. R. Jagadeep 4. Mr. Prabhuram K. 5. Mr. Venkata Navaneeth B. 6. Mr. S. Sandeep 7. Mr. Sai Nischay S. 8. Mr. Jeevan S. 9. Mr. Pradeep Kumar P. M. 10. Mr. Akhil Vardhan D. S. M. 11. Mr. Brite B. 12. Mr. Kangishwar S. 13. Ms. Lalitha Madhuri V. 14. Ms. Sreya Ramakrishnan 15. Mr. K. Bhargav 16. Mr. S. M. Anand Nataraj 17. Ms. Harshini G. V. 18. Ms. Kavya J. 19. Mr. Harivarshan A. 20. Mr. Shyam Mohan **CAYm1 – 2018-19** **Faculty Advisory Committee:** Mr. A. S. Prakash Mr. A. Sumesh **CAYm2 – 2017-18** **Faculty Advisory Committee:** Mr. D. Unnikrishnan Mr. Bipin Balaram

S.No.	Name of the professional societies / Chapter	No. members of the professional societies / Chapter	Office Bearers
2.	SAEINDIA		**Faculty Advisory Committee:** Dr. Srihari Mr. Srinivaas.A. Mr. Nanthakumar P. Mr. Prasad M. Mr. Sivanesan M. Mr. N. Tamilarasan Student Members **CAY – 2019-20** 102 members **CAY – 2018-19** 116 members **CAY – 2017-18** 171members Details of student members are available in professional societies file (P7)

B. List of activities organized by Professional Societies / Associations / Chapters (2015 – 2019)

S. No.	Professional society / Association / Chapter	Nature of the event (title)	No. of Participants (internal)	Duration	Date From - To	External expert members (industry / Academia)	Internal expert members
1.	ACME	Technical Talk on Internal Combustion Engine	60	1day	26.8.2015	Dr KC Vora Deputy Director & Head ARAI Academy	Dr.S.Thirumalini
2.	ACME	Simulation of Noise and Vibration in the Automotive Industries	75	1 day	06.01.2016	Ing.Dietmar Jennewein, Hochschule Darmstadt, University of Applied Sciences, Germany	Dr.S.Thirumalini
3.	ACME	Advanced Materials and Joining processes	84	2 days	26.02.2016 & 27.02.2016	Dr.N.Murugan, Patron – Indian Welding Society, Coimbatore.	Dr.R.Padmanaban Dr.M.Arivarasu
4.	ACME	Introduction to MATLAB	40	2 days	08.03.2016 & 22.03.2016	---	Dr.B.Santhosh, Dr.R.Padmanaban Dr.M.Saimurugan

S. No.	Professional society / Association / Chapter	Nature of the event (title)	No. of Participants (internal)	Duration	Date From - To	External expert members (industry / Academia)	Internal expert members
5.	ACME	Future Technologies & Design thinking	124	1 day	15.07.2016	Mr.Sudhakar Shenoy, Fr Sr. VP John Deere India Prof.S.Balaram, Dean D J Academy of Design India Mr Nitin Agarwal, Head, John Deere Technology Centre India Prof. S. Balaram, Dean DJ Academy of Design India	Dr.S.Thirumalini
6.	ACME	Students leadership program	45	1 day	15.07.2016	Mr. Sudhakar Shenoy Fr Sr. VP John Deere India	Dr.S.Thirumalini
7.	ACME	Improving the Quality of life for Humanity via Humanitarian Robotics and Automation	126	2 days	10.08.16 & 11.08.16	Dr.Raj Madhaavan Founder & CEO of Humanitarian Robotics Technologies (HumRobTech), LLC based in Maryland, USA	Dr.Sanjivi Arul
8.	ACME	Engines for off-Highway	95	1 day	24.11.2016	Mr. Radhakrisnan, Engineer, M/S Caterpillar IndiaChennai	Dr.S.Srihari
9.	ACME	Additive Manufacturing and its applications	60	1 day	02.01.2017	Prof. Sarat Singamneni, Associate Professor, Auckland University of Technology, Auckland, NZ	Dr. M. Ramu
10.	ACME	Introduction to Nonlinear Dynamics and Chaos-Theory and Computation	79	2 days	27.01.2017& 28.01.2017	---	Dr.Biswambhar Rakshit, Dr.B.Santhosh, Dr.Bipin Balaram
11.	ACME	Guest Lecture –Composite Materials	19	1day	03.02.2017	Dr Alan Richard Chambers Associate Professor University of Southampton Malaysian Campus)	Dr M.Ramu Dr R padmanabhan Dr N Radhika Dr M Saimurugan Dr P Krishnakumar
12.	ACME	Design Thinking	20	3 days	09.02.2017 to 11.02.2017	Dr.S.Balaram Fr. Industrial Designer, Sr Faculty, Fr Chairman, NID India.	Dr.M.Ramu
13.	ACME	Recent Trends in Signature Analysis of ARCWELDING	35	1 day	06.03.2017	Dr.A.Raja, Foemr Addl. GM, WRI-BHEL, Trichy; Prof.Dres Markus Rehfeldt, Professor, Albstadt-Sigmaringen University, Germany, Ing.Habil Dietrich Rehfeldt, Professor, Leibnis University, Hanover, Germany	Dr.K.I.Ramachandran

S. No.	Professional society / Association / Chapter	Nature of the event (title)	No. of Participants (internal)	Duration	Date From - To	External expert members (industry / Academia)	Internal expert members
14.	ACME	Challenges and Sustainable solutions for Rural India	64	1 day	09.03.2017	--	Dr.S.P.Anbuudayasankar Dr V Satheeshkumar
15.	ACME	Design Thinking - An Approach	47	4 days	10.07.2017 to 13.07.2017	Dr.Eric Blanco Associate Professor Grenoble University France	Dr.M.Ramu
16.	ACME	Lean Manufacturing and Applications in Innovation and New Product Development	49	1 day	17.07.2017	Dr.Eric Blanco Associate Professor Grenoble University France.	Dr.P.Raghuram, Dr.P.G.Saleeshya
17.	ACME	Meta-heuristics application to Large-scale Optimization in Logistics, Simulation	50	1 day	19.07.2017	Dr.Purushothaman Damodaran, Professor & Chair, Industrial & Sytems Engineering, Dr.Shanthi Muthusamy, Associate Professor, Department of Technology, Northern Illinois University, Chicago, USA.	Dr.S.P.Anbuudayasankar
18.	ACME	Physical Law Based Approach of CFD Development	70	1 day	13.09.2017	Prof.Atul Sharama Professor ME Department IIT B	Dr.S.Thirumalini
19.	ACME	Design thinking - Project Execution	30	4 days	18.12.2017 to 22.12.2017	Dr.Eric Blanco Grenoble University, France	Dr.M.Ramu
20.	ACME	Fulbright Specialist Program: 1. FD Workshop (for faculty) and Technical lectures for UG & PG students 2.Seminar on higher education opportunities in US 3.Research interaction with faculty TAG groups 4.Workshop on Computational Solid Mechanics and Advanced Mechanics of Materials	300	14 days	29.12.2017 to 11.01.2018	Mr.Romesh C. Batra Distinguished Professor, Department of Biomedical Engineering and Mechanics, Virginia-Tech USA.	Dr.Ajith Ramesh
21.	ACME	Vehicle Dynamics - A practical approach	61	2 days	05.02.2018 & 06.02.2018	Mr.Desigan Testing Engineer ATS	Mr.C.Lakshmikanthan
22.	ACME	Systems Approach to Automotive HMI Development	37	2 days	08.02.2018 & 09.02.2018	Mr Vivek Devaraj Co-founder Oversquare automotive	Mr.A.Srinivaas

S. No.	Professional society / Association / Chapter	Nature of the event (title)	No. of Participants (internal)	Duration	Date From - To	External expert members (industry / Academia)	Internal expert members
23.	ACME	3D Printing & Big Data Science	50	1 day	10.04.2018	Dr.Satishkumar Jothi Swansea University UK	Dr.M.Ramu
24.	ACME	Advanced Engine Control Technologies	23	1 day	26.06.2018	Mr.Vikash Sharma, and Mr. Yogesh Kalia - Founder, Medhaavi Center for Automotive Research, Punjab.	Dr.S.Thirumalini
25.	ACME	Int. Seminar on Emission and Low NOx Technologies in Diesel Engines	48	1 day	16.10.2018	Mr.Vishnu Padmanabhan PhD Scholar, University of West Virginia, USA	Dr.S.Thirumalini
26.	ACME	3D printing training for faculty / students	22	2 days	13.12.18 & 14.12.18	---	Dr.M.Ramu
27.	ACME	EDGECAM software training	21	2 days	18.02.19 & 19.02.19	---	Dr.K.RameshkumarDr.M.Elangovan
28.	ACME	Pathway to Excellence for Individuals and organization	89	1 day	22.03.19	Mr.Sudhakar Shenoy Fr Sr. Vice President John Deere India	---
29.	ACME	Workshop on MATLAB	108	5 days	11.03.19 to 15.03.19	---	Dr.R.Padmanaban, Dr.B.Santhosh, Dr.Bipin Balaram, Mr.K.Devarajan
30.	ACME	Faculty-Student interaction with Industry Experts (ELGi)	47	1 day	29.04.19	Dr. Venu Madhav Technical Director ELGi Equipments	Dr.B.Santhosh
31.	ACME	Transforming Global Health through computational Cook-stove Design	27	12 days	27.05.19 to 07.06.19	---	Dr.V.Ratnakishore, Dr.SriKrishnan.A.R.
32.	ACME	Talk on Higher education and Career opportunities	33	1 day	24.07.2019	Dr.Eric Blanco Associate Professor Grenoble University France	---
33.	ACME	Indo-French Summer School	20	12	08.07.2019 to 19.07.2019	Dr.Eric Blanco Associate Professor Grenoble University France	Dr.S.Thirumalini
34.	ACME	EURO 6 Engines	47	1 day	08.08.2019	N.Balasubramanian, Vice President Renault Nissan	Dr.S.Srihari

S. No.	Professional society / Association / Chapter	Nature of the event (title)	No. of Participants (internal)	Duration	Date From - To	External expert members (industry / Academia)	Internal expert members
35.	ACME/ SAEINDIA	Seminar on BAJA and SUPRA - Overview on Teams Participations & Challenges	48	1 day	07.09.2019	Mr. Sanjay Nibhande Deputy Director ARAI INDIA	Mr.P.Nanthakumar, Mr.N.Tamilarasn
36.	ACME	Introduction to the software-CONVERGE	22	1 day	17.09.2019	Mr Abhishek Sinha Business Development Manager Convergent Science	Mr.S. Prabhu
37.	ACME	Workshop on 'Introduction to MATLAB for Mechanical Engineers'	18	1 day	03.12.2019	---	Dr.R.Padmanaban
38.	ACME	Guest Lecture on 'Advanced Welding focusing on Automotive application'	3	1 day	04.12.2019	Dr.A.Raja Former G M WRI BHEL, Trichy	---
39.	ACME	INFERNO – Student Symposium	50	1 day	21.12.2019	---	Dr.R.Sakthivel

4.4.2 Publication of technical magazines, newsletters, etc. (5)

Institute Marks : 5.00

'Amritadhwani'is the annual college magazine & yearbook of Amrita School of Engineering, Coimbatore campus. The magazine highlights the happenings in Coimbatore campus. Literary works like poems and stories written by the students in different languages are published in the magazine.

'EnVision' is a newsletter of Amrita Vishwa Vidyapeetham, Coimbatore campus. Research work ongoing at Amrita, Faculty recognition, student achievements etc., are highlighted in this newsletter.

Figure B.4.5.1 College magazine https://www.amrita.edu/school/engineering /coimbatore/amritadhwani (https://www.amrita.edu /school/engineering/coimbatore/amritadhw))

Figure B.4.5.2 College newsletter https://www.amrita.edu/school/engineering /newsletter (https://www.amrita.edu/school /engineering/newsletter)

4.4.3 Participation in inter-institute events by students of the program of study (10)

Institute Marks : 10.00

Students actively participate in inter-institute events such as workshops, seminars, national and International conferences, symposiums, curricular and extra-curricular events. Experts from eminent industries / institutions are invited to the campus to deliver guest lectures. In addition, seminars and workshops are organized in collaboration with industries / institutions on emerging technologies for the benefit of students. The participation in Inter-Institute events by the students are provided in the Annexure 4.2.

ANNEXURE 4.2

Participation in Inter-Institute/Industry events by students of the program of study

a. Curricular Events

Title of the event	National / International	Event category	Participants Student list/ Numbers	Date of the event	Organizing institute	Prizes won (if any)
EFFICYCLE 2014	National	EFFICYCLE	10	October 2014	SAEINDIA	First prize in Marketing presentation and overall 4th position
PRAGYAN	National	Junkyard wars	5	26th Feb to 1st March 2015	NIT - TRICHY & L&T, Trichy	2nd place
EFFICYCLE 2015	National	EFFICYCLE	10	October 2015	SAEINDIA	24th position
SUPRA	National	Formula Student Car	24	July 2016	SAEINDIA	-AIR 3 out of 172 teams -2nd in cost & manufacturing -2nd in Design Presentation -Best appearance car award
SUPRA	National	Formula Student Car	24	June 2017	SAEINDIA	-6th place overall -Best Girl Participant award
Formula Bharat	National	Formula Student Car	24	January 2018	Formula Bharat	Participated
BAJA	National	ATV	25	January 2018	SAEINDIA	Participated
ESI BAJA	National	ATV	25	January 2018	Enduro Student India	Participated
TIFAN 2020	National	Design Manufacturing and Demonstration Self Propelled Onion harvester	24	March 2018	SAEINDIA	Participated
SUPRA	National	Formula Student Car	19	June 2018	SAEINDIA	-7th place overall -2nd prize in Business plan -3rd in cost & manufacturing
BOSCH Inscribe Competition 2018	National	Technical Presentation	3	October 2018	BOSCH	First Prize - Confirmed Internship at Pune Bosch in the Vehicle Dynamics Unit and Each one with Samsung Mobile phone worth 25k.
BAJA	National	ATV	22	January 2019	SAEINDIA	Participated
ESI BAJA	National	ATV	9	February 2019	Enduro Student India	Participated
Vigyaan 2019	National	Design and Development of Autonomous Harvestor	Madhu Hitesh & Saketh BSV	March 2019	Daimler India Commercial Vehicles Pvt. Ltd.	Participated
TIFAN 2020	National	Design Manufacturing and Demonstration Self Propelled Onion harvester	5	September 2019	SAEINDIA	Participated

Title of the event	National / International	Event category	Participants Student list/ Numbers	Date of the event	Organizing institute	Prizes won (if any)
International valve design challenge	International	Simulation and design	96	December 2019	Centre for Computational Technology, Pune	First Prize
REEV	National	Hybrid Vehicle	18	January 2020	SAEINDIA	Currently, preparations are ongoing

Ms.M.Gayathri - III year CBENU4MEE15013 received SAEINDIA - Best girl student participant in Greater Noida, Delhi. May 2017.

Formula Student car 2017

Formula Student team 2017

Best girl student in SAEINDIA Greater Noida event (2017) – Ms.M.Gayathri

Live-in-Labs®

Live-in-Labs® is a multidisciplinary experiential learning program that breaks classroom and lab barriers by applying learned theory in real-world settings. This credit-based academic program draws on principles of lean research for the development and deployment of sustainable solutions for current challenges faced by rural communities in India. By directly living in rural communities (labs) and co-designing solutions to development challenges, program participants gain first-hand knowledge and know-how of identifying and assessing community needs and subsequently developing and implementing viable solutions through various participatory methods.

With over 150 projects in 21 states across India, Live-in-Labs® participants have touched the lives of approximately 60,000 rural residents during the past several years. With participation from over 30 institutions around the world and nearly 50 departments, schools, and centers at Amrita, students and faculty have clocked in a monumental 200,000 + hours in the field working towards sustainable development in rural communities.

Around 60 students from the department of mechanical engineering have actively participated in the Live-in-Labs® programme since the academic year 2017-18 onwards.

Students participation in Livi-in-Lab activities

b. Student Participations / Awards won in National / International Conferences

Sl. No.	Roll No.	Name of Student	Title of Conference	Remarks
1	CB.EN.U4MEE13134	Khushal A Bhatiya	International Conference on Mechanical and Manufacturing Engineering, ICMME 2015 2,3 April 2015	Presented

2	CB.EN.U4MEE11208 CB.EN.U4MEE11253 CB.EN.U4MEE11219 CB.EN.U4MEE11222	Arjun B Shashank R Pillai Girish Chandar C KambhampatiAkhilTeja	2nd National Propulsion Conference IIT Bombay 23,24 Feb 2015	Presented
3	CB.EN.U4MEE12048 CB.EN.U4MEE12114	Sreeranj P Dheeraj K S	International Conference on Design, Analysis, Manufacturing and Simulation ICDAMS 2016	Best paper Awarded
4	CB.EN.U4MEE12232	MutyalaSesha Satya Sai Ram	International Conference on Advances in Materials and Manufacturing Applications 2016	Presented
5	CB.EN.U4MEE12056 CB.EN.U4MEE12052	Vijay P Sripathi J	International Conference on Advances in Materials and manufacturing Applications IconAMMA 2016	Presented
6	CB.EN.U4MEE13230 CB.EN.U4MEE13213 CB.EN.U4MEE13261	Karthick S Arun Kaarthic Siddharth C S K	ICMMM 2017	Presented
7	CB.EN.U4MEE13226	Gopikrishnan P	International Conference on Advances in Materials and manufacturing Applications IConAMMA 2017	Presented
8	CB.EN.U4MEE13130 CB.EN.U4MEE13269	Hitish Srivastava Vivek Saini	International Conference on Advances in Materials and manufacturing Applications IConAMMA 2017	Presented
9	CB.EN.U4MEE13125 CB.EN.U4MEE13126	Ramkumar S Gowtham S	ICMMM 2017	Presented
10	CB.EN.U4MEE13013 CB.EN.U4MEE13125 CB.EN.U4MEE13264	Kabilan V S E Gowtham Vaishnav B	International Conference on Advances in Materials and manufacturing Applications IConAMMA 2017	Presented
11	CB.EN.U4MEE14019	C Jayakarthick	International Conference on Advances in Materials and manufacturing Applications IConAMMA 2017	Presented
12	CB.EN.U4MEE15036 CB.EN.U4MEE15027	Pranav Raja R S Naveen Kumar V	International Conference on Advances in Materials and manufacturing Applications (IconAMMA2018)	Presented
13	CB.EN.U4MEE15050	Siddharth S S	International Conference 0n Mathematical methods, modelling and Simulation in Chemical Sciences 2018	Presented
14	CB.EN.U4MEE15058 CB.EN.U4MEE15052 CB.EN.U4MEE15060	Vignesh K A Sumanth Ram Vijeykumar S	ICAMEO 2019 Conference	Presented
15	CB.EN.U4MEE15063 CB.EN.U4MEE15059	S R Vishwanth Vigneshvar V	International Conference on Applied Mechanics and optimisations 2019	Presented
16	CB.EN.U4MEE15147 CB.EN.U4MEE15142	J Revant Rahul Sree Kumar	ICMECHD 2019 - SSN	Presented
17	CB.EN.U4MEE15214 CB.EN.U4MEE15211	Chand Swaroop C B Ashwin A	IOP Conference Series: Materials Science Engineering 2019	Presented
18	CB.EN.U4MEE15254	SreepathiRamiya	International Conference on mechanical and Building Science, ICMBS 2019	Presented

19	CB.EN.U4MEE15122 CB.EN.U4MEE15104	GokulGowri Shankar K R AjitBalakrishnan	9th International conference on manufacturing innovation strategies and appealing advancements 2019	Presented

C. Co-Curricular Events

C 1. Students' involvement in national level sports events

Year	Event	Roll Number	Name of the student
2017-18	HANDBALL	CB.EN.U4MEE13026	M. Makesh Kanna
2017-18	LONG JUMP	CB.EN.U4MEE13131	Jai Chandru
2017-18	4×100M RELAY	CB.EN.U4MEE13131	Jai Chandru
2017-18	100M	CB.EN.U4MEE14055	Vaidyanathan
2017-18	200M	CB.EN.U4MEE14055	Vaidyanathan
2017-18	4×100M RELAY	CB.EN.U4MEE14055	Vaidyanathan
2017-18	HANDBALL	CB.EN.U4MEE15247	S.Rohit Gopal
2017-18	HANDBALL	CB.EN.U4MEE16228	S.K Mathiarasu
2016-17	FOOTBALL	CB.EN.U4MEE12160	Varun Subrahmanian
2016-17	FOOTBALL	CB.EN.U4MEE13116	Ashwin Asokan
2016-17	FOOTBALL	CB.EN.U4MEE14126	Harikrishna D
2016-17	FOOTBALL	CB.EN.U4MEE14222	Harikrishnan S Nair
2016-17	FOOTBALL	CB.EN.U4MEE15154	Sri Kannan P
2015-16	BADMINTON	CB.EN.U4MEE11115	Duarakesh.S
2015-16	CHESS	CB.EN.U4MEE15112	Cheran G

C 2. Awards won by students in National-level events

S.No	Name	Roll No	Event	Place
South Zone Winners, 2015-16 - Mangalore University				
1	Rithin .K.R	CB.EN.U4MEE14242	Installation	2nd place
South Zone Winners, 2016 -17 - Bangalore University				
1	Puneeth.J	CB.EN.U4MEE13153	Quiz	3rd Place
2	Rithin .K.R	CB.EN.U4MEE14242	Installation	2nd place
Nationals winners, 2016-17– Shivaji University				
1	Rithin .K.R	CB.EN.U4MEE14242	Installation	3rd place

Students' participation in Gokulashtami Celebrations at Amrita - Coimbatore Campus

The birthday celebrations of Sri Krishna are conducted with a lot of pomp and splendour. During this occasion, the campus takes on a festive look, and the students, faculty, and non-teaching staff show extraordinary zeal and commitment in organizing various vibrant cultural programs. A grand procession with mechanized floats that depicts multiple episodes in Lord Sri Krishna's life, like; Mahishasura Vadham, Sundarakandam, Dashavatharam, Kaliya Narthanam, Vishwaroopa Darshanam and Mantralayam, etc., is a major attraction during the event. The mechanized floats are fabricated by the students themselves using the campus workshop facilities with guidance from faculty coordinators and workshop staff. To motivate healthy competition and to bring out the creative and artistic potential of the students, various other competitions in sports, literary, and culture, are also conducted. Every year ACME actively participates in all the events conducted during Gokulashtami Celebrations. ACME bagged the overall 1st Prize for the various events conducted during Gokulashtami Celebrations of the Year-2019. The following Figure displays a few snapshots of the celebrations organized in 2019.


Gokulashtami Celebrations in campus 2019

NSS Programs

The NSS wing of Amrita Vishwa Vidyapeetham with six units and consisting of 600 volunteers have conducted the following activities. Students from Department of Mechanical Engineering are actively participating in NSS activities.

1. Cleaning up of the Selvapuram tank along with other Socially committed groups
2. Blood donation Awareness camp
3. Awareness program on “Smokefree Diwali”
4. Campus cleaning after Gokulashtami as a part of SWACCHTA PAKHWADA program
5. Rally and pledge taking on National Integrations as a part of Ekta Diwas day
6. Visit to Mission of Charity - Old age home
7. Visit to General Hospital Cancer ward as a part of Ashwin Maharaj foundation
8. APJ Abdul Kalam Birthday celebration as Youth awakening Day Rally

Report on the activities undertaken by Amrita Vishwa Vidyapeetham, Coimbatore as a part of the SWACCHTA PAKHWADA.

NSS Volunteers cleaned the campus a stretch of 3 km road (2017).


Students participation in NSS activities - 2017

- NSS UNIT 1 LAKE CLEANING ACTIVITY - UNTANGLING THE TANGLED!!
- Amrita Vishwa Vidyapeetham NSS student volunteers participated in cleaning drive of the Kumarasamy lake - Muthanna Kulam, near SBOA School, Coimbatore (21.01.2018).



Kumarasamy lake - Before cleaning | Cleaning activity | After cleaning

5 FACULTY INFORMATION AND CONTRIBUTIONS (200) Total Marks 196.55

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Sr. No	Name	PAN No.	University Degree	Date of Receiving Degree	Area of Specialization	Research Paper Publications	Ph.D Guidance	Faculty receiving Ph.D during the assessment year	Current Designation	Date (Designated as Prof / Assoc. Prof.)	Initial Date of Joining	Association Type	At present working with the Institution (Yes / No)	Date of Leaving	IS HOD?
1	THIRUMALINI S	ACRPT7932P	ME/M. Tech and PhD	08/02/2008	IC ENGINES,CFD	34	7	2	Professor	01/03/2008	01/10/1997	Regular	Yes		Yes
2	JOSHI C HARAN	AAOPH4121M	M.Sc. (Engineering) and PhD	25/01/2006	THERMAL ENGG.	6	0	0	Professor	22/06/1994	22/06/1994	Contractual	Yes		No
3	K.I.RAMACHANDRAN	ACJPR7255H	ME/M. Tech and PhD	13/07/1994	DESIGN ENGG.	49	6	3	Professor	01/12/2003	06/10/1994	Regular	Yes		No
4	SALEESHYA P G	AFDPG2283D	ME/M. Tech and PhD	28/02/2005	INDUSTRIAL ENGINEERING AND	41	8	1	Professor	01/01/2011	03/10/2006	Regular	Yes		No
5	RAMESHKUMAR K	ACIPR8028B	ME/M. Tech and PhD	21/09/2007	MANUFACTURING ENGG.	29	5	2	Professor	11/12/2017	11/12/2017	Regular	Yes		No
6	S.RAJU	APVPS3723A	M.E/M.Tech	30/06/1969	NVH	59	0	0	Professor	01/07/2011	01/07/2011	Contractual	Yes		No
7	ANBU UDAYASANKAR S P	AGTPA3252F	ME/M. Tech and PhD	04/02/2011	INDUSTRIAL ENGINEERING	48	6	0	Associate Professor	01/07/2011	04/02/2004	Regular	Yes		No
8	GOKULACHANDRAN J	AFKPG7512A	ME/M. Tech and PhD	24/05/2013	INDUSTRIAL ENGINEERING	19	1	0	Associate Professor	01/07/2013	19/08/1996	Regular	Yes		No
9	ARUL SANJIVI	ACKPA9116F	MS and PhD	13/04/2013	ROBOTICS,AUTOMATION,WELDING	42	6	0	Associate Professor	01/07/2013	10/03/1997	Regular	Yes		No
10	AJITH RAMESH	AQKPA9430A	MS and PhD	01/07/2009	FEEA ON SLIDING BEARINGS	14	3	0	Associate Professor	01/07/2014	01/08/2009	Regular	Yes		No
11	ILANGOVAN S	AAAPI9540F	ME/M. Tech and PhD	19/08/2013	PRODUCTION ENGINEERING	35	0	0	Associate Professor	01/07/2014	21/09/1998	Regular	Yes		No
12	RADHIKA N	AIPPR8923A	ME/M. Tech and PhD	07/03/2012	ENGINEERING DESIGN	45	2	0	Associate Professor	01/07/2015	27/07/2006	Regular	Yes		No
13	RAMU M	AGAPR9878F	ME/M. Tech and PhD	31/07/2014	MECHANICAL	65	6	0	Associate Professor	01/06/2016	01/06/2016	Regular	Yes		No
14	RATNA KISHORE VELAMATI	AJBPV5438K	ME/M. Tech and PhD	30/01/2010	COMBUSTION, CFD	48	4	1	Associate Professor	01/07/2016	18/01/2011	Regular	Yes		No
15	SAI MURUGAN M	AKJPM7578E	ME/M. Tech and PhD	23/09/2013	CONDITION MONITORING	27	1	1	Associate Professor	01/01/2018	16/09/2008	Regular	Yes		No
16	RAGHURAM P	AFBPR9027A	ME/M. Tech and PhD	23/03/2018	PRODUCTION ENGINEERING	8	3	0	Assistant Professor		19/05/1997	Regular	Yes		No
17	KRISHNAKUMAR P	AJPPK1197C	ME/M. Tech and PhD	25/01/2017	CIM	8	1	0	Assistant Professor		02/02/2000	Regular	Yes		No
18	SANTHOSH B	AOIPS4838N	ME/M. Tech and PhD	22/07/2015	MACHINE DYNAMICS, VIBRATIONS.	11	2	0	Assistant Professor		03/07/2000	Regular	Yes		No
19	PUSHPARAJAN M	AKNPM1939P	M.E/M.Tech	30/06/2010	ENGINEERING DESIGN	4	0	0	Assistant Professor		11/08/2000	Regular	Yes		No
20	LAKSHMI KANTHAN C	ABMPL6941J	M.E/M.Tech	30/07/2011	NVH, Design	9	0	0	Assistant Professor		26/04/1999	Regular	Yes		No
21	PRAKASH A S	AFVPA7017B	M.E/M.Tech	31/12/2009	PROPULSION ENGINEERING	1	0	0	Assistant Professor		29/05/2002	Regular	Yes		No

22	KARTHICK S	AYFPS7295A	M.E/M.Tech	31/12/2002	REFRIGERATION & A/C	4	0	0	Assistant Professor		19/01/2004	Regular	Yes		No
23	PADMANABAN R	AMUPP7731P	ME/M. Tech and PhD	12/07/2013	ENGINEERING DESIGN	61	2	0	Assistant Professor		01/10/2004	Regular	Yes		No
24	RAVIKUMAR SENGOTTUVEL	AHHPR4442H	M.E/M.Tech	31/05/2001	CAD/CAM	2	0	0	Assistant Professor		01/11/2004	Regular	Yes		No
25	SRIHARI.S	BOOPS6814R	ME/M. Tech and PhD	04/08/2018	IC ENGINES	18	1	0	Assistant Professor		23/07/2007	Regular	Yes		No
26	SAKTHIVEL N R	ATCPS9014R	ME/M. Tech and PhD	10/10/2013	ENGINEERING DESIGN	28	0	0	Assistant Professor		20/07/2007	Regular	Yes		No
27	SARAVANAN.R	BTYPS7790F	ME/M. Tech and PhD	22/08/2016	MATERIAL SCEINCE	10	0	0	Assistant Professor		20/07/2007	Regular	Yes		No
28	BALAJI K	ALOPB4082C	ME/M. Tech and PhD	18/08/2017	FLUID DYNAMICS	5	0	0	Assistant Professor		01/08/2007	Regular	Yes		No
29	SENTHILKUMAR DURAISAMY	BMJPS2519E	M.E/M.Tech	31/05/2004	IC ENGINES	9	0	0	Assistant Professor		16/06/2008	Regular	Yes		No
30	SARAVANA MURUGAN S	APLPS0699P	ME/M. Tech and PhD	07/04/2016	ENGINEERING DESIGN	8	0	0	Assistant Professor		23/06/2008	Regular	Yes		No
31	TAMILARASAN N	AKCPT9148E	M.E/M.Tech	31/07/2007	ENGINEERING DESIGN	5	0	0	Assistant Professor		18/08/2008	Regular	Yes		No
32	SUMESH A	CCPPS6744A	M.E/M.Tech	31/07/2006	MANUFACTURING ENGINEERING	15	0	0	Assistant Professor		20/08/2008	Regular	Yes		No
33	MAHADEVAN LAKSHMANAN	AGJPL0557C	M.E/M.Tech	24/09/2010	ENGINEERING STRUCTURES	6	0	0	Assistant Professor		28/07/2010	Regular	Yes		No
34	UNNIKRISHNAN.D	ABWPU7360C	M.E/M.Tech	27/07/2009	ENGINEERING DESIGN	5	0	0	Assistant Professor		01/11/2010	Regular	Yes		No
35	C.S. SUMESH	CDFPS3084J	M.E/M.Tech	02/02/2006	PRODUCTION ENIGEERING	5	0	0	Assistant Professor		08/08/2011	Regular	Yes		No
36	SATHISH KUMAR VENKATRAMAN	CCQPS1200L	M.E/M.Tech	30/05/2011	MANUFACTURING ENGINEERING	5	0	0	Assistant Professor		14/11/2011	Regular	Yes		No
37	SHANMUGASUNDARAM A	ANBPS6491F	M.E/M.Tech	30/06/2011	PRODUCT DESIGN&DEVELOPMENT	19	0	0	Assistant Professor		16/12/2011	Regular	Yes		No
38	ARUN A	ASWPA2817R	M.E/M.Tech	31/07/2012	INTEGRATED DESIGN &MFG	4	0	0	Assistant Professor		05/07/2012	Regular	Yes		No
39	DEVARAJAN K	AOEPD1578G	M.E/M.Tech	31/07/2012	VIBRATIONS	7	0	0	Assistant Professor		05/07/2012	Regular	Yes		No
40	BIPIN BALARAM	AUKPB4146Q	ME/M. Tech and PhD	31/03/2017	ENGINEERING DESIGN	8	2	0	Assistant Professor		13/08/2012	Regular	Yes		No
41	NANTHA KUMAR P	AQWPN3897J	M.E/M.Tech	30/04/2012	AUTOMOBILE ENGINEERING	2	0	0	Assistant Professor		22/08/2012	Regular	Yes		No
42	BABU NAMBOODIRI K	BHFPK1819N	M.E/M.Tech	28/06/2013	MECHANICAL ENGINEERING	4	0	0	Assistant Professor		09/07/2013	Regular	Yes		No
43	SRINIVAAS A	EDNPS8536K	M.E/M.Tech	30/04/2012	AUTOMOBILE ENGINEERING	10	0	0	Assistant Professor		15/07/2013	Regular	Yes		No
44	RAJESH V. R	AKLPR9999J	ME/M. Tech and PhD	03/07/2018	ENERGY, CRYOGENICS	9	0	0	Assistant Professor		15/07/2013	Regular	Yes		No
45	THENARASU M	ATOPT3640G	M.E/M.Tech	31/07/2013	MANUFACTURING ENGINEERING	4	0	0	Assistant Professor		17/07/2013	Regular	Yes		No

46	PRASAD M	AYBPP7006Q	M.E/M.Tech	30/05/2015	AUTOMOTIVE ENGINEERING	1	0	0	Assistant Professor		12/06/2015	Regular	Yes		No
47	GOVINDARAJU M	AGWPG4552D	ME/M. Tech and PhD	22/04/2015	METALLURGY & MATERIALS SCIENCE	37	4	0	Assistant Professor		19/07/2016	Regular	Yes		No
48	SIVANESAN M	ESPPS7799P	M.E/M.Tech	31/05/2013	IC ENGINES	5	0	0	Assistant Professor		03/04/2017	Regular	Yes		No
49	PRABHU S	ARAPP5664L	M.E/M.Tech	16/07/2010	THERMAL ENGG.	4	0	0	Assistant Professor		13/06/2018	Regular	Yes		No
50	SAKTHIVEL R	ECMPS4312D	ME/M. Tech and PhD	24/09/2018	THERMO CHEMICAL CONVERSTION OF BIOMASS, IC ENGINES, ALTERNATIVE FUELS	12	0	0	Assistant Professor		13/06/2018	Regular	Yes		No
51	MOHANRAJ T	AXGPM2305R	ME/M. Tech and PhD	02/03/2018	MECHATRONICS, ROBOTIC AUTOMATION	15	0	0	Assistant Professor		28/06/2018	Regular	Yes		No
52	SATISH KUMAR T	DMCPS4820M	ME/M. Tech and PhD	01/11/2016	COMPOSITES,METALLURGY	22	0	0	Assistant Professor		20/05/2019	Regular	Yes		No
53	THIRUGNANASAMBANTHAM K G	ANMPT4120D	ME/M. Tech and PhD	01/06/2016	TRIBOLOGY, SURFACE MODIFICATION/COATINGS	10	0	0	Assistant Professor		03/06/2019	Regular	Yes		No
54	VAIRA VIGNESH R	ANQPV3226L	ME/M. Tech and PhD	02/09/2019	SOLID STATE WELDING & PROCESSING, FRICTION STIR PROCESSING, CORROSION	28	0	0	Assistant Professor		01/07/2019	Regular	Yes		No
55	JAYANTH N	BCFPJ7505K	M.E/M.Tech	01/04/2015	ADDITIVE MANUFACTURING	3	0	0	Assistant Professor		08/07/2019	Regular	Yes		No
56	MALLIKARJUNA B	BIWPM5439G	M.E/M.Tech	02/09/2013	ADDITIVE MANUFACTURING	3	0	0	Assistant Professor		19/08/2019	Regular	Yes		No
57	ELANGOVAN M	AABPE8259J	ME/M. Tech and PhD	16/06/2012	PRODUCT DESIGN/CAD/CAM	19	0	0	Professor	01/07/2004	15/11/2000	Regular	No	28/02/2019	No
58	SELLAMUTHU R	ACDPR5201R	ME/M. Tech and PhD	31/12/1979	MATERIALS, CASTING & WELDING	36	4	0	Professor	03/01/1997	03/01/1997	Contractual	No	30/06/2018	No
59	SATHEESHKUMAR V	AYIPV4113F	ME/M. Tech and PhD	27/04/2015	MANUFACTURING ENGG.	16	0	0	Assistant Professor		03/08/2015	Regular	No	02/04/2018	No
60	PARTHASARATHY P	BSGPP2408A	ME/M. Tech and PhD	30/09/2014	HEAT TRANSFER	10	0	0	Assistant Professor		18/07/2016	Regular	No	20/06/2018	No
61	DEEPAK SELVAKUMAR R	BUQPD0454A	M.E/M.Tech	30/06/2012	MANUFACTURING SYSTEM MANAGEMENT	0	0	0	Assistant Professor		17/08/2017	Regular	No	01/11/2018	No
62	PARVATHY UNNIKRISHNAN	ACEPU4801D	M.E/M.Tech	29/06/2013	ENGINEERING DESIGN	2	0	0	Assistant Professor		22/07/2016	Regular	No	27/09/2017	No
63	RAUSHAN KUMAR	HCRPK1926F	B.E/B.Tech	01/07/2010	COMPUTATIONAL FLUID DYNAMICS	1	0	0	Assistant Professor		28/03/2019	Regular	Yes		No
64	E A GOPALA KRISHNAAN	ANNPG8101G	ME/M. Tech and PhD	22/07/2016	ENGINEERING DESIGN	22	3	0	Assistant Professor		02/05/2016	Regular	Yes		No

5.1 Student-Faculty Ratio (SFR) (20) Total Marks 20.00

Institute Marks : 20

UG

No. of UG Programs in the Department 1

B.Tech – Mechanical Engineering						
Year of Study	CAY (2019-20)		CAYm1 (2018-19)		CAYm2 (2017-18)	
	Sanction Intake	Actual admitted through lateral entry students	Sanction Intake	Actual admitted through lateral entry students	Sanction Intake	Actual admitted through lateral entry students
2nd Year	180	0	240	0	180	0
3rd Year	240	0	180	0	180	0
4th Year	180	0	180	0	180	0
Sub-Total	**600**	**0**	**600**	**0**	**540**	**0**
Total	**600**		**600**		**540**	
Grand Total	600		600		540	

PG

No. of PG Programs in the Department 3

M.Tech - Automotive Engineering			
Year of Study	CAY(2019-20)	CAYm1(2018-19)	CAYm2 (2017-18)
	Sanction Intake	Sanction Intake	Sanction Intake
1st Year	30	30	30
2nd Year	30	30	30
Total	**60**	**60**	**60**

M.Tech - Engineering Design			
Year of Study	CAY(2019-20)	CAYm1(2018-19)	CAYm2 (2017-18)
	Sanction Intake	Sanction Intake	Sanction Intake
1st Year	30	30	30
2nd Year	30	30	30
Total	**60**	**60**	**60**

M.Tech - Manufacturing Engineering			
Year of Study	CAY(2019-20)	CAYm1(2018-19)	CAYm2 (2017-18)
	Sanction Intake	Sanction Intake	Sanction Intake
1st Year	30	30	30
2nd Year	30	30	30
Total	**60**	**60**	**60**
Grand Total	180	180	180

SFR

No. of UG Programs in the Department 1

No. of PG Programs in the Department 3

Description	CAY(2019-20)	CAYm1 (2018-19)	CAYm2 (2017-18)
Total No. of Students in the Department(S)	780 **Sum total of all (UG+PG) students**	780 **Sum total of all (UG+PG) students**	720 **Sum total of all (UG+PG) students**
No. of Faculty in the Department(F)	57 **F1**	52 **F2**	52 **F3**
Description	**CAY(2019-20)**	**CAYm1 (2018-19)**	**CAYm2 (2017-18)**
Student Faculty Ratio(SFR)	13.68 **SFR1=S1/F1**	13.85 **SFR2=S2/F2**	15.00 **SFR3=S3/F3**
Average SFR	14.18 **SFR=(SFR1+SFR2+SFR3)/3**		
F=Total Number of Faculty Members in the Department (excluding first year faculty)			

Note: 75% should be Regular/full time faculty and the remaining shall be Contractual Faculty/Adjust Faculty/Resource persons from industry as per AICTE norms and standards. The contractual faculty will be considered for assessment only if a faculty is drawing a salary as prescribed by the concerened State Government for the contractual faculty in the respective cadre.

5.1.1. Provide the information about the regular and contractual faculty as per the format mentioned below:

	Total number of regular faculty in the department	Total number of contractual faculty in the department
CAY(2019-20)	55	2
CAYm1(2018-19)	50	2
CAYm2(2017-18)	49	3

Average SFR for three assessment years : 14.18

Assessment SFR : 20

5.2 Faculty Cadre Proportion (20)

Total Marks 20.00

Institute Marks : 20.00

Year	Professors		Associate Professors		Assistant Professors	
	Required F1	Available	Required F2	Available	Required F3	Available
CAY(2019-20)	4.00	4.00	8.00	9.00	26.00	42.00
CAYm1(2018-19)	4.00	4.00	8.00	9.00	26.00	37.00
CAYm2(2017-18)	4.00	4.00	8.00	8.00	24.00	37.00
Average Numbers	4.00	4.00	8.00	8.67	25.33	38.67

Cadre Ratio Marks [(AF1 / RF1) + [(AF2 / RF2) * 0.6] + [(AF3 / RF3) * 0.4]] * 10 : 20.00

5.3 Faculty Qualification (20)

Total Marks 20.00

Institute Marks : 20.00

	X	Y	F	FQ = 2 x [(10X + 4Y) / F)]
2019-20(CAY)	31	26	38.00	21.79
2018-19(CAYm1)	28	24	38.00	19.79
2017-18(CAYm2)	26	26	36.00	20.22

Average Assessment : 20.60

5.4 Faculty Retention (10)

Total Marks 10.00

Institute Marks : 10.00

Description	2018-19 (CAYm1)	2019-20 (CAY)
No of Faculty Retained	46	46
Total No of Faculty	49	49
% of Faculty Retained	94	94

Average : 94.00

Assessment Marks : 10.00

5.5 Faculty competencies in correlation to Program Specific Criteria (10)

Total Marks 10.00

Institute Marks : 10.00

The Department of Mechanical Engineering has twelve specialized research groups. The outcome of the research will improve the effectiveness of teaching-learning process. Faculty members of the Department are actively involved in presenting papers, attending workshops / seminars and publishing book chapters / research articles in various peer-reviewed conferences and Journals. Faculty members are involved in the development of curriculum and syllabi. Faculty members are actively interacting with industries / institutes. Faculty competencies in correlation to Program Specific Criteria are given in Table 5.1.

S.No.	Area of specialization	Expert Members	Specialization	Publications
1.	Integrated Machine Health Monitoring (IMHM)	Dr.M.Saimurugan	Machine Condition Monitoring	27
		Dr.K.Rameshkumar	Manufacturing process monitoring	26
		Dr.P.Krishna Kumar	Tool wear Monitoring	8
		Mr.A.Sumesh	Weld quality monitoring	13
		Prof.K.I.Ramachandran	Fault diagnosis, Biomechanics, Signal and Image Processing	41
2.	Computational Nonlinear Dynamics and Vibrations	Dr.B.Santhosh	Machine Design and Dynamics	11
		Dr.Bipin Balaram	Machine Design	8
		Mr.K.Devarajan	Engineering Design	6
		Mr.M.Pushparajan	Engineering Design	3
		Dr.E.A.Gopalakrishnan	Engineering Design	22
3.	Exergy Studies	Dr.K.Balaji	Thermal Engineering	3
		Mr.P.Raghuram	Lean and exergy, Human Exergy Studies	1
4.	Alternate Energy Conversion Technologies	Dr.V.Ratna Kishore	Thermal Engineering	48
		Mr.S.Karthick	Refrigeration and Air-conditioning	4
		Mr.A.S.Prakash	Propulsion Engg.	1
		Mr.K.BabuNamboothiri	Thermal Engineering(R&AC)	5
		Mr.V.R.Rajesh	Energy Engineering	9
		Mr.S.Prabhu	Internal Combustion engines, Computational fluid dynamics	4
		Mr.Raushan Kumar	Computational Fluid Dynamics	6
5.	Computational Solid Mechanics	Dr.Ajith Ramesh	Computational Solid Mechanics	13
		Dr.S.SaravanaMurugan	Engineering Design	7
		Dr.N.R.Sakthivel	Engineering Design	25
		Mr.C.S.Sumesh	Production Engg., FEA, Numerical Modeling of Manufacturing Processes	5
		Mr.Unnikrishnan D	Engineering Design	5
		Mr.A.Arun	Integrated Design and Manufacturing	4
		Mr.Mahadevan Laxmanan	Engineering Design	6
6.	Industrial Engineering	Dr.P.G.Saleeshya	Industrial Engineering	41
		Dr.P.Raghuram	Manufacturing, Supply chain management	26
7.	Surface Engineering &Cryogenic Materials Processing	Dr.Sanjivi Arul	Materials Science, Automation and Robotics	37
		Dr.R.Saravanan	Material Science, Surface Engineering, Casting, Manufacturing processes	10

S.No.	Area of specialization	Expert Members	Specialization	Publications
		Dr.S.Ilangovan	Production and Materials Engineering	28
		Mr.A.Shanmugasundaram	Composite Materials, Surface Composite	18
8.	Light Weight & Smart Materials	Dr.R.Padmanaban	Welding and joining, Numerical simulation	62
		Dr.N.Radhika	Composite materials, Functionally graded materials, Heat treatment process, Optimization Techniques.	45
		Dr.M.Ramu	Additive Manufacturing, Engineering Design	60
		Dr.M.Govindaraju	Advanced Joining process, Material processing and Metallurgy	20
		Mr.N.Tamilarasan	Smart materials and structures	5
		Dr.R.VairaVignesh	Friction Stir Processing, Mg Alloys, Surface Composites, Material Characterization	47
		Dr.T.Satishkumar	Metal Matrix composites, Heat treatment and wear	22
		Dr.K.G.Thirugnanasambantham	Tribology	10
		Mr.N.Jayanth	Additive Manufacturing	5
		Mr.B.Mallikarjuna	Additive Manufacturing	5
9.	IC Engines & NVH Studies	Dr.S.Thirumalini	IC Engines	28
		Mr.C.Lakshmikanthan	Noise Vibration and Harshness – Automotive Engineering	9
		Dr.S.Srihari	IC Engines, Thermal Engineering	18
		Mr.D.Senthilkumar	Thermal Power	8
		Mr.P.Nanthakumar	Automobile	2
		Mr.A.Srinivaas	Automobile Engineering	10
		Mr.M.Sivanesan	Automotive & Thermal Engineering	5
		Mr.M.Prasad	Automotive Engineering	1
		Dr.R.Sakthivel	Thermal Engineering	26
10.	Atomization and sprays	Dr.K.Balaji	Thermo-fluids	5
		Mr.S.Karthick		2
11.	Robotics and Automation	Dr.T.Mohanraj	Mechatronics	10
12.	Logistics and supply chain management	S.P.Anbuudayasanker	Industrial Engineering	84
		Mr.V.R.Sathish Kumar	Industrial Engineering	5
		Mr.M.Thenarasu	Production & Industrial Engineering	4
		Dr.J.Gokulachandran	Industrial Engineering	16

Table 5.1. Faculty competencies in correlation to Program Specific Criteria

5.6 Innovations by the Faculty in Teaching and Learning (10) Total Marks 10.00

5.7 Faculty as participants in Faculty development/training activities/STTPs (15) Total Marks 11.55

Institute Marks : 11.55

Name of the faculty	Max 5 Per Faculty		
	2018-19(CAYm1)	2017-18(CAYm2)	2016-17(CAYm3)
Dr.Sanjivi Arul	0.00	5.00	3.00
Mr.D.Senthilkumar	0.00	3.00	3.00
Mr.A.Sumesh	0.00	0.00	5.00
Dr.P.Krishnakumar	0.00	0.00	3.00
Mr.A.Srinivaas	3.00	5.00	5.00
Mr.P.Nanthakumar	5.00	5.00	5.00
Dr.B.Santhosh	0.00	5.00	3.00
Dr.Bipin Balaram	0.00	5.00	3.00
Dr.P.Raghuram	5.00	0.00	3.00
Mr.K.Devarajan	0.00	0.00	3.00
Dr.S.Saravana Murugan	0.00	0.00	3.00
Dr.S.Thirumalini	5.00	0.00	3.00
Dr.M.Elangovan	0.00	0.00	3.00
Dr.Ajith Ramesh	0.00	5.00	3.00
Dr.N.Radhika	0.00	0.00	3.00
Dr.M.Ramu	5.00	3.00	5.00
Dr.R.Padmanaban	0.00	0.00	5.00
Dr.M.Govindaraju	0.00	0.00	5.00
Dr.P.Parthasarathy	0.00	5.00	3.00
Mr.A.Shanmugasundaram	0.00	0.00	3.00
Mr.M.Thenarasu	3.00	0.00	3.00
Mr.K.BabuNamboothiri	0.00	5.00	3.00
Mr.C.Lakshmikanthan	3.00	5.00	5.00
Mr.S.Ravikumar	0.00	5.00	3.00
Dr.R.Saravanan	0.00	5.00	0.00

Mr.M.Sivanesan	0.00	5.00	0.00
Mr.M.Prasad	5.00	5.00	0.00
Mr.DeepakSelvakumar	0.00	5.00	0.00
Dr.S.Srihari	5.00	5.00	0.00
Mr.S.Karthick	0.00	3.00	0.00
Dr.K.Balaji	3.00	5.00	5.00
Mr.Unnikrishanan D	0.00	5.00	0.00
Mr.C.S.Sumesh	0.00	5.00	0.00
Mr.A.Arun	0.00	5.00	0.00
Dr.V.Ratna Kishore	0.00	5.00	0.00
Dr.K.Ramesh Kumar	5.00	3.00	0.00
Dr.S.P.Anbuudayasankar	3.00	5.00	0.00
Dr.T.Mohanraj	3.00	0.00	0.00
Dr.R.Sakthivel	3.00	0.00	0.00
Mr.S.Prabhu	3.00	0.00	0.00
Dr.N.R.Sakthivel	3.00	0.00	0.00
Mr.V.R.Sathishkumar	0.00	3.00	0.00
Dr.P.G.Saleeshya	0.00	3.00	5.00
Mr.N.Tamilarasan	3.00	5.00	3.00
Sum	65.00	128.00	99.00
RF = Number of Faculty required to comply with 15:1 Student Faculty Ratioas per 5.1	52.00	52.00	48.00
Assessment [3*(Sum / 0.5RF)]	7.50	14.77	12.38

Average assessment over 3 years: 11.55

5.8 Research and Development (75) Total Marks 75.00

5.8.1 Academic Research (20)

Institute Marks : 20.00

A. Number of quality publications in refereed/SCI/Scopus Journals, Books/Book Chapters, etc.

*Details of publications are available in the department office.

B. Ph.D awarded during the assessment period while working in the institute

S.No.	Reg.No.	Name of the scholar	Name of the Guide / Co-Guide	Name of the Thesis	Area of Research	Date of Viva-Voce examination / Award of degree
2016-17						
1	CB.EN.D*MEE11005	Cherian Paul	Dr.R.Sellamuthu	Development of surface modified Cu-Sn Bronze alloys and determination of their hardness wear rate and coefficient of friction	Material Science	01.08.2016 / 21.08.2016
2	CB.EN.D*MEE09003	R.Saravanan	Dr.R.Sellamuthu	Surface Modification Al-Si-Mg alloy and determination of Microstructure, Hardness and wear rate	Material Science	16.08.2016 / 21.08.2016
3	CB.EN.D*MEE10001	S.K.Sreekala	Dr.S.Thirumalini	Investigation of Flow Performance,Cage Configurationand Aerodynamic Noise Evaluation In Globe Valves	Fluid Mechanics	21.12.2016 / 23.09.2017
4	CB.EN.D*MEE13002	Karthik V Shankar	Dr.R.Sellamuthu	Development of high strength Cu-Based spinodal alloys cast metal mould	Material Science	20.02.2017 / 23.09.2017
5	0130703108	P.Krishna Kumar	Dr.K.I.Ramachandran/ Dr.K.Rameshkumar	Vibration and Acoustic Emission (AE) based Tool Condition Monitoring in High Speed Machining (HSM) of Titanium alloy (Ti-6Al-4V) Using Machine Learning Algorithms	High Speed Machining	25.01.2017 / 23.09.2017
2017-18						
6	CB.EN.D*MEE13001	Nidhin Raj	Dr.R.Sellamuthu	An Investigation on the effect of Ni and Si addition on the Microstructure, Hardness, Tensile Properties and wear rate of Al-8Si-0.4Mg alloy cast in metal mould	Material Science	03.07.2017 / 23.09.2017
7	CB.EN.D*MEE09001	K.Balaji	Dr.V.Sivadas	Experimental studies of sprays generated by twin fluid atomizer utilizing active controls strategy under ambient condition	Characterization of twin fluid atomizers	19.08.2017 / 18.08.2018
8	CB.EN.D*MEE08002	P.Raghuram	Dr.PG.Saleeshya	Modeling assessment of Supply Chain Responsiveness	Supply Chain Management	23.03.2018 / 18.08.2018
2018-19						

S.No.	Reg.No.	Name of the scholar	Name of the Guide / Co-Guide	Name of the Thesis	Area of Research	Date of Viva-Voce examination / Award of degree
9	CB.EN.D*MEE09002	S.Srihari	Dr.S.Thirumalini	Investigation on Combustion and emission characteristics of PCCI-DI Engine using Biodiesel and oxygenated fuel additives	IC Engines	04.08.2018 / 18.08.2019
10	CB.EN.D*MEE13003	T.Praveen Kumar	Dr.M.Saimurugan / Dr.K.I.Ramachandran	Fault Diagnosis of Automotive Gearbox Based on Signal Processing Using Machine Learning Techniques	Machine Condition Monitoring	14.06.2019 / 31.08.2019
2019-20						
11	CB.EN.D*MEE15002	R.VairaVignesh	Dr.R.Padmanaban	Synthesis of Magnesium alloy surface composites by friction stir processing	Friction stir welding	07.09.2019 / 31.08.2019
12	CB.EN.D*MEE15004	E.V.Jithin	Dr.V.Ratnakishore	Measurement of burning velocities of hydrocarbon hydrogen mixtures and application to premixed laminar burner design	Combustion	29.11.2019 / 15.12.2019
13	CB.EN.D*MEE09004	A.Sumesh	Dr.K.Rameshkumar	Signature Analysis of Current and Voltage in GMAW-P Process for Weld defect Monitoring	Welding signature analysis	05.12.2019 / 15.12.2019

5.8.1.2 Number of Citations

Total number of citations (year-wise) for the publications done by the faculty members of the department are shown below:

Year	2014	2015	2016	2017	2018	2019
Total No. of Citations	177	311	377	677	1356	1736

5.8.2 Sponsored Research (20)

Institute Marks : 20.00

2018-19 (CAYm1)

Project Title	Duration	Funding Agency	Amount(in Rupees)
Development, field trials	3 years	DST	42300100.00
			Total Amount(X): 42300100.00

2017-18 (CAYm2)

Project Title	Duration	Funding Agency	Amount(in Rupees)
Processing and charact	2 years	ARDB	1865000.00
Development of braze jo	2 years	DOS (RESPOND Scher	2506000.00
Power train technology	5 years	DST-FIST	14750000.00
			Total Amount(Y): 19121000.00

2016-17 (CAYm3)

Project Title	Duration	Funding Agency	Amount(in Rupees)
Development of Laser S	3 years	DSR - TSDP (ARCI Pro	4040000.00
Measurement of burning	3 years	DST SERB	2492155.00
Synthesis and Characte	2 years	DRDO	1130000.00
A low cost hand and arr	2 years	DST	2262000.00
			Total Amount(Z): 9924155.00

Cumulative Amount(X + Y + Z) = 71345255.00

5.8.3 Development activities (15)

Institute Marks : 15.00

a) Product Development

Various products developed by the faculty and members with the assistance of students of the department are described in this section.

1. Name of the product: Smart Dust Bin

Faculty members involved: Dr.Sanjivi Arul

The smart dust bin utilizes an ultrasonic sensor for the opening and closing upon detection of human hand.

Smart Dust Bin

Name of the product: Soil Moisture Level Controller

Faculty members involved: Dr.Sanjivi Arul

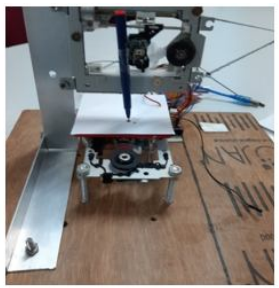
The soil moisture level controller reduces the human effort of watering the plants during our busy day by using a soil moisture sensor and switch the water pump ON when the soil moisture goes below a set value.

Soil Moisture Level Controller

3. **Name of the product: Laser Engraver prototype**

Faculty members involved: Dr.Sanjivi Arul

The engraver reproduces a given image file on wood using an Arduino controller and Benbox software. In this prototype a pen is used instead of a laser gun and it can reproduce an image on a paper.



Laser Engraver prototype

4. **Name of the product: Bottle Sorting Machine**

Faculty members involved: Dr.Sanjivi Arul

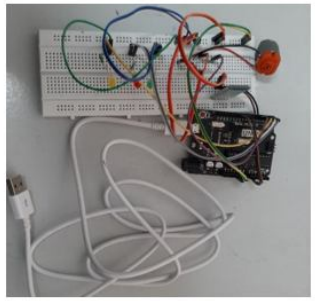
The bottle sorting machine can sort bottles of different heights. The bottles arriving on a conveyor are ejected out of the line to bins based on the bottles' height, using infrared sensors, solenoid and an Arduino controller.

Bottle Sorting Machine

5. **Name of the product: Voice Controlled Home Automation System**

Faculty members involved: Dr.Sanjivi Arul

The Voice Controlled Home Automation System controls light and fans using voice commands through a mobile phone connected via Bluetooth. Ardunio Controller is used to control the system.



Voice Controlled Home Automation System

6. Name of the product: Voice based wheel chair controller (Prototype)

Faculty members involved: Dr.Sanjivi Arul

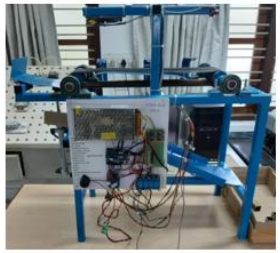
The Voice based wheelchair controller controls two motors, one for driving the wheelchair and another for steering, using voice commands through a mobile phone connected via Bluetooth. Ardunio Controller is used to control the system.

Voice based wheelchair controller

7. Name of the product: Automated Lacquer Coating Machine Prototype

Faculty members involved: Dr.Sanjivi Arul

This is Arduino controlled coating machine prototype. There are three stations, heating, lacquer application and drying in this machine. The product to be coated is identified in each station using infrared sensors while it arrives through a belt conveyor. The conveyor stops when the product reaches the stations. Once the heating, coating and drying process is over, a pneumatic cylinder ejects the finished product into a chute and the cycle continues.



Automated Lacquer Coating Machine Prototype

8. Name of the product: Vending machine prototype

Faculty members involved: Dr.Sanjivi Arul

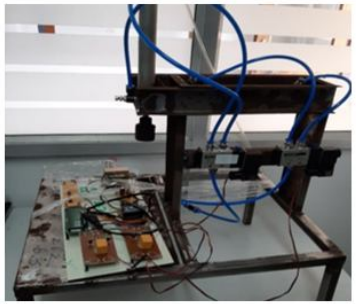
This is Arduino controlled vending machine. There are three items to be supplied through order. The order process is initiated using an RFID card and password. The user then presses a button for the item required. The solenoid pushes the item from the chute to the delivery tray, which arrives to the delivery point. Once the delivery is done, the tray moves to a washing area and is ready for the next cycle. The automation was achieved using three Arduino controllers, solenoids, water pumps, infrared sensors and motors.

Vending machine prototype

9. **Name of the product: Pneumatic Stamping Machine using Arduino Controller**

Faculty members involved: Dr.Sanjivi Arul

This stamping machine stamps on any surface automatically using a Arduino Nano controller, pneumatic cylinder, solinoid etc. The numbers of cycles are specified at the beginning. When the start button is pressed a pneumatic cylinder extends and the stamp is inked followed by a second cylinder stamps on the required surface.



Pneumatic Stamping Machine using Arduino Controller

10. Name of the product: Design and fabrication of a blanking die

Faculty members involved: Dr. A. Sumesh and Mr.A. Shanmugasundaram

Blanking die is developed for forming a cup in hydraulic / Mechanical press available in the press shop

Name of the product: Development of solid state -friction welding of cast iron and phosphor bronze

Faculty members involved: Dr. A. Sumesh and Mr.A. Shanmugasundaram

There is sometimes a need to fabricate machine parts, products that have the best properties of multiple materials while being economical at the same time. A prime example of such a scenario is with gears. Gears made out of cast iron are a poor choice because cast iron has poor impact resistance and is vulnerable to corrosion. The addition of phosphor bronze as an annulus to the cast iron hub in a composite gear provides the gear with those valuable resistances along with a superior intermeshing with mated gears. However, joining dissimilar materials such as cast iron to phosphor bronze is challenging when conventional welding techniques are employed. To overcome it, applying solid state friction welding to join cast iron to phosphor bronze is focused in this thesis. The obtained results are analyzed and optimized for this particular combination of materials to facilitate their use in gears. The results show that there is an increased accumulation of graphite at the weld joints between cast iron and phosphor bronze for trials at higher (rotational) welding speeds, which leads to less favorable mechanical properties. At lower welding speeds, sound joints with acceptable mechanical and metallurgical properties were obtained.

11. Name of the product: Development of solid state -friction welding of cast iron and phosphor bronze

Faculty members involved: Dr. A. Sumesh and Mr.A. Shanmugasundaram

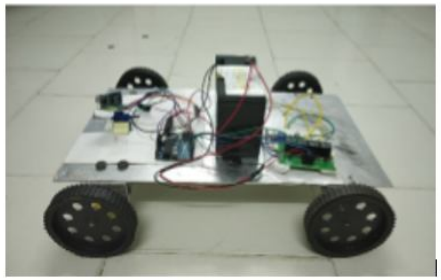
There is sometimes a need to fabricate machine parts, products that have the best properties of multiple materials while being economical at the same time. A prime example of such a scenario is with gears. Gears made out of cast iron are a poor choice because cast iron has poor impact resistance and is vulnerable to corrosion. The addition of phosphor bronze as an annulus to the cast iron hub in a composite gear provides the gear with those valuable resistances along with a superior intermeshing with mated gears. However, joining dissimilar materials such as cast iron to phosphor bronze is challenging when conventional welding techniques are employed. To overcome it, applying solid state friction welding to join cast iron to phosphor bronze is focused in this thesis. The obtained results are analyzed and optimized for this particular combination of materials to facilitate their use in gears. The results show that there is an increased accumulation of graphite at the weld joints between cast iron and phosphor bronze for trials at higher (rotational) welding speeds, which leads to less favorable mechanical properties. At lower welding speeds, sound joints with acceptable mechanical and metallurgical properties were obtained. The parameters are optimized and the pilot scale product using the optimized parameters were developed and demonstrated. The product developed using the process is show in Figure given below:

Solid state -friction welding of cast iron and phosphor bronze

12. Name of the product: Design and development of a compact autonomous vehicle

Faculty members involved:Dr S Thirumalini and Dr M Ramu

Designed and fabricated an autonomous vehicle with 40kg weight carrying capacity with 1m track width × 1.5m length. The product is shown in the Figure given below:



Compact autonomous vehicle

Compact autonomous vehicle

Features:

· Navigation to predefined location

· Carry a maximum payload of 5kg

· Obstacle detection

· Tracks the distance covered

13. Name of the product: Design and development of a mobile exercising machine

Faculty members involved: Dr S Thirumalini and Dr M Ramu

A comfortable, affordable and mobile exercise machine for use in closed community like parks, beach and so on. Details are shown in the Figure given below:

Mobile exercising machine

Features:

● Chainless Drive

● Weightless and Very low maintenance cost

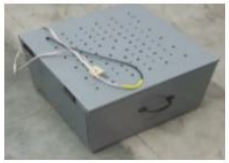
● Comfortable seating position

● Addition of auxiliary features are easy

14. Name of the product: Design and development of a low cost portable air purifier

Faculty members involved: Dr S Thirumalini and Dr M Ramu

A device that removes air contaminants to improve air quality and provide comfort for indoor conditions. Details are shown in Figure given below:



Low cost portable air purifier

Features:

· Low cost

· Portable

· Compact size

· Less weight

· Easy to manufacture

· Provision for easy maintenance

15. Name of the product: Development of a wheel chair to bed transfer assist system

Faculty members involved: Dr S Thirumalini and Dr M Ramu

Features:

· Convertible into bed from wheel chair and vice versa

· Height adjustment&Easy transfer from wheel chair to bed or vice versa

The photograph of the product is shown in the Figure given below:

Development of a wheel chair to bed transfer assist system

16. Name of the product: Development of functionally graded aluminium and copper composite

Faculty members involved: Dr. N. Radhika

- Functionally graded materials with high mechanical strength and high abrasive wear resistance properties are developed by reinforcing the hard reinforcements through the centrifugal casting process.
- The attainment of desired property in the selective region of composite is achieved by single step centrifugal casting process and therefore this process becomes very cost effective.
- These FGMs can be effectively utilized for the applications where light weight, better mechanical properties and high wear resistance are very essential.
- The FGMs can be used as the thermal barriers in structures of aerospace applications, wear-resistant linings for handling large heavy abrasive ore particles, cylinder blocks, cylinder liners and brake disc.
- Copper FGMs can be effectively used in bearings and bushes applications where wear becomes a major consideration

Details of the products developed are shown in the Figure given below:

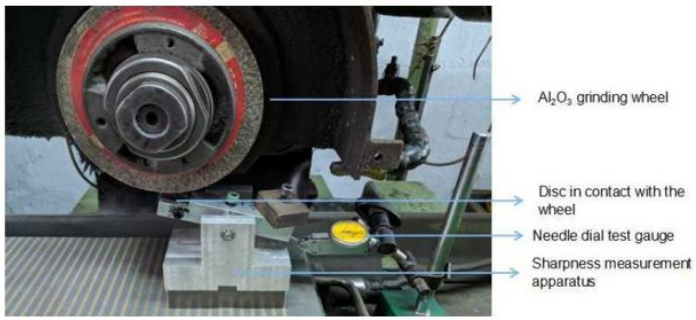
Aluminium FGM for cylinder liners

Copper FGM for bearings and bushes

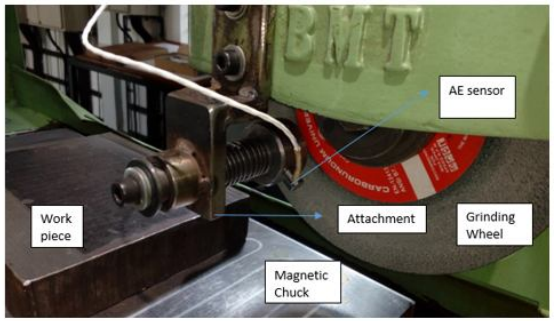
17. **Name of the product:** Grinding wheel sharpness measurement device and attachment for acquiring AE signals from the grinding wheel

Faculty members involved: Dr. K. Rameshkumar, D. S. B. Mouli (MTech student), Rahul Sree Kumar, and J. Revant (B. Tech students)

The devise is used for measuring the sharpness of the grinding wheel. It is attached with the surface grinding machine.



Sharpness measurement device



AE sensor attachment device

18. Title of the project: Miniature Acoustic Atomizer (MAA)

Faculty members involved: Dr. Vayalakkara Sivadas – Associate Professor, Aerospace Engineering, Dr. K Balaji – Assistant Professor (SG) – Mechanical Engineering

The present atomizer design is scaling down the atomizer based on the acoustic number concept. The conventional approach of perturbing the liquid column by an acoustic source, preferably a compression driver (standard loud-speaker), with an optimum frequency dictates the process. In doing so, efficient breakup of the liquid column, and subsequent generation of fine droplets at a short distance from the injector outlet can be realized. The simple design of this system leads to its easy operation in the practical domain. However, the optimum frequency of the sound wave that has pronounced effect on the liquid disintegration strongly depend on the specific atomizer cavity and the acoustic power. In other words, the resonant frequency is not known a priori. Therefore, fine tuning of acoustic behavior is a prerequisite in the atomizer design.

Miniature Acoustic Atomizer

b. Research laboratories

Research laboratories established in the department to carry out research activities are detailed in this section.

Tribology Research Laboratory
PI:Dr.N.Radhika

Research activities:

- Functionally graded materials with high mechanical strength and high abrasive wear resistance properties are developed by reinforcing the hard reinforcements through the centrifugal casting process.
- The attainment of desired property in the selective region of composite is achieved by single step centrifugal casting process and therefore this process becomes very cost effective.
- These FGMs can be effectively utilized for the applications where light weight, better mechanical properties and high wear resistance are very essential.

- The FGMs can be used as the thermal barriers in structures of aerospace applications, wear-resistant linings for handling large heavy abrasive ore particles, cylinder blocks, cylinder liners and brake disc.
- Copper FGMs can be effectively used in bearings and bushes applications where wear becomes a major consideration

DST grant: Development of Functionally-Graded Aluminium Metal Matrix Composites and to investigate the Mechanical and Tribological Properties

DRDO grant: Synthesis and Characterization of Functionally Graded Copper Metal Matrix Composites

ARDB grant: Processing and Characterization of Heat Treated Functionally Graded (A359) Aluminium Composites for Aerospace Applications

Facilities:

- Centrifugal Casting Machine
- Electric Resistance Furnace
- Dry Abrasion Tester
- Copper Melting Furnace
- Heat treatment furnace
- Linear Reciprocating tribometer

Publications: 20 International journal papers

Amrita Automotive Research & Technology Centre

Dr.S.Thirumalini – Head;

Prof.S.Raju – Advisor

Members – Prof.C.Lakshmikanthan, Dr.S.Srihari,

Prof.D.Senthilkumar,

Prof.A.Srinivaas,

Prof.P.Nanthakumar,

Prof.M.Sivanesan,

Prof.M.Prasad,

Dr.J.Gokulachandran.

- DST - FIST
- DST-TSDP project in collaboration with International Advanced Research Center for Powder Metallurgy and New Materials (ARCI)

Facilities:

Eddy Current Dynos : Range: 39kW to 500kW

AC Dyno, Max power:168 kW , Max Torque : 353 Nm, Speed:0 -10000 RPM

Emission systems, Chassis Dynamometer

- NVH facilities

Research Domain:

Engines, Hybrid-Electric Engines, Alternate fuel, Emission studies, Noise, Vibration & Acoustics studies, Psychoacoustics studies, Vehicle dynamics, ADAS, Parametric studies & optimization, Life-cycle assessment, Low temperature combustion studies etc.,

Work Carried out:

- Performance and emission characteristics of low heat rejection engine fuelled with Biodiesel
- Experimental Investigation on performance and emission characteristics of DI diesel engine fuel blended with tyre pyrolysis oil and Di phenyl ether
- Design and Analysis of Engine Mount System for a Formula Student Vehicle
- Experimental study on the performance and emission characteristics of SI engine with ethers
- Experimental investigation of diesel engine fuelled with cotton seed oil and anti NOx agents.
- Performance and emission characteristics of fuel from plastic waste
- Effect of Antioxidants on the performance and emission characteristics of a CI engine fuelled by waste cooking biodiesel
- Heat release rate analysis of diesel water emulsion
- Investigation on performance, emission of RCCI duel fuel combustion by direct injection
- An experimental study on PCCI-DI engine fuelled with diesel and biodiesel blends
- Obstacle warning system via camera module
- Assessment and improvising driver seat comfort in a farm equipment
- Novel ignition system for lean burn combustion engines
- Emission modeling of commercial vehicle engines
- Determination of Acoustic Performance for different types of Expansion Chamber
- Comparison of performance and emission attributes of neem-ethanol-diesel blends with and without EGR in single cylinder diesel engine using pilot injection
- Influence of variable injection pressure and split injection on combustion and emission behavior of an engine with diesel-biodiesel blends
- Engine test cell noise measurement and attenuation
- Vibration analysis of coiled springs
- Machine learning approach for prediction of diesel engine performance using artificial neural network.
- Effect of EGR and injection timing on performance and emission characteristics of a CI engine using methanol diesel blends
- Design and fabrication of EGR and optimization of the emission characteristics of single cylinder CI engine.
- Thermodynamic analysis on performance of EGR valve of a DI engine using bio diesel

Effect of psychoacoustic analysis in vehicle exhaust noise

Academic Programmes:

M.Tech Automotive Engineering

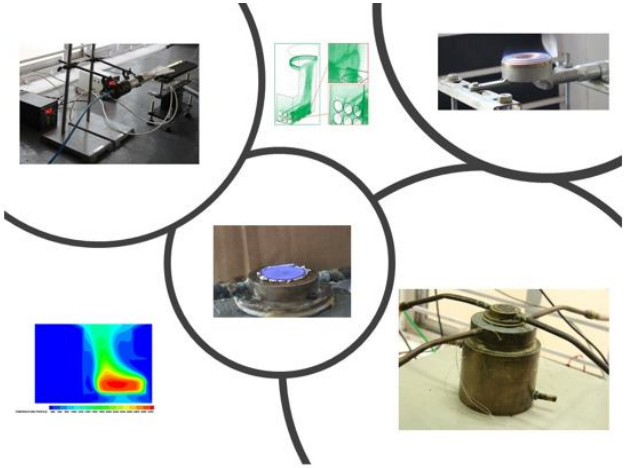
M.Tech Automotive electronics

Publications: 47

Patent: Kadge Rushiraj Ashok & Dr.S.Thirumalini, "Design of a new horizontal K-type configuration for internal combustion engine", 2019.

AMRITA-ROBERT BOSCH AUTOMOTIVE ELECTRONICS LABORATORY

Dr.S.Thirumalini Prof.M.Prasad, Dr.S.Srihari, Prof.D.Senthilkumar, Dr.T.Mohanraj	**Collaborator:** Robert Bosch Engineering and Business Solutions (RBEI)
Projects • Fuel injection control in a Reactivity Controlled Compression Ignition (RCCI) for improving the performance and emission. • GPIO configuration for reading the controlling sensors and actuators. • Timer configuration for synchronizing the channels. • ADC and DAC configuration for analogue signal processing • PWM configuration for speed control of motors	Embedded System Development Kit powered with Freescale processor with sensors and actuators provides an actual ECU environment for the experiments conducted here in the laboratory. This free scale kit customized with all the advanced features that are necessary for any Automotive Embedded Software Development. The kit has LIN, CAN, SPI, GPIO Interfaces and is built on TWR-K40D100M Free scale Tower Board.
	Publications: • V. Charitha, S. Thirumalini, M. Prasad, S. Srihari, “Investigation on performance and emissions of RCCI dual fuel combustion on diesel - bio diesel in a light duty engine”, Renewable Energy (https://www.sciencedirect.com/science/journal/09601481), Volume 134 (https://www.sciencedirect.com/science/journal/09601481/134/supp/C), April 2019, Pages 1081-1088
The lab supports the students pursuing their degree in engineering disciplines, viz., Electronics and Communication Engineering, Electrical and Electronics Engineering, Mechanical Engineering, Automotive Engineering, Automotive Electronics and Electronics & Instrumentation Engineering.	
Combustion Research Lab	
Dr. V. Ratna Kishore	
The combustion research lab focuses on fundamentals research in laminar premixed flames and combustion modelling. The major experimental setups developed in this lab are listed below.	DST: Measurement of burning velocities of hydrocarbon hydrogen mixtures and application to premixed laminar burner design. Collaborators: Prof.Sudarshan Kumar (IITBombay) Dr. BhupendraKhandelwal (University of Sheffield) Prof.SubhahChander (NIT Jalandhar) Prof. M. R. Ravi (IITDelhi) Dr. C. Prathap (IIST, Trivandrum) Dr. P. Parthasarathy (NIT Surathkal)



Experimental setups developed: • Diverging channel Experimental Setup • Heat flux method setup • Experimental setup for household burners • Combustion Modeling	**Facilities:** • 10 ltr gas cylinder with double stage regulators • Temperature regulated water baths • Compressor • 47 ltr gas cylinders with two stage pressure regulators • DSLR camera • Fine wire thermocouples with sheath • High precision gas mass flow controllers
	Publications: 22

Simulation Lab

Dr. V. Ratna Kishore

The lab has 15 high end computers (HP-64 bit systems, 8 GB RAM, i5 2500@ 3.3 GHz) with LAN connection. The software available are ANSYS, FLUENT, ABAQUS, COMSOL Multiphysics, ARENA, MATLAB and ADAMS. The lab is used by students to perform numerical simulations of structures subjected to mechanical, thermal, fluid, electrical, electromagnetic loads/fields. The lab serves the computational and simulation needs of the UG, PG and PhD students working in various fields of engineering. Submissions to the central computing facility (HPC) can be made from the simulation lab.

Casting and Welding Research Laboratory

Dr. R Saravanan **Dr. Sanjivi Arul** **Mr.AShanmugasundaran** • Development of wear and corrosion resistant surfaces using surface alloying techniques • Study of effect of cryogenic treatment on electrical and magnetic properties of materials • Development of Materials for cryogenic applications • Materials database of properties for cryogenically treated materials • Development of Indigenous composite and high strength alloys	**Funded Projects: DRDO, DST, RPS-AICTE** **Facilities:** • Gas Tungsten Arc Welding Machine • Gas Metal Arc Welding Machine • Melting furnace • Heat Treatment • Ultraviolet radiation measuring instrument **Publications:** 39
	
Design Thinking lab	
Dr.S.Thirumalini Dr.M.Ramu Design thinking is a project based course scheduled for 30 lecture and 30 practical sessions with students' engaged in continuous learning with day to day activities thus making it different from the traditional course. Design thinking lab has been developed with a dedicated working space of 100 sq.m to accommodate 30 students working in six different teams. Each team will be given with unique need statement at the beginning of the course and the design thinking process will be systematically undergone.	The laboratory encompasses the following facilities to work as team: • Working table for each group • White board for each group • Flip chart board for each group • Projection and audio visual aids • Wi-Fi connection • Working stationeries Common facilities like fabrication shop, machining workshop, 3D printers, computing facility and material for prototyping were made available for the students at any time of the course.

Material Processing Laboratory

Dr.M.Govindaraju

It is for research and development on processing of advanced materials, with facility for melting and solidification, thermo-mechanical processing, ceramic to metal seals, active brazing, vacuum brazing of aerospace materials, automotive brazing, powder metallurgy processes, vacuum heat treatment, diffusion bonding, hot pressing etc. It serves as critical gap filling laboratory in material science and manufacturing engineering. This serves as facility to carry our research in latest and emerging area (in terms of processes custom made and materials)

Facilities:

1. High temperature furnace
2. Medium frequency induction melting
3. Multipurpose high vacuum furnace
4. Support system for all above such as chiller etc

Integrated Machine Health Monitoring Lab

Dr.K.I.Ramachandran Dr.K.Rameshkumar Dr.M.Saimurugan Dr.P.Krishnakumar Dr.A.Sumesh	Funded projects: Rs. 75 lakhs Collaborators:ISRO:VSSC; DRDO:ARDB/CVRDE/GTRE Godrej Aerospace; BHEL: WRI Predictive Analytics in welding ·Process Monitoring in High Speed Machining of Titanium alloy • Predictive Analytics in Gear Box Fault Diagnosis • Automated fault diagnosis of rotating machines
Health monitoring of machines –Predictive Analytics approach ○ Need to increase reliability ○ Improve the quality of the job ○ Reduce the maintenance cost ○ Avoid catastrophic damages Research Experise in •Intelligent fault diagnosis of rotating machinery •Extraction of information from the machine using multi sensor fusion techniques •Machining process monitoring and control •Tool condition monitoring in high speed precision milling process •Prediction of surface roughness in the work piece •Grinding wheel condition monitoring •Development of hardware unit for process monitoring and fault diagnosis •Machinability studies on hard materials such as Titanium, Inconel, etc •Prediction of residual stress in the machined component •Online welding quality control using signature analysis •Identification of welding defect using image processing and machine learning techniques	**Facilities:** 1.Machine Fault Simulator 2.Gearbox Test-rig 3.AE sensor (Physical Acoustics) with data analysis software 4.Vibration signal analyzer 5.Tri-axial Accelerometer 6.Microphone 7.Impulse Hammer 8.Vibration shaker with data acquisition system 9.Residual stress measurement set up **Course offered in B.Tech Mechanical Engineering** 1.Condition Monitoring and Diagnostic Maintenance **Course offered in M.Tech Engineering Design** **1.**Engineering Design Lab-I(Machine Condition Monitoring Lab) **2.**Machine Condition Monitoring **3.**Design Automation with IoT **Publications:** 50 **Products:** Developed low cost real time monitoring system for early fault detection using Predictive Analytics

5.8.4 Consultancy (from Industry) (20) Institute Marks : 20.00

2018-19 (CAYm1)

Project Title	Duration	Funding Agency	Amount(in Rupees)
Stress analysis	December 201	M/s. Visual Edı	10000.00
• Engineeri	July 2018 – Jui	Automotive Tes	8800000.00
			Total Amount(X): 8810000.00

2017-18 (CAYm2)

Project Title	Duration	Funding Agency	Amount(in Rupees)
• Engineeri	July 2017 – Jui	Automotive Tes	2400000.00
			Total Amount(Y): 2400000.00

2016-17 (CAYm3)

Project Title	Duration	Funding Agency	Amount(in Rupees)
• Engineering servic	July 2016 – Jui	Automotive Tes	800000.00
			Total Amount(Z): 800000.00

Cumulative Amount(X + Y + Z) = 12010000.00

5.9 Faculty Performance Appraisal and Development System (FPADS) (10) Total Marks 10.00

5.10 Visiting/Adjunct/Emeritus Faculty etc. (10)

Total Marks 10.00

Institute Marks : 10.00

The details of participation and contribution in teaching / learing / research by Visiting/Adjunct/Emeritus Faculty members from eminient institutes / industry are given in Table 5.3.

Sl. No.	Name	Designation	Period from	Period to
	2016-17			
	Dr. Eric Blanco, University of Grenoble, France	Adjunct Professor	01.12.2016	31.12.2017
	Mr.S.Raju, ARAI	Visiting Professor	01.07.2016	30.06.2017
	2017-18			
	Dr. Eric Blanco, University of Grenoble, France	Adjunct Professor	01.01.2017	31.12.2020
	Dr. A. Raja, WRI, Trichy	Adjunct Professor	24.01.2018	30.06.2020
	Mr.S.Raju, ARAI	Visiting Professor	01.07.2017	30.06.2018
	Dr. Raju Ananth, Senior Consultant, Structural Integrity Associates Inc, Windsor Way, SAN JOSE	Industrial Consultant	01.07.2017	30.06.2018
	2018-19			
	Dr. Eric Blanco, University of Grenoble, France	Adjunct Professor	31.12.2018	31.12.2020
	Dr. A. Raja, WRI, Trichy	Adjunct Professor	24.01.2018	30.06.2020
	Mr.S.Raju, ARAI	Visiting Professor	01.07.2018	30.06.2019
	Dr. Raju Ananth, Senior Consultant, Structural Integrity Associates Inc, Windsor Way, SAN JOSE	Industrial Consultant	01.07.2018	30.06.2019

Table 5.3. Details of Visiting/Adjunct/Emeritus Faculty members

6 FACILITIES AND TECHNICAL SUPPORT (80)

Total Marks 80.00

6.1 Adequate and well equipped laboratories, and technical manpower (40)

Total Marks 40.00

Institute Marks : 40.00

Sr. No	Name of the Laboratory	Number of students per set up(Batch Size)	Name of the Important Equipment	Weekly utilization status(all the courses for which the lab is utilized)	Technical Manpower Support		
					Name of the Technical staff	Designation	Qualification
1	CAD Lab	1	1.Dell (core i7,	28	M Ravi Kumar	Skilled Assistar	DME
2	Dynamics Lab	3	1. Gyroscope 2	24	C. Alexpandi	Skilled Assistar	DME
3	Fluid Mechanic	3	1.Centrifugul p	30	V.Vignesh	Skilled Assistar	ITI
4	Instrumentatior	3	1. Level proc	24	R.Yuvaraj	Skilled Assistar	DME
5	Lathe Worksho	1	1. All gearec	20	C. Chandramo	Instructor	ITI
6	Product worksh	2	1.Worm gear b	25	D. Vijayakumar	Skilled Assistar	ITI
7	Fluid Power La	2	1. Pneumatic	25	K.Sundararam	Skilled Assistar	DME
8	Robotics & Aut	2	1. Pneumatic	16	K.Sundararam	Skilled Assistar	DME
9	Soldering and	2	1.Welding trans	25	R. Senthilkuma	Skilled Assistar	ITI
10	Sheet Metal W	2	1.Bench drilling	25	N.Karthikeyan	Skilled Assistar	S.M.C.C
11	Special Machi	3	1.Vertical Millin	24	K. Dhayalan	Foreman	DME
12	Foundry Works	2	1. Moulding bo	14	M. Sundararaj	Instructor	DME
13	Metallurgy Lab	3	1.Disc polishin	16	P Maasilamani	Instructor	DME
14	Metrology Labo	3	1. Height Ga	12	R. Balaji	Skilled Assistar	DIE
15	Press Shop	2	1. Mechanical I	12	K. Balamuruga	Skilled Assistar	DME
16	Thermal Engin	3	1.Experimental	16	S.Kannapiran	Sr.Instructor	DME
17	Heat Transfer I	3	1. Natural conv	16	S.Kannapiran	Sr.Instructor	DME
18	Additive Manu	2	Olivettis2 Mach	25	S. Mohan Pras	Lab Assistant	DME
19	Plumbing Lab	2	Pipe vice pipe	25	V. Vignesh	Skilled Assistar	ITI

6.2 Laboratories maintenance and overall ambiance (10)

Total Marks 10.00

Institute Marks : 10.00

Maintenance of laboratory equipment are carried out periodically as per maintenance schedule prepared in advance for every academic year. A faculty member is in-charge of each Laboratory. The faculty in-charge will oversee the maintenance activities (equipment and general maintenance) of concerned laboratory. Each Laboratory has one or more qualified technical staff to assist in practical classes and maintain the laboratory. The maintenance schedule of the laboratory is displayed in the respective laboratories. A sample maintenance schedule for Fluid Mechanics and Machinery laboratory is given in Table 6.1.

Name of the Laboratory / Workshop: Fluid Mechanics and Machinery laboratory

Academic Year: July 2015 - June 2016

		X / Y actual date/ planned date												
Sl.No.	**Name of the Equipment / Machinery / Instruments**	**July**	**August**	**September**	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**Remarks**
1	Centrifugal pump	14\20												
2	Reciprocating pump				5\21									
3	Submersible pump												2\15	
4	Jet pump									15\22				
5	Gear pump						23\24							
6	Pelton wheel turbine		17\26											
7	Francis turbine							11\19						
8	Kaplan turbine					25\26								
9	Multi stage pump			2\4										
10	Variable speed pump								16\18					
11	Mouth piece test rig										14\19			
12	Friction factor test rig											11\18		
13	Venturimeter test rig				5\13									
14	Orifice meter test rig	20\23												
15	Triangular notch test rig						2\16							
16	Bernoullis principle test rig									1\8				
17	Watermeter&Rotometer												22\29	
18	Jet impact test rig		4\6											
19	Drag reduction test rig					2\17								
20	Packed bed test rig							12\20						
21	Annular pipe test rig			14\22										
22	Helical coil test rig										4\7			
23	Metacentric height test rig	13\23												
Sl.No.	General Maintenance													**Remarks**
1	Painting													
2	Floor Work													
3	White Washing													
4	Electrical Work			4\14										
5	Any Others													

Table 6.2.1 Maintenance Schedule for Equipment and General Maintenance

6.3 Safety measures in laboratories (10) Total Marks 10.00

Institute Marks : 10.00

Sr. No	Laboratory Name	Safety Measures
1	CAD/CAM Laboratory	1. Do not attempt to repair, open, tamper or interfere with any of the computer, printer or network components. 2. Avoid contact with extension boxes and electrical terminals. 3. Report safety hazards like open wire / shock, malfunctioning immediately to staff. 4. Students should neither unplug the Keyboard or Mouse nor put the Pen drive without prior approval. 5. Follow the instructions given by the staff member. First Aid Kit and Fire Extinguisher are available in the lab.
2	Dynamics Laboratory	1. Wear proper uniform and shoes. 2. No equipment should be used without proper supervision. 3. Machinery must not be operated only one person at a time. 4. After use, all tools must be stored in the correct location or returned to the storeroom. 5. Machines, equipment and associated area's must be cleaned properly after use. 6. When a machine or piece of equipment is operational, never attempt to touch any of the moving parts. In an emergency, power should be switched off first. First Aid Kit and Fire Extinguisher are available in the lab.
3	Fluid Mechanics & Machinery Laboratory	1. Use laboratory equipment for its designed purpose. 2. Wear shoes that cover the feet at all times. Bare feet or sandals are not permitted in the lab. 3. Confine long hair and loose clothing. Avoid disturbing or distracting others while they are performing laboratory tasks. 4. Avoid switching on the equipment before the water circuit is turned on. 5. Do not wear any rings, bracelets, watches or neck chains when working near electrical equipment. 6. Wash hands upon completion of laboratory procedures. 7. Know the location and correct use of all available safety equipment. 8. Report any accident, injury, incorrect procedure, unsafe conditions or damaged equipment to your laboratory supervisor immediately. 9. Switch-off the equipment when not in use. First Aid Kit and Fire Extinguisher are available in the lab.
4	Foundry Shop	1. Always wear gloves, shoes and apron. 2. While melting the metal wear infrared goggles, face shield apron and gloves. 3. Do not stand near the mould while pouring or immediately after pouring because the molten metal may splash out of the mould. 4. Fettling operation should be done with due care and ensure no damage to the casting. First Aid Kit and Fire Extinguisher are available in the lab.
5	Lathe Workshop	1. Don't remove the guard or machine parts unless authorized to do so. 2. Report immediately the faults and repairs to the shop- in-charge. 3. On completion of the work, clean the machine and dispose the chip into the chip cover. 4. Switch off the machine immediately whenever power supply fails. 5. Keep the tools and equipment in proper place, when they are not in use. 6. Keep the floor free from Oil, Grease and Chips. 7. Remove wrist watches, rings and bracelets before starting the work. 8. Never wear loose clothing when operating a machine. First Aid Kit and Fire Extinguisher are available in the lab.
6	Instrumentation Laboratory	1. Uniform and shoe are to be worn during lab session. 2. Do not operate any instruments, without studying the specifications and operating instructions. 3. Do not overload any instruments beyond its capacity. 4. Load and unload the instruments gradually. 5. Keep safe distance from any moving/rotating part of the machinery. 6. After the experiments is over, switch off the power supply (if any). 7. Return the instruments after the experiments. First Aid Kit and Fire Extinguisher are available in the lab.
7	Metallurgy Laboratory	1. Do's & Do not's charts are displayed in the Lab. 2. Safety equipment like fire extinguisher, First aid box are available in the lab. 3. Safety Precautions are displayed in the laboratory. 4. Students wear shoe and Lab uniform. 5. Lab equipment are cleaned and serviced periodically. 6. Loose clothing, watches and jewels are prohibited. 7. Hand gloves are provided when handling chemicals and furnaces. First Aid Kit and Fire Extinguisher are available in the lab.
8	Metrology Laboratory	1. Do not operate any electrical device /Air conditioning unit without permission from the concerned staff. 2. Do not try to repair any instrument in the laboratory. 3. If any difficulty encountered in operating the instrument, bring the same to the notice of the staff members. 4. Handle the instruments with great care since they are composed of delicate and precise parts. 5. Return the instruments properly after the experiments are over. 6. Do not inhale the chemicals meant for cleaning the workspace. First Aid Kit and Fire Extinguisher are available in the lab.
9	Press Shop	1. Always wear goggles, gloves, ear plug and shoes . 2. While m/c is loaded goggles, ear plug and stay away from the m/c. 3. Ensure M/c is switched off while changing die. First Aid Kit and Fire Extinguisher are available in the lab.
10	Product workshop	1. Wear proper clothing in the workshop. 2. Wear safety shoes in the workshop. 3. Use appropriate tools for the job. 4. Do not in use defective or broken tools. 5. Tools not in use should be kept in its proper place. 6. Working tools shouldn't be kept at the edge of the table. 7. Be safety conscious while in workshop. 8. Do not wear jewels. 9. When in doubt ask your Instructor. First Aid Kit and Fire Extinguisher are available in the lab.
11	Sheet Metal workshop	1. Always use safety goggles to protect your eyes from fine particles that fly during the bending process. 2. Avoid running your hands over a sharp cut, even if you are wearing gloves. 3. Always ensure that all the burr are filed properly. 4. Make use of work boots. They prevent any scrap, or pointed material from hurting your feet. 5. Do not wear ties, loose clothing, jewellery, gloves, etc. around moving or rotating machinery. Long hair must be tied back or covered to keep it away from moving machinery. 6. Think through the entire job before starting. 7. A brush, hook, or special tool is preferred for removal of chips, shavings, etc. from the work area. 8. A hard hammer should not be used to strike a hardened tool or any machine part. 9. Don't rush or take chances. Obey all safety rules. First Aid Kit and Fire Extinguisher are available in the lab.

12	Soldering workshop	1. Wear proper uniform and shoes. 2. Never touch the element or tip of the soldering iron. They are very hot (about 400°C) and will burn. 3. Always return the soldering iron to its stand when not in use. 4. Turn unit off or unplug it when not in use. 5. Frayed electrical cords could be a fire and/or shock hazard. 6. Do not try to rectify electrical faults yourself; call an electrician. 7. Ensure that tweezers, pliers or clamps are available to hold wires that are to be heated to avoid potentially receiving burns from objects that are heated. First Aid Kit and Fire Extinguisher are available in the lab.
13	Special Machines Laboratory	1. Don't remove the guard or machine parts unless authorized to do so. 2. Report immediately the faults and repairs to the shop- in-charge. 3. On completion of the work, clean the machine and dispose the chip into the chip cover. 4. Switch off the machine immediately whenever power supply fails. 5. Keep the tools and equipment in proper place, when they are not in use. 6. Keep the floor free from Oil, Grease and Chips. 7. Remove wrist watches, rings and bracelets before starting the work. 8. Never wear loose clothing when operating a machine. First Aid Kit and Fire Extinguisher are available in the lab.
14	Additive Manufacturing Laboratory	1. Use safety glasses for SLA system. 2. Use gloves for post - processing. 3. Do not see laser source in SLA System with naked eyes. Use Goggles. 4. Do Not Touch the extruder and motors during operations as they are HOT. 5. Removal tools are SHARP. Handle with care. 6. Do clean up after using the machine. 7. Do inform the mentors for any machine errors. 8. Do close the printer door while in operations. 9. Do return the tools and other accessories after usage. 10. Don't use the printers unless you have been trained. 11. Don't modify the machine setting. 12. Don't remove the filament from the machine. First Aid Kit and Fire Extinguisher are available in the lab.
15	Robotics and Automation Laboratory	1. Students should use the experimental setups only under the supervision of an instructor. 2. Never blow compressed air at any one. 3. Don't turn the main air supply on until the circuit is connected disconnected pipes can whip round and cause injury. 4. If air is leaking from a joint switch off air supply. 5. Always turn air off before altering the circuit. 6. Keep fingers away from the piston. 7. Wear safety glasses when building and operating pneumatic systems. 8. To minimize personal injury and equipment damage when using compressed gases, observe all operating safety precautions, including the following: - Do not use the compressed air to clean parts of your body or clothing or to perform general space clean up instead of sweeping . - Never attempt to stop or repair a leak while the leaking portion is still under pressure. Always isolate. Depressurize and tag out the portion of the system to be repaired. 9. Avoid application of heat to the air piping system or components, and avoid striking a sharp, heavy blow on any pressurised part of the piping system. First Aid Kit and Fire Extinguisher are available in the lab.
16	Thermal Engineering / Heat Transfer Laboratory	1. Manual cranking of engines should be done with due care. 2. In the case of engine provided with a self-starter, do not operate it when the engine is running. 3. Start the engine only after making the primary checks like the sump oil level, water flow etc. Start engines under no load conditions while centrifugal pumps and blowers should be started with the discharge valve closed. 4. Do not stand close to the rotating part particularly in a radial direction to the rotating member. 5. Avoid stepping over the mesh guard placed over the water trench. 6. Never blow off dust with compressed air. 7. Do not wear any rings, bracelets, watches or neck chains when working near rotating machinery or electrical equipment. 8. If the fuel or solvent splashes into your eyes, wash with copious amount of water immediately. 9. Handle salts, acids and bases with care using gloves. 10. Fuels are harmful. Avoid spilling or splashing on your hands, body or clothing. 11. Never breathe in or inhale vapour of any fuel. This may cause irritation in the respiratory system. First Aid Kit and Fire Extinguisher are available in the lab.
17	Welding Workshop	1. Wear proper uniform. 2. Use gloves, shield and chipping goggles. 3. Use the eye shield to avoid any sort of eye injury. 4. Use tongs when handing hot metals. 5. Beware of hot metal that looks like cold metal. 6. Keep the welding area free from moisture. 7. Do not carry matches or inflammable materials. 8. Do not try to rectify electrical faults yourself, call an electrician. 9. Do not throw the electrode stubs on the floor. Put them in a container. 10. Switch OFF the machine, when not in use. Switch OFF the machine, when not in use. First Aid Kit and Fire Extinguisher are available in the lab.

6.4 Project laboratory (20) Total Marks 20.00

Institute Marks : 20.00

Equipment in laboratories are available to students for executing their project works. Laboratories are opened till late in the evening and are supported by technical staff members. Facilities in the research laboratories of the department are also utilized by the students for projects. Laboratory wise utilization for project work is as given in Table 6.2.

S.No.	Name of the laboratory	No. of students did project work	Name of the equipment used for project	Utilization status (Last 3 years) Hours used for Project work			
				2016-17	2017-18	2018-19	2019-20
1	Fitting Workshop	30	• Power Hacksaw Machine • Bench Grinding Machine • Bench Drilling Machine	-	13	15	2
2	Thermal Engineering Lab	54	• Bomb Calorimeter • Data Acquisition System on Multi-Cylinder Petrol Engine • Emission Test For Two Wheeler 100 CC • Field Marshal Slow Speed Engine with Mechanical Dynamometer • Gl-400 Engine with Eddy Current Dynamometer • Hot Plate Apparatus • Load Test on Diesel Engine • Magnetic Stirrer • Radiator • Redwood Viscometer • Refrigerator Model • Single Cylinder Vertical Diesel Engine • Viscosity, Fire Point And Flash Point Test Setup	103	73	248	--
3	Foundry Workshop	8	• Moulding flask • Moulding tools • Electric furnace	63	52	4	17
4	Metrology Lab	431	• MITUTOYO MVK-H11 Hardness Tester • CARL ZEISS – Surface Roughness Tester • Computerized UTM (Tinius Olsen UK)	343	271	290	99
5	Special Machines Lab	201	• Vertical Milling Machine • Universal Milling Machine • Surface Grinding • Cylindrical Grinding • Gear Hobbing • Shaping machine • Drilling Machine • Tool and Cutter • Grinder • Bench Grinder • Slotting Machine • CNC VMC	173	302	526	202
6	Welding Workshop	110	• Welding transformer • Hand Grinding Machine • Drilling Machine	154	49	-	65
7	Instrumentation Lab	60	• NI DAQ • FFT Analyser • LVDT Displacement • Angular Displacement	278	133	45	56
8	Lathe Shop	221	• Lathes	769	494	183	106

S.No.	Name of the laboratory	No. of students did project work	Name of the equipment used for project	Utilization status (Last 3 years) Hours used for Project work			
				2016-17	2017-18	2018-19	2019-20
9	CAD Lab	3931	• ABAQUS • ANSYS, FLUENT & GAMBIT • ARENA • AUTOCAD • AUTODESK INVENTOR • CARSIM • COMSOL Multiphysics • MATLAB • MSC Adams & Nastran • SolidEdge • Edge CAM • LabVIEW	4054	1869	1257	706
10	Tribology Lab	16	• Centrifugal casting machine • Dry abrasion tester • Electric resistance furnace • Heat treatment furnace • Reciprocating wear tester	109	197	275	-
11	Metallurgy Lab	160	• Automatic Disc Polishing Machine • Zesis Axiovert Metallurgical Microscope • Pinion Disc Wear Tester • Juniour Cut-off Machine • Disc Polishing Machine • Muffle Furnace • Linisher Polisher • Electronic Weighing Balance • Bench Grinder	483	414	368	100
12	Casting and Welding Lab	30	• TIG welding machine • Heat Treatment furnace	75	75	75	-
13	Additive Manufacturing Lab	9	• Olivettis2 Machine • Spaar Creative	-	-	127	83
14	Fluid Mechanics and Machinery Lab	1	• Centrifugal Pump	-	40	-	-
15	Machine Condition Monitoring Lab	18	• Machinery Fault Simulator • Gear Box Fault Diagnosis Test Rig	40	75	160	55
16	Sheet Metal Lab	35	• Hand shear cutter • Bench drilling machine • Bench grinding machine • Bending machine	-	17	17	-
17	Spray Laboratory (Aerospace Department)	32	• High Speed Camera • Atomizers	150	120	150	-
18	SAE Workshop	260	• TIG - Welding Machine • Arc - Welding Machine • Bench Grinding Machine • Angle Grinding Machine • Hand Drilling Machine • Air - Compressor with spray gun	440	490	480	290

S.No.	Name of the laboratory	No. of students did project work	Name of the equipment used for project	Utilization status (Last 3 years) Hours used for Project work			
				2016-17	2017-18	2018-19	2019-20
19	Amrita Automotive Research and Technology Center (AARTC)	96	• Eddy Current Dynamometer • Pressure Transducer • Crank Angle Encoder • Five Gas Analyzer • Smoke Meter • Bosch Freescale Kit • Single Cylinder Diesel Engine Attached To Eddy Current Dynamometer With PCCI Set-Up • Single Cylinder Diesel Engine For RCCI Setup	144	144	144	144

Table 6.2.2 Project laboratory and its utilization

7 CONTINUOUS IMPROVEMENT (75) Total Marks 75.00

7.1 Actions taken based on the results of evaluation of each of the COs, POs & PSOs (30) Total Marks 30.00

Institute Marks : 30.00

POs Attainment Levels and Actions for Improvement- (2018-19)

POs	Target Level	Attainment Level	Observations
PO 1 : Engineering Knowledge			
PO 1	2.25	2.73	The PO target has been attained for the set target level. There is a scope for improvement in some of the COs in the following courses. 15MEC201 -Engineering Thermodynamics 15MEC303 - Heat Power Engineering 15MEC312 - Heat Transfer 15MEC382 - Thermal Science Laboratory 15MEC313 - Introduction to Finite Element Methods
Action 1: 15MEC201 -Engineering Thermodynamics For better understanding of topics related to Energy balance and Power cycles, following actions were initiated: a) Tutorials were conducted in addition to the regular assignments. b) Videos / Animations were shown to improve the understanding of the concepts. c) No. of credits has been increased to 4 in R2019 curriculum (3 (L)-1(T)-0 (P)-4(C)) including tutorial sessions. d) Syllabus has been revised by giving importance to gas and vapour power cycle in R2019 curriculum. Action 2: 15MEC303 - Heat Power Engineering Additional classes/assignments have been conducted on exergy analysis, energy balance and entropy topics. Tutorial has been given to solve problems in gas power cycle. Action 3: 15MEC313 - Introduction to Finite Element Methods Additional classes / assignments were given to improve the understanding of fundamentals concepts in FEA. Number of faculty members has been increased to 4 for assisting students in the FEA laboratory for a batch of 60 students. • Extra lab sessions with additional problems were given to the students to improve their proficiency inusing the software. Action 4: • Special attention has been given to slow learners by providing extra classes. Action 5: Videos / Animations / Models / Cut sections were supplemented to enrich conceptual understanding of fundamental courses. Action 6: Introduction on fundamentals of refrigeration and air conditioning has been provided for thermal science laboratory. Action 7: Experiments on hydrostatics, flow visualization, pumps in series & parallel connections and study on vapor pressure are introduced in the Fluid mechanics and machinery laboratory (R2019 Curriculum) to improve the fundamental knowledge of students.			
PO 2 : Problem Analysis			
PO 2	2.25	2.73	The PO target has been attained for the set target level. There is a scope for improvement in some of the COs in the following courses. 15MEC303 - Heat Power Engineering 15MEC404 - Mechanical Vibrations 15MEC313 - Introduction to Finite Element Methods 15MEC301 - Design of Machine Elements I 15MEC311 - Design of Machine Elements II 15MEC402 - Control Engineering 15MEC411 - Operations Research 15MEC495 - Project phase I 15MEC499 - Project phase II Students findit difficult to translate physical problems into mathematical models. In the design of machine elements course, only component level design approach is followed. Project course is offered in two phases (phase I & II). Students are conducting literature review, formulating the problem and defining the methodology in project phase I. In phase II, students carry out projects involving theoretical and /or computational and/or fabrication and/or experimental work. The project work phase II is focused on synthesis of knowledge gained over the entire duration of the course.
Action 1: Problem analyzing capability of the students has been increased by solving more practical problems in the class through assignments/tutorials. Action 2: The project work is monitored continuously by the project guides and periodic review is conducted by a team of faculty members. The progress of the project work is recorded and monitored through project diary. Action 3: Analyzing problems individually as well as in groups to arrive at solutions. Action 4: In Heat Power Engineering, tutorial sessions on power cycles were introduced for solving practical problems. New experiments on boiling and condensation has been added to improve the understanding of phase change phenomenon in heat exchanger in R2019 curriculum. Action 5: In R2019 curriculum,a course on Operations Research is revised as laboratory integrated course by giving due weightage to solve problems using software tools. Action 6: Faculty members are encouraged to offer mini projects, case studies, term papers to students individually as well as in groups to improve the problem solving capability.			
PO 3 : Design/development of Solutions			
PO 3	2.25	2.73	The PO target has been attained for all the set target level. There is a scope for improvement in some of the COs in the following courses. 15MEC313 - Introduction to Finite Element Methods 15MEC212 - Kinematics of Machines 15MEC301 - Design of Machine Elements I 15MEC311 - Design of Machine Elements II 15MEC402 - Control Engineering 15MEC401 - Advanced Fluid Mechanics 15MEC495 - Project Phase I 15MEC499 - Project Phase II • Students find it difficult to solve complex engineering problems. • Students need to understand and analyze the mechanical system to develop solutions for engineering problems. • Students are encouraged to take-up more industrial, societal, and environmental oriented projects to solve real time problems through Live-in-Labs.
Action 1: Problem analyzing capability of the students has been increased by solving more problems in the class through assignments/tutorials. Action 2: Case studies for the design of mechanical system involving selection of materials, detailed design, and validation using numerical analysis are introduced in R2019 curriculum. Action 3: To understand the needs of the society and give solutions for the societal problems, students are trained through Live-in-Lab courses. Action 4: Create innovative solutions to design problems using Design Thinking course. Action 5: ICT (Animation / Videos / Models) tools are utilized for better understanding.			
PO 4 : Conduct Investigations of Complex Problems			
PO 4	2.25	2.84	The PO target has been attained for all the set target level. There is a scope for improvement in some of the COs in the following courses. 15MEC313 - Introduction to Finite Element Methods 15MEC212 - Kinematics of Machines 15MEC312 - Heat Transfer 15MEC303 - Heat Power Engineering 15MEC302 - Dynamics of machines 15MEC402 - Control Engineering 15MEC382 - Thermal Science Laboratory 15MEC499 - Project phase II • Students need to improve their analytical and data interpretation skills in solving complex engineering problems. • Students find it difficult to design mechanisms for specific applications. • Students undertake research based projects wherein they apply engineering knowledge and use modelling and analysis tools like finite element method, computational fluid dynamics, statistical tools like design of experiments, and data acquisition tools to perform analysis, synthesis of data, and parametric optimization. • Students are taking up the research based projects/case studies/industrial projects and publish their research findings in reputed conferences and journals.

Action 1: Students are encouraged to undertake Internships/Industrial projects to solve real time problems utilizing appropriate tools and techniques. Action 2: Establishment of labs such as Tribology laboratory, Material processing laboratory, Automotive Research laboratory, Additive Manufacturing laboratory and Condition monitoring laboratory to carryout research investigations in addition to regular laboratories. Facility available in Spray laboratory is used. Action 3: New experiments (Boiling and condensation heat transfer) related to phase change heat transfer have been introduced in R2019 curriculum to improve the understanding of phase change phenomenon in heat exchanger. Action 4: Simulation or working model of the mechanisms/ tool kits is used to demonstrate the working of different mechanisms. Analytical techniques and its numerical solution for the mechanism analysis and synthesis of mechanisms are introduced in R2019 curriculum. The topic on kinematics of rigid bodies with emphasis on analysis of moving frames of references included in engineering mechanics course offered in the second semester in R2019 curriculum. Action 5: Dynamics of machines course has been revised by incorporating fundamentals of 1 degree of freedom and 2 degrees of freedom vibration in R2019 curriculum. A course on vibration is offered as an elective course in R2019 curriculum for those who pursue project in related area.

PO 5 : Modern Tool Usage

PO 5	2.25	3	15MEC212 - Kinematics of Machines 15MEC313 - Introduction to Finite Element Methods 15MEC386 - Metrology and Measurements laboratory 15MEC402 - Control Engineering 15MEC403 - Industrial Robotics 15MEC411 - Operations Research 15MEC202 - Machine Drawing 15MEC239 - Modeling and Simulation of Engineering Systems 15MEC385 - Thermal Analysis laboratory 15MEC482 - Dynamics and Control laboratory 15MEC481 - Computer Integrated Manufacturing laboratory 15MEC499 - Project Phase II • Students use modern engineering tools to solve engineering problems. • Students should be exposed to solve operations research problems through software tools. • Students use modern tools like ANSYS, ABAQUS, ADAMS, CATIA, MATLAB, COMSOL, EDGECAM, ARENA, Automation Studio etc., to model complex engineering problems and new product development as a part of their course and final year project work.

Action 1: Additional faculty members are assigned to the laboratory integrated courses to assist the course faculty to facilitate better training of modern tools and effective evaluation of the students. Action 2: Laboratories are open after regular working hours (up to 10.30 PM) for facilitating the students to learn modern tools / techniques for solving engineering problems. Action 3: Students are encouraged to select elective courses such as Optimization Techniques in Engineering, Computational fluid dynamics, Simulation, modelling and analysis of manufacturing system and Fundamentals of IT related to the use of modern tools and techniques to solve real-world problems. Action 4: Based on current needs of the industry new courses like Python programming, CNC and system simulation, Automation and IOT, Additive manufacturing has been introduced in R2019 curriculum. Action 5: A course on operations research is introduced in R2019 curriculum by giving importance to solve operation research problems using software tools.

PO 6 : The Engineer and Society

PO 6	2.4	2.73	Students are trained to use relevant engineering standards, thermo-physical property tables, material data hand book, design data hand book and lab manuals so as to educate them in professional engineering practices. The courses are designed to address the needs of health, safety and social concerns in engineering practices. • Cultural education courses focusing on Indian culture, yoga, science and technology in ancient India are offered to the students. • Amrita value programs emphasize on making students familiar with tapestry of Indian life, culture, arts, science, and heritage.

Action 1: Students are provided opportunities to take up real time societal issues faced especially in rural areas and provide engineering solutions through Live-in-Lab courses. Action 2: Course on disaster management, Indian constitution are introduced in R2019 curriculum. Action 3: Students undertake industrial training/internships to understand good engineering practices and solve real time industrial problems. Action 4: Students are taking part in the following initiatives taken-up by the university and understanding the societal problems and providing solutions to the needy Amrita Learning to Integrate Values and Excellence (ALIVE) Amala Bharatham Clean (ABC) Drive NSS Disaster relief activities Action 5: Students clubs and associations such as Anantam, Arya, Astha, Mindspace, Shristi, SAEINDIA, Vajra, Natyasudha, Raagasudha, Nature Club, NSS, Chetana, Maardhani, Sanskriti, Prachodana, and Prerana are helping the overall development of the students and participation in a wide range of extra-curricular, social and community development activities.

PO 7 : Environment and Sustainability

PO 7	2.4	2.46	15SWK230 - Corporate Social Responsibility 15MEC334 - Industrial Engineering 15MEC275 - Design Thinking 15ENV300 - Environmental Science and Sustainability 15MEC335 - Lean manufacturing 15MEC390 - Live-in-Lab I 15MEC395 - Live-in-Lab II 15MEC499 - Project phase II • The above courses are designed to address the impact of engineering solutions in societal & environmental contextsand sustainable development. • The students are visiting remote villages and studying the environmental issues and offering sustainable solution for the welfare of the people as a part of Live - in - Lab courses. • A topic on Green Manufacturing is included in Manufacturing Process course.

Action 1: To provide sustainable engineering solutions to society and industry by implementing lean manufacturing, sustainable design, and exergy analysis through industry projects. Action 2: Students are motivated to carry out social and environmental related projects for sustainable development.

PO 8 : Ethics

PO 8	2.4	2.62	15CUL101 - Cultural Education-I 15CUL111 - Cultural Education-II 15AVP201 - Amrita Values Program I 15AVP211 - Amrita Values Program II 15HUM239 - Psychology for Engineers 15SWK230 - Corporate Social Responsibility 15MEC334 - Industrial Engineering 15MEC495 - Project phase I 15MEC499 - Project phase II • The above courses are designed to address the importance of ethics and apply professional ethics and responsibilities in engineering practice. • Value education is imparted through cultural education course for the first four semesters. • The ethical practices and social responsibility are imparted to the students continuously.

Action 1: Students are encouraged to participate in NSS and other club activities in the institution to improve their professional commitments. Action 2: Emphasis is given to follow codes of practice for design and development activities. Action 3: Career readiness program, corporate lectures and motivational talks are arranged to impart the importance of ethical principles. Action 4: To ensure originality, plagiarism check is introduced for research papers / project report has to undergo plagiarism check before submission.

PO 9 : Individual and Team Work

PO 9	2.4	2.62	15MEC202 - Machine Drawing 15SWK230 - Corporate Social Responsibility 15MEC390 – Live-in-Lab 15MEC275 - Design Thinking 15MEC495 – Project Phase I 15MEC499 – Project Phase II • The above courses are intended to effectively function as an individual and as a team member in multidisciplinary settings. • Students are provided with ample opportunities / activities to groom well as individuals and good team players through variety of curricular and co-curricular activities.

Action1: Group activities are part of some of the courses. Students solve problems as group and arrive at solutions for complex problems. Action2: Final year project work is carried out as group. There, the group and individual performances are evaluated. Action 3: Students are involved in group activities such as a) Conducting research and writing research articles b) Organizing various technical (ANOKHA) and cultural events. Action 4: Student teams are taking part in national events such as BAJA, SUPRA, EFFICYCLE, TIFAN, REEV in a multidisciplinary environment. Action 5: Student clubs and associations exhibit the talents of the students in the individual capacity and group. Some of the active clubs / associations in the institutions are as follows: Anantam, Arya, Astha, Mindspace, Shristi, SAEINDIA, Vajra, Natyasudha, Raagasudha, Nature Club, NSS, Chetana, Maardhani, Sanskriti, Prachodana, and Prerana These clubs / associations helping the overall development of the students and participation in a wide range of extra-curricular, social and community development activities

PO 10 : Communication

PO 10	2.4	2.62	Students were able to communicate effectively on engineering activities through seminars, project presentations, paper presentations in conferences, writing technical articles, organizing technical and non-technical events.

Following initiatives are helping the students to improve their presentation, and documentation capabilities: Student project work Student seminars Writing research articles and presenting papers in seminars / conferences Professional activities Co-curricular activities Live-in-Labs Part of the courses Soft skill 1, Soft skill 2 and Soft skill 3 focuses on communication and presentation skill development.

PO 11 : Project Management and Finance

PO 11	2.4	2.46	15SWK230 - Corporate Social Responsibility 15MEC390 – Live-in-Lab 15MEC395 – Live-in-Lab 15MEC499 – Project Phase II 15MEC334 – Industrial Engineering 15MEC272 - Product Cost Estimation 15MEC331 - Engineering Economics and cost analysis 15MEC332 - Enterprise Management 15MEC340 - Supply Chain Management 15MEC411 - Operations Research • The above courses are intended to execute a project with finance and time management. • Identifying the financial implications of a project in multidisciplinary environment has to be improved.

Action 1: Students are motivated to attend various entrepreneurial workshops through Amrita Centre for Entrepreneurship -TBI Action 2: Students are involved in the design and development of prototypes / actual systems for various national competitions. The project funding is mobilized and managed by the students with the guidance of faculty members.

PO 12 : Life-long Learning

PO 12	2.4	2.57	Department empowers students with adequate life skills and domain skills so that they graduate from the university as competent and confident individuals who can take on the never-ending challenges of the industry and society. The department has demonstrated its commitment to this important function by facilitating excellent infrastructure, human and other resources.

Action 1: CIR – a separate centre to train the students in soft skills, logical reasoning, communication skills, career guidance, entrepreneurship and personality development. Action 2: Cultural education foundation course of two credits is offered to all undergraduate students apart from various electives. The course includes yoga, meditation and personality development through a positive appreciation of Indian culture and heritage. Action 3: Students are given self study topics to improve their learning capabilities. Action 4: Students are exposed to learn the state-of-art technology in industries through guest lectures and seminars. In order to align with the emerging trend, a new course Automation and IOT is introduced as a core course in R2019 curriculum.

PSOs Attainment Levels and Actions for Improvement- (2018-19)

PSOs	Target Level	Attainment Level	Observations
PSO 1 : Apply knowledge acquired in the field of Design, Manufacturing, Thermal, and Fluid sciences to solve real-world engineering problems using emerging technologies			
PSO 1	2.25	2.62	• Some of the analytical courses though attained the CO target could be improved for better understanding of fundamental concepts to solve engineering problems. • Students are solving real-world engineering problems through research / industry projects. • Students are publishing research articles in reputed conferences / journals utilizing the facilities available in the campus with the guidance of faculty members. • A patent was filed as an outcome of student project.
Action 1: • Problem analyzing capability of the students has been increased by solving more practical problems in the class through assignments/tutorials. Action 2: • Students are encouraged to utilize the research laboratories like Tribology, Welding, Spray, and Material processing labto execute their project work. Action 3: • Students are motivated to participate in national / international technical events such as BAJA, SUPRA, TIFAN, EFFICYCLE, REEV, Formula student, and Hackathon etc., through professional student bodies. Action 4: • A detailed manual on CFD Tools were given to the students for better understanding and practicing the CFD tools. • CFD elective course has emphasis on software tools in R2019 curriculum. Action 5: • An open lab facility for fabrication of student projects / projects related competitions has been established. Action 6: • New experiments (Boiling and condensation heat transfer) has been introduced related to phase change heat transfer to improve the understanding of phase change phenomenon in heat exchanger.			
PSO 2 : Extend and implement innovative thinking on product design and development with the aid of modern tools			
PSO 2	2.25	2.62	• A course on Design Thinking is offered for the students to implement innovative thinking on product design and development. • Students use modern tools such as ANSYS, ABAQUS, ADAMS, ARENA, EDGECAM,LabVIEW, CATIA, MATLAB, COMSOL, AUTOMATION STUDIO, ZEILOSOFT etc., to model complex engineering problems and new product development as a part of their course and final year project work. • It is observed that Industry 4.0 concepts need to be addressed to the student's in line with industry requirements.
Action 1: • Additive Manufacturing laboratory has been introduced in R2019 curriculum. Action 2: • CAD/CAM/CAE facilities are enhanced with latest hardware and software. • CNC Lab course is introduced in R2019 curriculum with a focus on CAM. • A course on Automation and IOT has been introduced in R2019 curriculum. Action 3: • The students are encouraged to utilize research and computational facilities available in the campus beyond the regular working hours. The computer labs, research labs and fabrication facilities are opened up to 10:30 PM.			
PSO 3 : Apply the Science and Engineering knowledge for materials design, and processing for development and improvement of products and processes			
PSO 3	2.25	2.62	• Students are working on new alloy development, material property enhancement, improvement in materials processing. • New product development aiming at technology development to be focused. • Students are publishing research papers in the journals and conferences.
Action 1: • Advanced materials processing facilities such as high vacuum furnace, vacuum brazing furnace, high frequency induction furnace, High temperature furnace, Friction stir welding, Stir casting, Centrifugal casting, Abrasive wear testing are established for conducting research in materials design and processing. Action 2: • Students are encouraged to solve real world problem related to materials and collaborations with industry and institutes are established. Action 3: • Laboratory course on system simulation is introduced in R2019 curriculum with a focus on modeling and analysis of manufacturing systems.			

7.2 Academic Audit and actions taken thereof during the period of Assessment (15) Total Marks 15.00

Institute Marks : 15.00

The department has an audit system in place to monitor the quality of the teaching and learning process to ensure that the mission and vision of the university and in turn that of the department is realized. The academic audit comprises of end semester question paper audit, review of end semester answer sheets, laboratory assessment, class committee meetings and feedback on faculty. Publication of research papers is also subjected to an academic audit procedure.

Subject mentors are appointed for each subject of the programme. The mentor/senior faculty of the department scrutinizes the question papers for periodical tests and specifically the Semester End Examination. Answer sheets of semester end examination are also reviewed by the mentor/senior faculty of the department.

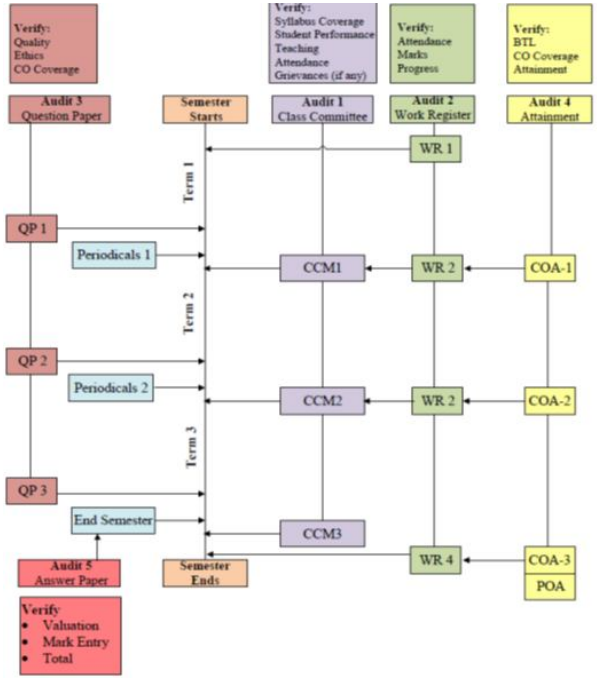


Figure 7.1 Academic audit

Class committee meetings are conducted before/after each periodical test and inputs from students and faculty are recorded and corrective measures if any are suggested on both sides. Each class is assigned a class coordinator (senior faculty in the department) who can be approached by students/faculty for any academic grievances.

To maintain research standards of the university every paper publication undergoes a plagiarism check and steps are taken to ensure that plagiarism is below 15% for any publication. The general flow of academic audit is shown in Figure 7.1.

7.3 Improvement in Placement, Higher Studies and Entrepreneurship (10) Total Marks 10.00

Institute Marks : 10.00

a) Placement

Period	Total No. of students placed	No. of students placed in Core companies	Others (Nos.)	Avg. Pay package
CAY 2018-19	77	33	44	3.91 L
CAYm1 2017-18	92	51	41	3.76 L
CAYm2 2016-17	146	66	80	3.72 L

i) List of companies recruited our students (CAY 2018-19)

- Carborundum Universal Limited, Chennai
- Lakshmi Machine Works, Coimbatore
- ACC Ltd, Mumbai
- Mu Sigma, Bengaluru (https://www.google.com/search?client=firefox-b-d&q=Bangalore&stick=H4sIAAAAAAAAAOPgE-LSz9U3yDJOSSo0U-IAsS2TDc21NDLKrfST83NyUpNLMvPz9POL0hPzMqsSQZxiq_TEoqLMYqBwRuEiVk6nxLz0xJz8olQAUUvynk4AAAA&sa=X&ved=2ahUKEwiv8p7L0-TmAhXdwTgGHYIAD_gQmxMoATAcegQIERAV)
- Robert Bosch, Coimbatore
- TITAN, Hosur
- Siemens Gamesa Renewable Power Pvt Ltd, Chennai
- Dassault Systems
- TCS Digital, Chennai
- The Math Company, Bengaluru
- Daimler, Bengaluru
- GMMCO
- Oracle Solution Engineering
- CTS
- INFOSYS
- TCS
- Wipro

ii) List of companies recruited our students (CAYm1 2017-18)

- Renault Nissan
- ELGI, Coimbatore
- FLSMIDTH
- Robert Bosch
- Saint-Gobain Glass India
- TITAN
- Mahindra & Mahindra
- 3dPLM Software
- ACC Ltd
- Daimler
- FIAT Chrysler, Chennai
- Shapoorji Pallonji
- Tredence
- GMMCO
- Saint-Gobain SEFPRO
- Bibox
- TCS
- INFOSYS
- Accenture
- BYJUs
- CTS

iii) List of companies recruited our students (CAYm2 2016-17)

- Robert Bosch
- Larsen & Toubro
- Daikin Air conditioning
- Sanmar Engineering
- Mahindra & Mahindra
- Tata Technologies
- FLSMIDTH
- Carborundum Universal Limited

- Renault Nissan
- Saint-Gobain Glass India
- AQ-TBA
- ELGI
- L&T Construction
- 3dPLM Software
- TCI Tech
- Hyundai
- Tech Mahindra
- Genpact
- I-Exceed
- Amazon-CS
- GMMCO
- VDart Software
- FIITJEE
- Cognizant
- TCS
- INFOSYS

b) Higher Studies

Period	Total No. of students qualified in GATE	Total No. of students qualified in GRE/TOEFL/ IELTS	Total No. of students qualified in GMAT	Total No. of students qualified in CAT	Total No. of students admitted in pr Institutions
CAY 2018-19	13	30	3	0	40
CAYm1 2017-18	7	17	1	4	31
CAYm2 2016-17	11	33	3	4	34

c) Entrepreneurs

Period	Total No. of Entrepreneurs
CAY 2018-19	4
CAYm1 2017-18	2
CAYm2 2016-17	1

7.4 Improvement in the quality of students admitted to the program (20)

Total Marks 20.00

Institute Marks : 20.00

Item		2019-20	2018-19	2017-18
National Level Entrance Examination	No of students admitted	142	190	244
Amrita Engineering Entr	Opening Score/Rank	1235	410	230
	Closing Score/Rank	25021	24253	32000
State/ University/ Level Entrance Examination/ Others	No of students admitted	16	0	0
JEE	Opening Score/Rank	32904	0	0
	Closing Score/Rank	878668	0	0
Name of the Entrance Examination for Lateral Entry or lateral entry details	No of students admitted	0	0	0
	Opening Score/Rank	0	0	0
	Closing Score/Rank	0	0	0
Average CBSE/Any other board result of admitted students(Physics, Chemistry&Maths)		79.76	86.64	90.32

8 FIRST YEAR ACADEMICS (50)

Total Marks 47.48

8.2 Qualification of Faculty Teaching First Year Common Courses (5)

Institute Marks : 5.00
Total Marks 5.00

Please provide First year faculty information considering load

Institute Marks : 5.00

Name of the faculty member	PAN No.	Qualification	Date of Receiving Highest Degree	Area of Specialization	Designation	Date of joining	Teaching load (%)			Currently Associated (Yes / No)	Nature Of Association (Regular / Contract)	Date Of leaving(In case Currently Associated is 'No')
							CAY	CAYm1	CAYm2			
MANJUSHREE	AHAPH5162K	MA	23/01/2016	Spiritual Studies	Assistant Professor	10/07/2017	100	100	100	Yes	Regular	
NAVEEN BHA	BVZPB1889F	M.A and Ph.D	14/10/2018	Spiritual Studies	Assistant Professor	20/08/2014	100	100	100	Yes	Regular	
PRAMOD KUN	ALLPM1017D	MA	29/11/2004	Spiritual Studies	Assistant Professor	01/09/2004	100	100	100	Yes	Regular	
AMBIKA P	AIQPA5583L	MA	19/08/1999	European Literature	Assistant Professor	17/07/2000	100	100	100	Yes	Regular	
PRIYA M C	ASFPG7193P	M.A and Ph.D	10/08/2017	Indian Writing in English	Assistant Professor	01/07/2005	100	100	100	Yes	Regular	
SANDHYA V	AKSPV9734C	MA	08/07/2004	Indian Writing in English	Assistant Professor	28/07/2010	100	100	100	Yes	Regular	
SHOBANA K	BKZPS4297R	M.Phil	20/07/2005	Folk Literature	Assistant Professor	16/08/2010	100	100	100	Yes	Regular	
SUSHMA M.P	DEMPS1509M	MA	18/08/1998	Ancient Hindi Literature	Assistant Professor	19/01/2011	100	100	100	Yes	Regular	
TEENA V	AOSPT7052D	MA	28/07/2007	Minority Literature	Assistant Professor	11/07/2011	100	100	100	Yes	Regular	
NANDHINI T	AAEPT4272R	M.Phil	14/07/2002	American Literature	Assistant Professor	16/04/2012	100	100	100	Yes	Regular	
AKILA J	BMVPA4063M	MA	17/05/2012	Childrens Literature	Assistant Professor	19/05/2014	100	100	100	Yes	Regular	
SARAVANA P	CXRPS5800C	M.A and Ph.D	17/08/2014	American Literature	Assistant Professor	02/06/2014	100	100	100	Yes	Regular	
AKHIL V.P	BPLPP8060E	M.A and Ph.D	15/07/2014	Post Colonial Literature	Assistant Professor	09/06/2014	100	100	100	Yes	Regular	
SUDAKSHINA	AXAPB5068L	MA	06/07/1990	Indian Writing in English	Assistant Professor	02/07/2014	100	100	100	Yes	Regular	
ANKUSHA BA	BPRPA9469J	MA	15/05/2012	Spritual Literature	Assistant Professor	02/02/2015	100	100	100	Yes	Regular	
MANDEEP BC	AREPB3585A	M.A and Ph.D	06/05/2015	Latin American Literature	Assistant Professor	09/09/2015	100	100	100	Yes	Regular	
SULAGNA MC	AWSPM1500F	M.A and Ph.D	07/09/2015	Post Colonial Literature	Assistant Professor	01/07/2016	100	100	100	Yes	Regular	
ASHA PRIYA	AHBPA5401H	M.A and Ph.D	07/09/2006	Indian Writing in English	Assistant Professor	27/06/2018	100	0	0	Yes	Regular	
BISWAMBHAR	AKQPR3058R	M.Sc. and PhD	19/10/2010	Nonlinear Dynamics and Chaos Theory	Assistant Professor	21/07/2016	100	100	100	Yes	Regular	
DEEPA MENO	AHHPD2170L	M.Sc. and PhD	07/08/2003	Statistical Quality Control	Associate Professor	02/01/2004	100	100	100	Yes	Regular	
GAYATHRI K	AOBPG7443L	M.Sc. and PhD	07/03/2018	Blood Flow in Large Arteries	Assistant Professor	17/08/2005	100	100	100	Yes	Regular	

Year | X (Number Of Regular Faculty with Ph.D) | y (Number Of Regular Faculty with Post graduate Qualification) | RF (Number Of Faculty Members required as per SEB of 20:1) | Assessment Of Faculty Qualification [(5X + 3Y) / RF]

Year	X	y	RF	Assessment
2017-18	57	16	65	5.00
2018-19	61	17	65	5.00
2019-20	66	18	60	6.00

Average Assessment: 5.33

8.3 First Year Academic Performance (10)

Total Marks 7.48

Institute Marks : 7.48

Academic Performance	CAYm1(2018-19)	CAYm2(2017-18)	CAYm3 (2016-17)
Mean of CGPA or mean percentage of all successful students(X)	7.40	7.34	7.71
Total Number of successful students(Y)	1094.00	1239.00	1103.00
Total Number of students appeared in the examination(Z)	1094.00	1239.00	1103.00
API [X*(Y/Z)]	7.40	7.34	7.71

Average API[(AP1+AP2+AP3)/3] : 7.48

Assessment = Average API : 7.48

8.4 Attainment of Course Outcomes of first year courses (10)

Total Marks 10.00

8.4.1 Describe the assessment processes used to gather the data upon which the evaluation of Course Outcomes of first year is done (5)

Institute Marks : 5.00

The CO attainment is computed at Amrita School of Engineering, Coimbatore using the **Inpods Software**. The following procedure is followed to do the computation.

Step 1:	Faculty sets the assessment question paper with CO mapping, BTL mapping and Marks of each question.
Step 2:	Faculty enters the step 1 data in Inpods software and the bundle number is generated. Bundle Number is the unique number (Spread sheet) for a exam for a particular course for a particular class.
Step 3:	The answer paper is evaluated by the faculty and is shared with the students for verification.
Step 4:	The front sheet of the answer paper which contains the question wise mark is torn and collected back by the faculty.
Step 5:	Faculty sends those front sheet along with bundle number generated in step 2 to the data entry team
Step 6:	Data entry team enters the marks of each students, question wise, in the Inpods software with the help of bundle number(spread sheet).
Step 7:	The entry will be done by the faculty for assignment and quiz in inpods.
Step 8:	Step 1 to Step 6 will be followed for Periodicals 1, Periodicals 2 and End Semester.
Step 9:	The Course Attainment-Direct is computed by the Inpods software.

The process followed at Amrita School of Engineering, Coimbatore for CO computation in a theory course is given in Figure 3.2.1. In the CO attainment calculation for a course, 80% is contributed through direct and 20% through Indirect. As per the university regulation, 50% of the direct is contributed by Cumulative Internal Examination (CIE) and 50% from Semester End Examinations (SEE) for theory courses. In the CIE, Periodical 1, Periodical 2 and Continuous Assessment contributes 15, 15 and 20 respectively. For Lab courses, 80% and 20% is contributed by continuous assessment and end semester examinations respectively to the direct attainment.

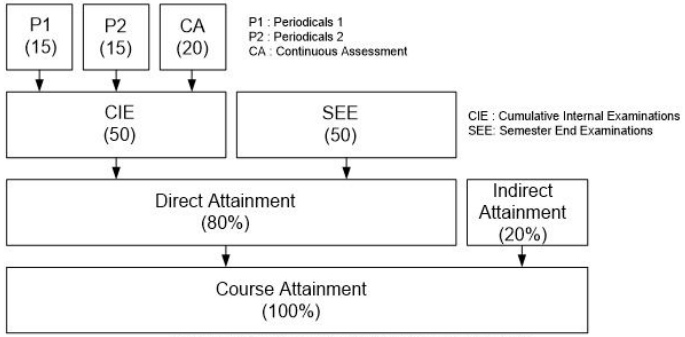
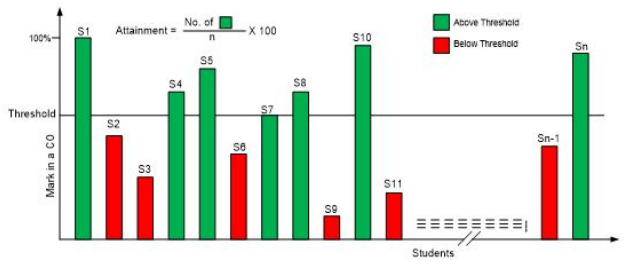


Figure 3.2.1 CO attainment for theory courses

Inpods do the attainment calculation based on the following expression:

Direct	The direct part of the CO attainment is computed through exams. The percentage of students in the class who scored more than threshold percentage of marks in the respective CO is the attainment.

	
Indirect	Based on Survey $Attainment = \frac{\sum_{i=1}^{5} i * no.of\ students\ gave\ i\ option}{5 * no.of\ responses}$

3.3.1. Describe the assessment tools and processes used for measuring the attainment of each Program Outcomes and Program Specific Outcomes (10)

The PO/PSO attainment is computed through direct and indirect. The direct part is computed through the attainment of COs from all courses, using the Course Articulation Matrix (CAM). The indirect attainments of the POs are computed through survey among stakeholders as shown in Figure 3.3.1.

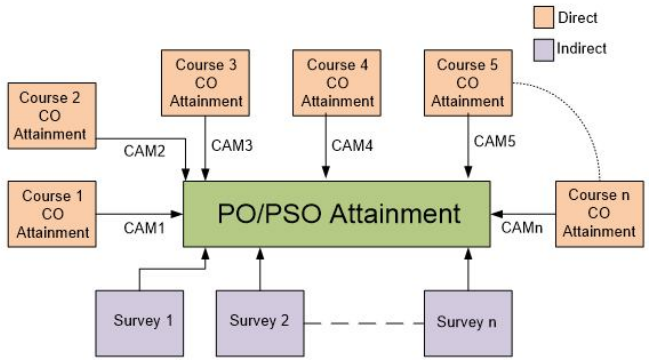


Figure 3.3.1. PO/PSO attainment

PO/PSO Attainment is Computed based on the following expressions

Direct	**Attainment of PO/PSO through a Course:** PO_{ij} Attainment = $\frac{\sum_{k=1}^{COmax} CA_{ik} * CAM_{ijk}}{\sum_{k=1}^{COmax} CAM_{ijk}}$ Where, PO_{ij} is the Attainment of 'i' th PO through the course 'j' COmax is the maximum number of COs in the course 'j' CA is Course Attainment CAM_{ijk} is the Course Articulation matrix for the 'i' th PO for the course 'j' with 'k' COs **Attainment of PO/PSO through all courses** Poi Attainment = Average across all Courses Addressing that POs/PSOs
Indirect	**Based on Survey** $PO_i = \frac{\sum_{i=1}^{5} i * no.of\ students\ gave\ i\ option}{5 * no.of\ responses}$ Where, PO_i is the attainment of the 'i'th PO

8.4.2 Record the attainment of Course Outcomes of all first year courses (5) Institute Marks : 5.00

Program shall have set attainment levels for all first year courses

Level (3)	**>**	**60**
Level (2)	**>**	**40**
Level (1)	**>**	**0**

CO-Attainment Level Academic Year 2015-2016:

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
15AES111	Introduction to Aerospace Technology	2.60	3.00	2.60	2.20	2.20	2.60		
15CHE111	Introduction to Chemical Engineering	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
15CHE112	Material Balances	3.00	2.2	2.2	2.2				
15CVL102	Mechanics: Statics and Dynamics	2.20	1.80	2.20	2.20	2.20			
15CVL111	Introduction to Civil Engineering	2.20	2.20	2.20					
15CVL112	Engineering Graphics-CAD	2.60	2.60	2.60	2.60	2.60			
15CSE100	Computational Thinking and Problem Solving	3.00	3.00	3.00	3.00				
15CSE102	Computer Programming	2.27	2.27	2.27	2.27				
15CSE111	Computer Science Essentials	2.48	2.68	2.68	2.48	2.28	2.48		
15CSE180	Computer Programming Lab	1.95	2.15	2.15	1.95				
15CUL101	Cultural Education -1	2.61	2.69	2.69	2.61	2.53	2.60		
15CUL111	Cultural Education-2	2.50	2.50	2.50	2.50	2.50	2.50		
15ECE111	Solid State Devices	2.20	2.20	2.20	2.20	2.20			
15ECE112	Fundamentals of Electrical Technology	2.20	1.80	2.20	2.20	2.20	2.20		
15EEE111	Fundamentals of Electrical and Electronics Engineering	2.40	2.45	2.17	2.62	2.40	2.62		
15EEE180	Workshop B	2.39	2.39	2.39	2.39				
15ENG111	Communicative English I	2.98	2.98	2.98	2.98	2.98	2.70		
15MAT111	Calculus, Matrix Algebra	3.00	3.00	3.00	3.00	3.00	3.00		
15MAT121	Vector Calculus and Ordinary Differential Equations	2.41	2.44	2.39	2.34	2.42	2.45		
15MEC100	Engineering Drawing -CAD	2.71	2.71	2.71	2.71	2.71	2.71		
15MEC101	Engineering Drawing-CAD-II	2.89	2.89	2.89	2.89	2.89	2.89		
15MEC102	Engineering Mechanics	2.60	2.60	2.47	2.60	2.60			
15MEC111	Fundamentals of Mechanical Engineering	2.00	2.00	2.20	2.20	2.20			
15MEC180	Workshop A	2.74	2.71	2.72	2.71				
15CHY100	Chemistry	2.60	2.60	2.60					
15CHY181	Chemistry Lab.	2.78	2.78	2.78	2.78	2.78			
15PHY100	Physics	2.60	2.60	2.60					
15PHY181	Physics Lab	2.99	2.99	2.99					

CO-Attainment Percentage Academic Year- 2015-2016:

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
15AES111	Introduction to Aerospace Technology	74.15	74.15	60.59	56.52	63.30	67.37		
15CHE111	Introduction to Chemical Engineering	86.83	97.71	90.43	70.43	84.99	81.31	83.15	79.55
15CHE112	Material Balances	69.32	56.60	56.60	58.44				
15CVL102	Mechanics: Statics and Dynamics	57.23	50.51	58.51	71.64	91.19			
15CVL111	Introduction to Civil Engineering	70.15	67.69	70.15					
15CVL112	Engineering Graphics-CAD	71.58	68.77	70.18	70.18	70.18			
15CSE100	Computational Thinking and Problem Solving	88.52	85.81	88.65	88.00				
15CSE102	Computer Programming	60.48	57.00	59.20	52.95				
15CSE111	Computer Science Essentials	67.64	77.77	69.04	75.16	70.36	67.79		
15CSE180	Computer Programming Lab	47.54	49.42	49.17	47.85				
15CUL101	Cultural Education -1	78.04	75.17	75.79	79.77	75.48			
15CUL111	Cultural Education-2	69.43	67.08	67.40	71.00	68.49			
15ECE111	Solid State Devices	55.26	57.26	59.87	66.89	66.89			
15ECE112	Fundamentals of Electrical Technology	54.66	51.96	57.80	57.80	69.04	69.04		
15EEE111	Fundamentals of Electrical and Electronics Engineering	64.41	63.85	70.19	82.28	75.36	77.32		
15EEE180	Workshop B	63.76	76.33	79.64	54.09				
15ENG111	Communicative English I	88.73	96.59	97.06	84.48	84.71			
15MAT111	Calculus, Matrix Algebra	80.02	85.97	87.21	82.57	84.66	85.82		
15MAT121	Vector Calculus and Ordinary Differential Equations	67.29	66.94	62.55	61.29	75.98	66.00		
15MEC100	Engineering Drawing -CAD	66.08	68.27	66.08	68.27	66.08	67.48		
15MEC101	Engineering Drawing-CAD-II	73.85	73.85	75.12	75.12	75.12	75.12		
15MEC102	Engineering Mechanics	87.70	77.59	68.75	85.59	72.54	88.42		
15MEC111	Fundamentals of Mechanical Engineering	45.60	44.17	48.46	79.17	69.89			
15MEC180	Workshop A	81.76	80.85	81.17	81.28				
15CHY100	Chemistry	62.20	66.59	67.06					
15CHY181	Chemistry Lab.	78.07	78.07	78.31	78.31	77.53			
15PHY100	Physics	66.19	66.72	64.52					
15PHY181	Physics Lab	94.14	94.14	94.14					

Sample Calculations of CO-Attainment:

Course	COs	Internal Examination (CIE)		End Semester Examination (SEE)		Direct 50% of CIE and 50% of SEE		Indirect		Final Course Attainment 80% of Direct and 20% of Indirect		Target (%)	Attainment Yes/No
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15MAT111	CO1	80.97	3	78.26	3	79.61	3.00	81.65	3	80.02	3.00	50.00	YES
	CO2	90.14	3	78.26	3	84.20	3.00	93.00	3	85.96	3.00	50.00	YES
	CO3	94.69	3	78.26	3	86.47	3.00	89.99	3	87.18	3.00	50.00	YES
	CO4	81.55	3	78.26	3	79.90	3.00	93.20	3	82.56	3.00	50.00	YES
	CO5	85.41	3	78.26	3	81.84	3.00	94.00	3	84.27	3.00	50.00	YES
	CO6	88.70	3	78.26	3	83.48	3.00	93.00	3	85.38	3.00	50.00	YES

Course	COs	Internal Examination (CIE)		End Semester Examination (SEE)		Direct 50% of CIE and 50% of SEE		Indirect		Final Course Attainment 80% of Direct and 20% of Indirect		Target (%)	Attainment Yes/No
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15CHY100	CO1	69.23	3	55.60	2	62.41	2.50	61.34	3	62.20	2.60	50.00	YES
	CO2	77.80	3	55.60	2	66.70	2.50	66.17	3	66.59	2.60	50.00	YES
	CO3	78.97	3	55.60	2	67.28	2.50	66.17	3	67.06	2.60	50.00	YES
	CO4												
	CO5												
	CO6												

Course	COs	Internal Examination (CIE)		End Semester Examination (SEE)		Direct 50% of CIE and 50% of SEE		Indirect		Final Course Attainment 80% of Direct and 20% of Indirect		Target (%)	Attainment Yes/No
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15PHY100	CO1	79.79	3	56.53	2	68.16	2.50	73.30	3	69.19	2.60	50.00	YES
	CO2	73.61	3	56.53	2	65.07	2.50	73.30	3	66.72	2.60	50.00	YES
	CO3	68.12	3	56.53	2	62.32	2.50	73.30	3	64.52	2.60	50.00	YES
	CO4												
	CO5												
	CO6												

CO-Attainment Level Academic Year 2016-2017:

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
15AES111	Introduction to Aerospace Technology	3.00	3.00	2.00	2.00	2.00	3.00		
15CHE111	Introduction to Chemical Engineering	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
15CHE112	Material Balances	3.00	2.20	2.20	2.20				
15CVL102	Mechanics: Statics and Dynamics	2.00	2.00	2.00	3.00	3.00			
15CVL111	Introduction to Civil Engineering	3.00	3.00	3.00					
15CVL112	Engineering Graphics-CAD	3.00	3.00	3.00	3.00	3.00			
15CSE100	Computational Thinking and Problem Solving	2.95	2.95	2.95	2.95				

15CSE102	Computer Programming	2.80	3.00	3.00	2.80				
15CSE111	Computer Science Essentials	2.69	2.89	2.89	2.69	2.49	2.69		
15CSE180	Computer Programming Lab	2.27	2.47	2.47	2.27				
15CUL101	Cultural Education -1	2.60	2.60	2.60	2.60	2.60			
15CUL111	Cultural Education-2	2.58	2.58	2.58	2.58	2.58			
15ECE111	Solid State Devices	2.33	2.33	2.50	2.50	2.50			
15ECE112	Fundamentals of Electrical Technology	3.00	3.00	3.00	3.00	3.00	3.00		
15EEE111	Fundamentals of Electrical and Electronics Engineering	2.77	2.84	2.69	2.87	2.74	2.87		
15EEE180	Workshop B	2.76	2.76	2.76	2.76				
15ENG111	Communicative English I	2.79	2.79	2.79	2.79	2.79			
15MAT111	Calculus, Matrix Algebra	2.85	2.87	2.87	2.80	2.87	2.85		
15MAT121	Vector Calculus and Ordinary Differential Equations	3.00	2.97	3.00	3.00	3.00	3.00		
15MEC100	Engineering Drawing -CAD	2.96	2.97	2.97	2.96	2.95	2.96		
15MEC101	Engineering Drawing-CAD-II	2.95	2.95	2.95	2.95	2.95	2.95		
15MEC102	Engineering Mechanics	3.00	3.00	3.00	3.00	3.00			
15MEC111	Fundamentals of Mechanical Engineering	3.00	3.00	2.81	2.81	3.00			
15MEC180	Workshop A	2.77	2.85	2.82	2.85				
15CHY100	Chemistry	3.00	3.00	3.00					
15CHY181	Chemistry Lab.	2.72	2.72	2.72	2.72	2.72			
15PHY100	Physics	2.72	2.70	2.70					
15PHY181	Physics Lab	2.99	2.99	2.99					

CO-Attainment Percentage Academic Year- 2016-2017 :

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
15AES111	Introduction to Aerospace Technology	71.19	71.19	54.24	49.15	57.63	62.71		
15CHE111	Introduction to Chemical Engineering	86.83	97.71	90.43	70.43	84.99	81.31	83.15	79.55
15CHE112	Material Balances	69.32	56.60	56.60	58.44				
15CVL102	Mechanics: Statics and Dynamics	50.88	42.11	50.88	68.42	94.74			
15CVL111	Introduction to Civil Engineering	87.69	84.62	87.69					
15CVL112	Engineering Graphics-CAD	89.47	85.96	87.72	87.72	87.72			
15CSE100	Computational Thinking and Problem Solving	81.76	79.25	82.81	81.06				
15CSE102	Computer Programming	72.68	72.09	76.04	75.36				
15CSE111	Computer Science Essentials	76.31	81.91	78.36	76.10	77.58	69.85		
15CSE180	Computer Programming Lab	56.65	58.60	59.21	57.74				
15CUL101	Cultural Education -1	71.95	74.75	74.98	75.63	75.74			
15CUL111	Cultural Education-2	73.29	71.08	73.67	76.49	71.76			
15ECE111	Solid State Devices	58.08	58.59	61.62	60.61	61.11			
15ECE112	Fundamentals of Electrical Technology	75.70	75.70	75.70	75.70	83.94	83.94		
15EEE111	Fundamentals of Electrical and Electronics Engineering	78.19	77.54	85.13	88.50	81.05	80.58		

15EEE180	Workshop B	79.85	87.04	88.30	72.94				
15ENG111	Communicative English I	80.29	81.50	81.50	77.58	77.58			
15MAT111	Calculus, Matrix Algebra	74.51	78.74	67.56	75.19	82.51	76.40		
15MAT121	Vector Calculus and Ordinary Differential Equations	79.25	86.57	81.23	78.72	82.45	81.00		
15MEC100	Engineering Drawing -CAD	85.91	87.31	85.99	87.20	85.67	85.79		
15MEC101	Engineering Drawing-CAD-II	75.72	75.72	76.94	76.94	76.94	85.92		
15MEC102	Engineering Mechanics	83.03	78.54	78.13	85.07	82.22			
15MEC111	Fundamentals of Mechanical Engineering	71.51	68.06	68.06	66.68	76.34			
15MEC180	Workshop A	82.75	84.04	82.69	83.83				
15CHY100	Chemistry	75.89	77.85	77.11					
15CHY181	Chemistry Lab.	75.10	75.10	75.26	75.26	75.10			
15PHY100	Physics	72.37	69.55	70.69					
15PHY181	Physics Lab	91.44	91.44	91.44					

Sample Calculations of CO-Attainment:

Course	COs	Internal Examination (CIE)		End Semester Examination (SEE)		Direct 50% of CIE and 50% of SEE		Indirect		Final Course Attainment 80% of Direct and 20% of Indirect		Target (%)	Attainment Yes/No
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15CSE 102	CO1	80.36	3	72.85	3	76.61	3.00	55.00	2	72.29	2.80	50.00	YES
	CO2	78.46	3	72.85	3	75.66	3.00	64.00	3	73.32	3.00	50.00	YES
	CO3	95.29	3	72.85	3	84.07	3.00	62.00	3	79.66	3.00	50.00	YES
	CO4	93.21	3	72.85	3	83.03	3.00	55.00	2	77.43	2.80	50.00	YES
	CO5												
	CO6												

Course	COs	Internal Examination (CIE)		End Semester Examination (SEE)		Direct 50% of CIE and 50% of SEE		Indirect		Final Course Attainment 80% of Direct and 20% of Indirect		Target (%)	Attainment Yes/No
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15ENG 111	CO1	96.96	3	62.32	3	79.64	3.00	82.88	3	80.29	2.79	50.00	YES
	CO2	100.00	3	62.32	3	81.16	3.00	82.88	3	81.50	2.79	50.00	YES
	CO3	100.00	3	62.32	3	81.16	3.00	82.88	3	81.50	2.79	50.00	YES
	CO4	90.18	3	62.32	3	76.25	3.00	82.88	3	77.58	2.79	50.00	YES
	CO5	90.18	3	62.32	3	76.25	3.00	82.88	3	77.58	2.79	50.00	YES
	CO6												

Course	COs	Internal Examination (CIE)		End Semester Examination (SEE)		Direct 50% of CIE and 50% of SEE		Indirect		Final Course Attainment 80% of Direct and 20% of Indirect		Target (%)	Attainment Yes/No
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15CHY 100	CO1	87.16	3	66.51	3	76.83	3.00	72.09	3	75.89	3.00	50.00	YES
	CO2	92.08	3	66.51	3	79.30	3.00	72.09	3	77.85	3.00	50.00	YES
	CO3	92.57	3	66.51	3	79.54	3.00	67.42	3	77.11	3.00	50.00	YES

CO-Attainment Level Academic Year 2017-2018 :

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
15AES111	Introduction to Aerospace Technology	2.20	2.20	2.20	2.20	2.20	2.20		
15CHE111	Introduction to Chemical Engineering	3.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00
15CHE112	Material Balances	3.00	3.00	3.00	2.00				
15CVL102	Mechanics: Statics and Dynamics	2.60	2.60	2.20	2.20	2.20			
15CVL111	Introduction to Civil Engineering	2.60	2.60	2.60					
15CVL112	Engineering Graphics-CAD	3.00	2.68	3.00	2.68	3.00			
15CSE100	Computational Thinking and Problem Solving	2.90	2.90	2.90	2.90				
15CSE102	Computer Programming	2.80	2.92	2.57	1.88				
15CSE111	Computer Science Essentials	2.69	2.89	2.89	2.69	2.49	2.69		
15CSE180	Computer Programming Lab	2.34	2.54	2.54	2.34				
15CUL101	Cultural Education -1	3.00	3.00	3.00	3.00	3.00			
15CUL111	Cultural Education-2	2.54	2.47	2.49	2.42	2.42			
15ECE111	Solid State Devices	2.13	2.00	2.13	2.00	2.00			
15ECE112	Fundamentals of Electrical Technology	2.45	2.76	2.00	2.42	2.53	2.21		

15EEE111	Fundamentals of Electrical and Electronics Engineering	2.61	2.37	2.75	2.46	2.90	2.40		
15EEE180	Workshop B	2.36	2.36	2.36	2.36				
15ENG111	Communicative English I	3.00	2.52	3.00	3.00	2.82			
15MAT111	Calculus, Matrix Algebra	2.89	2.89	2.91	2.87	2.89	2.89		
15MAT121	Vector Calculus and Ordinary Differential Equations	2.94	2.94	2.96	2.94	2.92	2.94		
15MEC100	Engineering Drawing -CAD	2.95	2.95	2.95	2.95	2.95	2.95		
15MEC101	Engineering Drawing-CAD-II	3.00	3.00	3.00	3.00	3.00	3.00		
15MEC102	Engineering Mechanics	3.00	3.00	3.00	3.00	3.00			
15MEC111	Fundamentals of Mechanical Engineering	2.40	2.40	2.40	2.40	2.40			
15MEC180	Workshop A	2.86	2.84	2.88	2.9				
15CHY100	Chemistry	2.60	2.60	2.60					
15CHY181	Chemistry Lab.	2.60	2.60	2.60	2.60	2.60			
15PHY100	Physics	2.60	2.60	2.60					
15PHY181	Physics Lab	2.97	2.97	2.97					

CO-Attainment Percentage Academic Year - 2017-2018:

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
15AES111	Introduction to Aerospace Technology	43.17	48.25	46.98	46.98	49.52	50.79		
15CHE111	Introduction to Chemical Engineering	60.07	75.82	61.45	62.62	57.90	62.04	73.10	80.63
15CHE112	Material Balances	72.77	72.84	65.83	59.59				
15CVL102	Mechanics: Statics and Dynamics	70.22	65.62	70.65	65.36	61.70			
15CVL111	Introduction to Civil Engineering	57.02	60.30	62.67					
15CVL112	Engineering Graphics-CAD	85.92	89.00	84.79	87.28	82.30			
15CSE100	Computational Thinking and Problem Solving	81.82	78.99	84.74	81.44				
15CSE102	Computer Programming	68.63	67.57	61.32	58.91				
15CSE111	Computer Science Essentials	74.83	79.43	77.76	76.22	73.70	71.88		
15CSE180	Computer Programming Lab	55.54	57.40	57.07	55.60				
15CUL101	Cultural Education -1	82.32	84.70	79.01	81.82	80.25			
15CUL111	Cultural Education-2	70.14	64.13	63.48	64.72	61.65			
15ECE111	Solid State Devices	52.71	50.06	51.51	50.50	51.58			
15ECE112	Fundamentals of Electrical Technology	59.16	65.92	52.15	65.92	87.42	64.65		
15EEE111	Fundamentals of Electrical and Electronics Engineering	67.15	61.62	67.26	70.46	80.02	69.29		
15EEE180	Workshop B	56.81	73.43	74.98	44.51				
15ENG111	Communicative English I	74.44	85.94	82.32	72.09	69.95			
15MAT111	Calculus, Matrix Algebra	74.92	80.05	70.37	75.18	83.83	78.58		
15MAT121	Vector Calculus and Ordinary Differential Equations	77.84	85.42	79.15	76.33	80.28	78.50		
15MEC100	Engineering Drawing -CAD	85.09	86.76	85.09	86.76	85.09	85.09		
15MEC101	Engineering Drawing-CAD-II	91.19	91.19	92.18	92.18	92.18	92.18		
15MEC102	Engineering Mechanics	84.62	84.65	81.35	92.11	84.98			

15MEC111	Fundamentals of Mechanical Engineering	69.94	61.79	72.16	90.68	68.46			
15MEC180	Workshop A	78.96	77.29	78.69	79.58				
15CHY100	Chemistry	68.23	68.24	71.47					
15CHY181	Chemistry Lab.	65.68	65.68	65.68	65.68	65.68			
15PHY100	Physics	71.16	68.54	69.82					
15PHY181	Physics Lab	93.81	93.67	93.87					

Sample Calculations of CO-Attainment:

Course	COs	Internal Examination (CIE)		End Semester Examination (SEE)		Direct 50% of CIE and 50% of SEE		Indirect		Final Course Attainment 80% of Direct and 20% of Indirect		Target (%)	Attainment Yes/No
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15CUL 101	CO1	88.98	3	74.82	3	81.90	3.00	84.00	3	82.32	3.00	50.00	YES
	CO2	92.92	3	74.82	3	83.87	3.00	88.00	3	84.70	3.00	50.00	YES
	CO3	84.71	3	74.82	3	79.77	3.00	76.00	3	79.01	3.00	50.00	YES
	CO4	88.74	3	74.82	3	81.78	3.00	82.00	3	81.82	3.00	50.00	YES
	CO5	91.79	3	74.82	3	83.31	3.00	68.00	3	80.25	3.00	50.00	YES
	CO6												

Course	COs	Internal Examination (CIE)		End Semester Examination (SEE)		Direct 50% of CIE and 50% of SEE		Indirect		Final Course Attainment 80% of Direct and 20% of Indirect		Target (%)	Attainment Yes/No
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15CHY 100	CO1	77.50	3	53.78	2	65.64	2.50	78.60	3	68.23	2.60	50.00	YES
	CO2	79.87	3	51.43	2	65.65	2.50	78.60	3	68.24	2.60	50.00	YES
	CO3	88.47	3	50.92	2	69.69	2.50	78.60	3	71.47	2.60	50.00	YES
	CO4												
	CO5												
	CO6												

Course	COs	Internal Examination (CIE)		End Semester Examination (SEE)		Direct 50% of CIE and 50% of SEE		Indirect		Final Course Attainment 80% of Direct and 20% of Indirect		Target (%)	Attainment Yes/No
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15CHY181	CO1	80.87	3	45.92	2	63.40	2.50	74.82	3	65.68	2.60	50.00	YES
	CO2	80.87	3	45.92	2	63.40	2.50	74.82	3	65.68	2.60	50.00	YES
	CO3	80.87	3	45.92	2	63.40	2.50	74.82	3	65.68	2.60	50.00	YES
	CO4	80.87	3	45.92	2	63.40	2.50	74.82	3	65.68	2.60	50.00	YES
	CO5	80.87	3	45.92	2	63.40	2.50	74.82	3	65.68	2.60	50.00	YES
	CO6												

Course	COs	Internal Examination (CIE)		End Semester Examination (SEE)		Direct 50% of CIE and 50% of SEE		Indirect		Final Course Attainment 80% of Direct and 20% of Indirect		Target (%)	Attainment Yes/No
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15PHY100	CO1	84.25	3	57.18	2	70.71	2.50	72.96	3	71.16	2.60	50.00	YES
	CO2	77.28	3	57.18	2	67.23	2.50	73.82	3	68.54	2.60	50.00	YES
	CO3	80.56	3	57.18	2	68.87	2.50	73.63	3	69.82	2.60	50.00	YES
	CO4												
	CO5												
	CO6												

CO-Attainment Level Academic Year - 2018-2019:

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
15AES111	Introduction to Aerospace Technology	2.20	2.20	2.20	2.20	2.20	2.20		
15CHE111	Introduction to Chemical Engineering	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
15CHE112	Material Balances	2.20	3.00	3.00	3.00				
15CVL102	Mechanics: Statics and Dynamics	3.00	3.00	2.60	2.20	3.00			
15CVL111	Introduction to Civil Engineering	3.00	2.20	2.20					
15CVL112	Engineering Graphics-CAD	3.00	2.68	3.00	2.68	3.00			
15CSE100	Computational Thinking and Problem Solving	2.82	2.69	2.65	2.82				
15CSE102	Computer Programming	2.81	2.64	2.58	2.66				
15CSE111	Computer Science Essentials	2.60	3.00	3.00	3.00	3.00	3.00		
15CSE180	Computer Programming Lab	2.20	2.20	2.20	3.00				
15CUL101	Cultural Education -1	2.96	2.96	2.96	3.00	3.00			
15CUL111	Cultural Education-2	2.76	2.75	2.77	2.78	2.78			
15ECE111	Solid State Devices	3.00	3.00	2.50	2.50	2.81			
15ECE112	Fundamentals of Electrical Technology	3.00	3.00	2.60	3.00	3.00	3.00		
15EEE111	Fundamentals of Electrical and Electronics Engineering	2.76	2.53	2.25	2.42	2.54	2.25		
15EEE180	Workshop B	76.16	85.52	86.87	67.00				
15ENG111	Communicative English I	2.82	2.44	2.68	2.74	2.56			
15MAT111	Calculus, Matrix Algebra	2.82	2.91	2.84	2.89	2.89	2.92		

15MAT121	Vector Calculus and Ordinary Differential Equations	2.34	2.52	2.50	2.43	2.24	2.33		
15MEC100	Engineering Drawing -CAD	3.00	3.00	3.00	3.00	3.00	3.00		
15MEC101	Engineering Drawing-CAD-II	3.00	3.00	3.00	3.00	3.00	3.00		
15MEC102	Engineering Mechanics	2.60	3.00	2.60	3.00	3.00			
15MEC111	Fundamentals of Mechanical Engineering	2.80	2.00	2.40	2.40	2.40			
15MEC180	Workshop A	2.68	2.91	2.93	2.76				
15CHY100	Chemistry	2.73	2.90	2.85					
15CHY181	Chemistry Lab.	3.00	3.00	3.00	3.00	2.95			
15PHY100	Physics	2.47	2.30	2.43					
15PHY181	Physics Lab	2.93	2.93	2.93					

CO-Attainment Percentage Academic Year - 2018-2019:

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
15AES111	Introduction to Aerospace Technology	43.17	48.25	46.98	46.98	49.52	50.79		
15CHE111	Introduction to Chemical Engineering	75.05	91.10	79.50	67.30	83.35	79.90	84.25	79.55
15CHE112	Material Balances	64.20	65.72	70.20	74.76				
15CVL102	Mechanics: Statics and Dynamics	84.40	73.84	90.19	72.18	88.78			
15CVL111	Introduction to Civil Engineering	91.49	74.08	73.04					
15CVL112	Engineering Graphics-CAD	85.91	89.00	84.79	87.28	82.30			
15CSE100	Computational Thinking and Problem Solving	76.64	70.27	75.81	72.84				
15CSE102	Computer Programming	71.93	65.70	73.27	69.02				
15CSE111	Computer Science Essentials	75.43	78.00	83.57	78.08	83.56	81.76		
15CSE180	Computer Programming Lab	88.55	88.40	85.76	87.61				
15CUL101	Cultural Education -1	77.92	79.41	80.76	87.82	87.68			
15CUL111	Cultural Education-2	76.48	76.26	76.61	77.34	81.31			
15ECE111	Solid State Devices	79.15	73.90	66.55	64.86	75.46			
15ECE112	Fundamentals of Electrical Technology	79.82	80.70	67.72	79.35	86.64	78.17		
15EEE111	Fundamentals of Electrical and Electronics Engineering	69.13	60.42	71.46	82.72	88.50	54.15		
15EEE180	Workshop B	2.82	2.82	2.82	2.82				
15ENG111	Communicative English I	51.80	76.06	72.09	49.15	47.31			
15MAT111	Calculus, Matrix Algebra	69.86	76.48	73.07	76.99	80.25	78.18		
15MAT121	Vector Calculus and Ordinary Differential Equations	69.76	71.03	71.67	72.11	66.56	60.97		
15MEC100	Engineering Drawing -CAD	80.29	77.01	77.03	74.18	83.34	76.86		
15MEC101	Engineering Drawing-CAD-II	80.67	80.67	85.78	79.55	68.10	85.57		
15MEC102	Engineering Mechanics	65.84	74.73	63.82	84.35	81.49			
15MEC111	Fundamentals of Mechanical Engineering	7.88	51.62	62.03	65.99	63.86			
15MEC180	Workshop A	77.35	86.61	87.65	79.45				
15CHY100	Chemistry	67.21	72.93	70.24					
15CHY181	Chemistry Lab.	92.39	90.47	91.25	91.82	68.90			

15PHY100	Physics	60.92	57.13	98.45					
15PHY181	Physics Lab	87.80	86.64	89.33					

8.5 Attainment of Program Outcomes from first year courses (20) Total Marks 20.00

8.5.1 Indicate results of evaluation of each relevant PO and/or PSO if applicable (10)

Institute Marks : 10.00

POs Attainment:

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
15AES	2.2	2.2	0	2.2	0	2.2	2.2	0	2.2	2.2	0	2.2
15CHE	3	3	0	3	3	0	0	3	0	0	0	0
15CHE	2.75	2.75	2.8	2.82	0	0	0	0	0	0	0	0
15CVL	2.76	2.76	0	0	0	0	0	0	0	0	0	0
15CVL	1.48	1.48	1.48	1.48	1.48	0	0	0	0	0	0	1.48
15CVL	2.87	2.87	2.87	2.87	2.87	0	0	0	0	0	0	2.87
15CSE	2.72	2.74	2.74	0	2.74	0	0	2.69	2.69	2.69	0	0
15CSE	2.67	2.63	2.63	0	0	0	0	0	0	0	0	0
15CSE	2.40	2.40	2.40	0	2.20	0	0	0	0	0	0	0
15CUL	0	0	0	0	0	2.98	2.98	2.98	2.98	2.98	2.98	2.98
15CUL	0	0	0	0	0	2.92	2.92	2.92	2.92	2.92	2.92	2.92
15ECE	2.76	2.76	0	0	0	0	0	0	0	0	0	2.76
15ECE	2.94	2.92	2.87	0	0	0	0	0	0	0	0	2.91
15EEE	2.47	2.50	2.20	0	0	0	0	0	0	0	0	0
15EEE	2.82	2.82	2.82	0	0	0	0	2.82	2.82	2.82	0	2.82
15ENC	0	0	0	0	0	0	0	2.56	2.44	2.67	0	2.63
15MAT	2.87	2.88	2.88	0	0	0	0	0	0	0	0	2.83
15MAT	2.39	2.46	2.42	0	0	0	0	0	0	0	0	2.43
15MEC	3.0	3.0	3.0	3.0	0	0	0	0	0	3.0	0	3.0
15MEC	3.0	3.0	3.0	3.0	0	3.0	0	0	0	0	0	3.0
15MEC	2.73	2.73	2.71	2.73	0	0	0	0	0	0	0	2.73
15MEC	2.4	2.4	2.36	2.27	0	2.4	2.4	0	2.4	0	0	2.4
15MEC	2.82	2.85	2.91	0	2.91	0	0	0	2.82	2.82	0	2.82
15CHY	2.73	2.9	2.85	0	0	0	0	0	0	0	0	0
15CHY	2.99	2.99	2.98	0	0	0	0	0	0	0	0	0
15PHY	2.4	2.4	0	0	0	0	0	0	0	0	0	2.4
PHY18	2.93	2.93	2.93	2.93	2.93	2.93	0	0	0	0	0	0
15CSE	2.96	2.96	2.96	0	0	0	0	0	0	0	0	0

PO Attainment Level

PSOs Attainment:

Course	PSO1	PSO2	PSO3
Cxxx	PSO1	PSO2	PSO3

8.5.2 Actions taken based on the results of evaluation of relevant POs and PSOs (10)

Institute Marks : 10.00

9 STUDENT SUPPORT SYSTEMS (50)

Total Marks 50.00

9.1 Mentoring system to help at individual level (5)

Total Marks 5.00

Institute Marks : 5.00

Amrita's approach to mentoring and counselling the students is guided by the vision of imparting value-based education to our students. The role of a dedicated and hardworking faculty body is vital towards achieving this objective. A balanced and active mentoring is in place, maintaining a healthy relationship between faculty members and students. Mentoring and counselling are planned for the following aspects:

- Improve AcademicPerformance
- Develop a Research Orientation
- Guidance for Professional Career, Higher Studies, and Skill Development
- Resolve Personal Issues: Behavioral, Psychological
- Encourage Spirit of Innovation by motivating and training students to participate in Technical Contests, Conferences, Projects, and Internships
- Motivate to pursue Extra-curricular and Social activities
- Encourage students to participate in Cultural activities, Arts, and Sports
- Develop Personality and Character
- Foster Good Values, Discipline, and healthy living

Student Portfolio

The Student Portfoliowith personal details along with their academic performance and progress, is maintained as follows:

- Personal file: A detailed personal file is kept in the School Administration Office, recording all relevant aspects of a student (Ref.B 9.1). This is supplemented by two automated software.
- Amrita University Management System (AUMS) Software: A master database holding all academic records (Ref.B 9.2).
- Campus Management System (CMS): A database containing essential information, both academic (operational) and non-academic elements, required for effective mentoring and counselling of students at multiple levels. The data is stored as Work Registers, Counseling Diaries, Achievements, and Disciplinary actions(Ref. B 9.3, 9.4, 9.5 and 9.6).

The Mentoring Structure

An effective student mentoring and counselling system has been implemented in the institution. The Department Chairperson assisted by the Department Vice-Chairperson(s) steer, direct, and oversee this vital aspect:-

- **Batch Coordinators**: Each batch (from first year onwards to final year) of the programme is assigned with a batch coordinator (BC) who is delegated the responsibility of coordinating with the class advisors of every section (class) belonging to the particular batch. They shall advise, help, and coordinate the class advisors in the process of mentoring the students and in motivating the students to maintain excellent academic performance. They are also responsible for organizing frequent class-committee meetings and in reporting the developments to the Department Chairperson.
- **Class Advisors:** Class Advisors (CA) are appointed for a group of every 20 students in a class when the students join the UG programme. Class Advisors so nominated hold the responsibility until the students complete the programme. The CAs will maintain all records of their respective wards assigned to them in the work register/counselling diary in the CMS. They shall guide and mentor the students on maintaining excellent academic performance, attendance, and discipline. They shall advise the students, monitor the courses undergone by them, monitor their performance in tests and also look into their personal difficulties. They also guide students on internships and higher studies and facilitate the students wishing to pursue the various programmes offered by Amrita Centre for International Programmes (ACIP). An Advisor also keeps track of Co-curricular, Extra Curricular achievements, and Social activities. The CAs shall inform the parents regarding the academic progress and attendance status immediately after the periodical tests and end semester examinations (Ref. B 9.7&9. 8).
- **Class Committee**: Class committee comprises of the Chairperson, Batch Coordinator, Class Advisors, and Student Representatives.

  The Class Committees are of two kinds:

  (i) Student Class Committee, comprising of student representatives, Chairperson/Vice Chairperson, and Batch Coordinator. Student grievances, academic and non-academic related, consolidated by the representatives will be reported and discussed in these committee meetings.

  (ii) Staff Class Committee, comprising of the Batch Coordinator, Class advisors, and the faculty handling the courses. All student grievances and findings raised in the student class committee are addressed.

  The overall goal of the class committee is toimprove the effectiveness of the teaching-learning process.Class committee meetings are conducted immediately after each of the periodicals. Aspects addressed during the Class Committee meetings are:

- Resolve any issues faced by students in the classroom/ laboratories.
- Clarify Rules & Regulations of the degree program.
- Discuss the academic progress and the coverage of syllabus.
- Analysis of student performance.
- Identify slow learners, if any, and plan necessary support measures.
- Track attendance shortage and caution students lacking the requisite percentage.
- Feedback from the students is conveyed to the concerned faculty member.

- **Quality Improvement Committee**: The Quality Improvement Committee (QIC) formulates the Vision, Mission, and PEOs of the Department. The Committee ensures collective responsibility of overall academic activities, programs, and performance of the department by taking measures to enhance the quality of the teaching-learning process. This committee will review the results of the Cumulative Internal examinations (CIE) and Semester End Examinations (SEE), frame strategies for enhancing staff development, teacher's attitude to students, etc. This will also function as the departmental discipline monitoring committee.

  Apart from the regular monitoring, the committee also assesses the quality of the question paper set by the faculty members. It ensures whether the question paper satisfies the Bloom's Taxonomy Levels - Knowledge, Comprehension, Application, Analysis,Synthesis, and Evaluation. Moreover, it deals with faculty who scores less than 75% in the student's feedback evaluation.

  The minutes of meetings are circulated to all concerned for further actions. The Office of Dean Engineering is kept informed of points deserving his attention.

Academic Processes (Mentoring)

A systematic and structured orientation programme is conducted for the fresher's, (both on academic and cultural aspects) as given below:-

- **Orientation of Fresher's (Academic)**

Amrita attracts UG students with varied academic (CBSE/ State Boards/ ICSE) and cultural backgrounds (from abroad as well). At the commencement of the academic programme, a detailed orientation is imparted to fresher's. Parents are also called for the meetings to make them aware of the campus life and academic rules & regulations.

- A School level, 2-week induction programme is organized. Activities involved during the induction programme includes physical activities like yoga, aerobics, and sports, exposure to creative arts, universal human values, motivational lectures, and field trips (Ref.

B 9.9).

- This is followed by a separate department level orientation for two days.
- **Programme Specific**
- Weekly mentoring Sessions: Mentoring sessions are scheduled in the faculty-student timetable. The faculty mentors discuss issues related to academics with the assigned students (20) which can help in an improved academic achievement (Ref. B 9.10).
- Professional Orientation for 2nd Year Students: This is conducted for 2nd year students, to orient them professionally to the respective engineering discipline that they have enrolled.
- Choice of Electives: In higher semesters, guidance is provided to the students for selecting appropriate elective courses (Ref. B 9.11).
- Mentoring for Higher Education: Students planning to pursue higher studies are guided and mentored by faculty members.
- Support for Placements: Continuous support is rendered by the departments in tandem with the efforts of the Corporate and International Relations (CIR) to prepare students to achieve quality placements. During the beginning of the semester, the department is actively involved in the CIR pre-placement training offered to the final year students, wherein the faculty members reviseimportantcourses covered in the previous academic years. This is intendedto improve the confidence of students during the placement sessions.
- **Course Work Specific**
- Tutorial Classes: Tutorial sessions are embedded in the curriculum, enabling a direct first level mentoring by the respective teaching faculty.
- Course CommitteeMeetings and Follow Up Mentoring Actions: The primary aim of the course committee meetings is to develop a proper course-plan at the beginning of the semester, and to ensure proper progress of the course during the running semester. In addition, feedback taken from the student representatives during the Class Committee meetings is discussed and necessary corrective actions are recommended. Based on this feedback, mentoring and counselling of faculty is done by the Department Chairperson/Senior professors. This feedback and actions rendered would help in closing the academic course loop.

Alumni Interaction

Visiting alumni are a great source of inspiration to the student body. They interact with the students, counsel, and guide them. This has immensely benefitted, especially the motivated students, who plan to pursue higher studies (both in India and abroad).

Personal Issues- Counseling & Resolution of Personal Problems: A healthy and peaceful state of mind goes a long way to enable students to concentrate on academics. Counselling students on personal issues is therefore vital and hence is incorporated into the system (Figure 9.1. Categories of issues encountered are: interpersonal relationships, behavioural abnormalities, adjustment to the campus environment, emotional disturbances, family related problems etc.

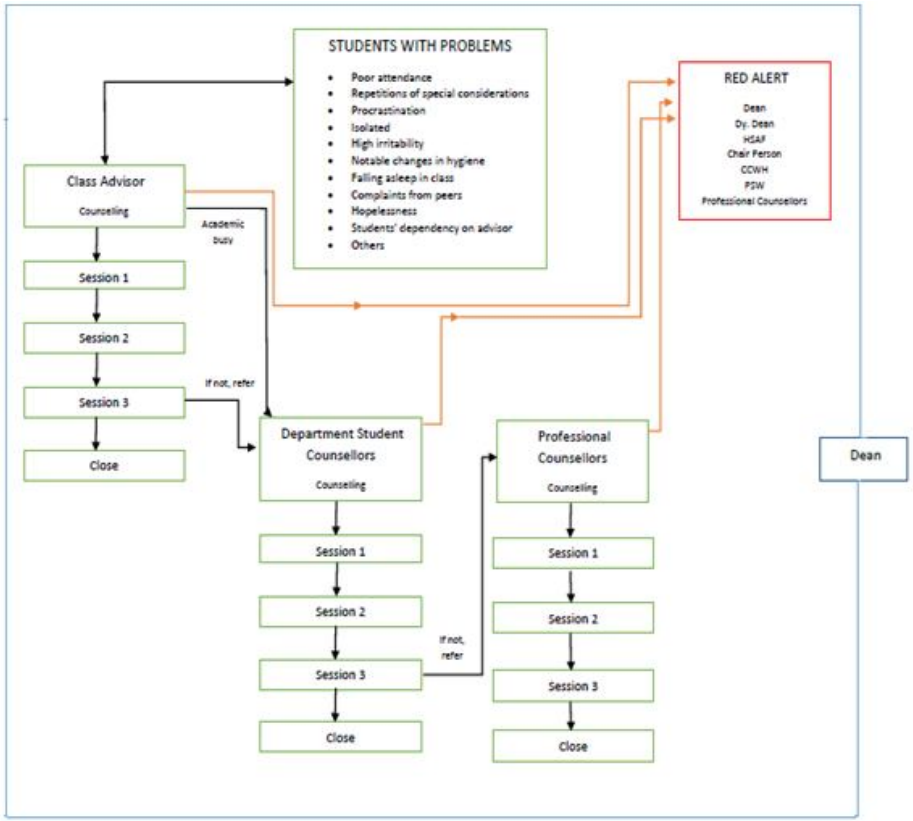


Figure 9.1 The Mentoring Work-Flow

The Counseling Structure

- **Department Faculty Counselors**: While the Class Advisors focus primarily on dealing with academic issues, some Professors are trained and nominated as Department Faculty Counselors, to handle behavioral issues of the students which are beyond the immediate scope of the Class Advisors (Ref. B 9.12a).
- **Professional Counselors**: Cases are escalated and referred to the professional counselors when such a necessity is felt by the departments. They provide individual and group counselling to the students to help them maintain and improve their emotional, intellectual, physical and spiritual well-being through a process of self-discovery that promotes overall well-being. Two Professional Counsellors directly interact with students in need of personal counselling to alleviate stress and anxiety, achieve enhanced self-esteem, attain good inter-personal skills and ultimately help to achieve educational goals. Through the two-tier system of Class Advisors and Department Counsellors, a personal rapport is established with the individual students. Cordial relations are also developed with parents by interacting with them on need basis. For confidential help and exigencies, students are advised to directly contact the help line No.91-9487302905 or email to wecare@cb.amrita.edu (Ref. B 9.12b). A summary of counseling activities carried out by them is given at Ref. B 9.12c. They also carry out training of the Department Counselors (Ref. B 9.12d)
- **Chief Faculty Wardens (CFW) and Wardens of Hostels**: The CFW and the network of wardens play a crucial role in identifying students needing counseling. Cases that require focused care and attention are referred to the Class Advisors/ Department Counselors.

The Work Flow of Counseling Process

- Level-1: (Respective Class Advisors / Teaching faculty/ Hostel Wardens). At the first level, behavioral issues noticed by a warden or a class handling faculty, if not addressed by them, are referred to the Class Advisor.
- Level-2: (Department Faculty Counselors / CFW). In case the issue is not resolved by the functionaries mentioned at Level-1, it is escalated.
- Level-3: Professional Counselors. The case is referred to the Professional Counselor, from any level, if warranted.

Wherever required, parents are also invited to render their support and cooperation for effective counseling of their wards. Cases requiring psychiatric treatment are referred to hospitals in the City. A strategy for counseling and monitoring students, generally followed by departments are given at Ref. B 9.12e. Minutes of one Counselors Meeting of 27 Jun 2018 is given at Ref. B 9.12f Follow up action report is given in Ref. B 9.12g, Ref. B 9.12h, and Ref. B 9.12i.

Student Support Extended for Value Based Education

To follow up on the stated mission of the University, "*To provide value-based education and mould the character of younger generation.....*", varied multi-pronged steps have been initiated to by way of offering opportunities to students to learn by example. Towards this, a strong foundation is laid for holistic education through Live-in-Labs, Amrita Serve, Amala Bharatham, IAM meditation techniques, Amrita Yoga and Geetamritam (Bhagavat Geeta camp) etc. A special programme is run for the freshers as Amrita Learning to Integrate Values and Excellence (ALIVE) projects in Care to Care, Combating Social evils, Organic Farming, Amala-Bharatham (Swatchata drive), Amrita Quench (Conservation of water), Holistic Personality, etc. (Ref. B 9.13).

Efficacy of Mentoring System:

The mentoring-counseling system in place in the School of Engineering has reaped rich dividends in the following ways:

- A gradual and systematic induction of the students assisted in effective transition to college life, reducing their sense of isolation and homesickness. This gave the students confidence to face the rigors of academics.
- The mentors provided impartial advice, individual and personal care, and encouragement to the students all through their academic years. This created a positive work environment and developed a supportive relationship between the students and the staff. A mixture of harmonious and happy atmosphere prevalent in the campus enables the students to focus on academics and research.
- The placement statistics, success in GATE/CAT exams, and admit to premier institutions in India and abroad are testimony to the efficacy of the mentoring and counseling procedure adopted to sustain the academic rigor.
- Enhanced the efficacy of the teaching learning process.
- Increased the comfort level of the students by progressing them through a systematic and structured path to their graduation.

9.2 Feedback analysis and reward /corrective measures taken, if any (10) Total Marks 10.00

Institute Marks : 10.00

Faculty Feedback analysis process

Feedback is collected for all courses and participation of all students is ensured. This is done by online teacher evaluation through AUMS. Based on the findings, a comprehensive analysis of the teaching and mentoring ability of the teachers is carried out. The detailed student feedback is communicated to the respective faculty members, to make them aware of their strengths and weaknesses in order to enhance their teaching skills.

Batch Coordinator/Class advisors visit the classes at the beginning of the semester and provide an overview of the courses and general instructions. During this meeting, the batch coordinator/advisor emphasizes the importance of each course, its applications, and about curricular and co-curricular activities planned in that semester. This ensures a smooth academic environment for the students to progress. The faculty in charge of each course starts the classes with an introduction to the course with an emphasis on the pre-requisites if any. This is followed by a review of the syllabus, lecture plan, and course objectives & outcomes.

• Basis of reward/corrective measures, if any

Faculty members who receive a feedback below 75% are identified and they are supposed to undergo a faculty development programme as directed by the Quality Improvement Committee. On the other hand, the faculty members who receive good feedback are appreciated at the department level staff meetings.

The faculty feedback analysis process is presented in Figure 9.2. The questionnaire used for collecting faculty feedback from the students is given in Annexure 9.1

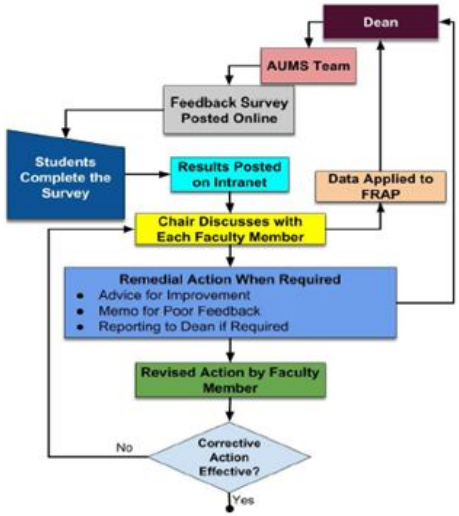


Figure 9.2 Faculty Feedback analysis process

Number of corrective actions taken in the department in the last three years: 7

2019 20 (EVEN): 0

2019 20 (ODD) : 0

2018 19 (EVEN): 0

2018 19 (ODD) : 2

2017 18 (EVEN): 0

2017 18 (ODD) : 5

ANNEXURE 9.1

a). The questionnaire for faculty feedback assessment(2017-2018)

Q.No.	Questions	Options
1	Knowledge of the teacher in the subject.	Excellent
		Good
		Fair
		Poor

Q.No.	Questions	Options
		Unable to Judge
2	Clarity and understandability of teachers explanations.	Excellent
		Good
		Fair
		Poor
		Unable to Judge
3	Teachers willingness to help the students.	Excellent
		Good
		Fair
		Poor
		Unable to Judge
4	Approximate percentage of classes not engaged by the teacher in the subject.	Less than 10%
		10% to 25%
		More than 25%
		Unable to judge
5	Whether the teacher dictates notes only without explanations?	Yes
		No
		Unable to Judge
6	Teachers ability to organize lectures.	Excellent
		Good
		Fair
		Poor
		Unable to Judge
7	Speed of presentation.	Just Right
		Too Fast
		Too Slow
		Unable to Judge
8	Behavior of the teacher.	Pleasant
		Indifferent
		Unpleasant
		Unable to Judge
9	Does the teacher encourage questioning?	No
		Sometimes
		Yes
		Unable to Judge
10	Sincerity of the teacher.	Sincere
		Not Sincere
		Unable to Judge
		Do not want to answer

Q.No.	Questions	Options
11	Overall teaching effectiveness	Excellent
		Good
		Fair
		Poor
		Unable to Judge
12	I would like to take another course from this teacher.	Yes
		No
		Do Not want to answer
13	The teacher has utilized the CBT (Computer Based Training) facilities to improve the quality of the course delivery and teaching / learning experience, (e.g. Projector classes, AUMS, Online exams, quizzes, Discussion forums, etc.)	Less than 10%
		Between 10% and 50%
		Between 50% and 80%
		Above 80%
		Not applicable for this course
14	My intellectual curiosity has been stimulated by this course.	Yes
		No
		Do Not want to answer
15	Tests and papers are graded and returned promptly.	Yes
		No
		Not always
16	The instructor is approachable for the students.	Yes
		No
		Not always
17	Strength of the teacher (Special/Significant conspicuous remarks)	Text
18	Weakness of the teacher (Special/Significant conspicuous remarks)	Text
19	Any other information (Mannerism, peculiarities or anything relevant).	Text

b). The questionnaire for faculty feedback assessment (2018-2019 Onwards)

Q.No	Questions	Options
1	How much of the syllabus was covered in the semester/year?	85 to 100%
		70 to 84%
		55 to 69%
		30 to 54
		Below 30%
2	How well did the faculty prepare for the classes?	Thoroughly
		Satisfactorily
		Poorly
		Indifferently
		Won't teach at all
3	Faculty inform you about the expected competencies, course outcomes and programme outcomes	Every time
		Usually
		Occasionally/Sometimes
		Rarely
		Never
4	How well was the faculty able to communicate?	Always effective
		Sometimes effective
		Just satisfactorily
		Generally ineffective

Q.No	Questions	Options
		Very poor communication
5	The faculty approach to teaching can best be described as	Excellent
		Very good
		Good
		Fair
		Poor
6	Fairness of the internal evaluation process by the faculty.	Always fair
		Usually fair
		Sometimes unfair
		Usually unfair
		Unfair
7	Was your performance in assignments discussed with you?	Every time
		Usually
		Occasionally/Sometimes
		Rarely
		Never
8	The faculty illustrates the concepts through examples and applications.	Every time
		Usually
		Occasionally/Sometimes
		Rarely
		Never
9	Your faculty does a necessary follow-up with an assigned task to you.	Every time
		Usually
		Occasionally/Sometimes
		Rarely
		Never
10	The faculty identify your strengths and encourage you with providing right level of challenges.	Fully
		Reasonably
		Partially
		Slightly
		Unable to
11	Faculty is able to identify your weaknesses and help you to overcome them.	Every time
		Usually
		Occasionally/Sometimes
		Rarely
		Never
12	The faculty helps you identify your strengths and weaknesses.	Every time
		Usually

Q.No	Questions	Options
		Occasionally/ Sometimes
		Rarely
		Never
13	The faculty use student centric methods, such as experiential learning, participative learning and problem solving methodologies for enhancing learning experiences.	To a great extent
		Moderate
		Some what
		Very little
		Not at all
14	What percentage of faculty use ICT tools such as LCD projector, Multimedia, etc. while teaching.	Above 90%
		70 – 89%
		50 – 69%
		30 – 49%
		Below 29%
15	The overall quality of teaching-learning process was very good.	Strongly agree
		Agree
		Neutral
		Disagree
		Strongly disagree
16	Give three observation / suggestions to improve the overall teaching – learning experience in your institution.	Text

9.3 Feedback on facilities (5) Total Marks 5.00

Institute Marks : 5.00

The campus is facilitated with nine hostels. Details of facilities extended are listed in the Hostel Handbook (Ref. B 9.14a).The feedback on central facilities is taken on a regular basis from the students and is incorporated into the academic and counselling structure. A survey taken from Final Year students is reported in Table.9.1(a) & 9.1(b).

Feedback of Final Year Students (2015-2016 Batch) - Residents – Report

Total Responses: 1113

Measure of positivity = positive responses/negative responses = (Very Good + Good) / (Very Poor + Poor)

Table 9.1(a) Exit Feedback 2016-2017 batch

S.No.	Parameters	Very Good	Good	Average	Poor	Very Poor	Positivity
1	Waste Management System	334	515	186	30	49	10.7
2	Drinking Water	294	531	200	40	49	9.2
3	Dining Hall Capacity	240	582	194	40	58	8.3
4	Hostel surroundings (Garden, Hygiene)	304	521	188	49	52	8.0
5	Dining Hall Hygiene	245	534	228	40	67	7.2
6	Visits By Resident Warden	248	529	222	45	70	6.7
7	Mess Hall Infrastructure	207	518	264	57	68	5.8
8	Room Furniture Adequacy	254	468	258	72	62	5.3
9	Hostel Room/Corridor Hygiene	258	471	245	69	71	5.2
10	Toilet Cleanliness	272	461	240	74	67	5.0
11	Accessibility of staff	192	516	261	70	75	4.8
12	Electrical Equipments Availability	239	473	247	84	71	4.5
13	Sports Facilities (Gym, Outdoor, Indoor etc.)	207	471	275	85	76	4.2
14	Laundry Facility	181	454	310	83	86	3.7
15	Behavior Of Hostel Staff	209	470	246	86	103	3.6
16	Reading Room Facilities (News Papers, Magazines etc.)	176	402	345	111	80	3.0
17	Food Serving Mechanism	160	414	306	103	131	2.4
18	Attention On Problems	155	401	273	130	155	1.9
19	Role Of Student Representatives	147	372	298	148	149	1.7
20	Computerized Gate pass Management System (CMS)	177	388	222	117	210	1.7
21	Recreational Facilities	156	279	340	197	142	1.2
22	Quality of Food	110	239	304	173	288	0.8

Action taken:

1. Wi- Fi extended to all Hostels 24x7.
2. CCTV cameras installed throughout the campus including hostels for safety and security.
3. Dish washers were installed in all hostels, a total of four dish washers.
4. The existing Gate Pass Management System upgraded to Campus Management System with more students friendly add ons.
5. The Main canteen was completely renovated to accommodate more students and menu revamped.
6. Timings of all canteens were extended till 8 PM.
7. Power laundry was introduced.
8. New saloon and spa introduced in the campus.
9. New stage constructed in the Main Playground/Track enhanced with greenery

Table.9.1(b) Feedback of Final Year Students (2017-2018 Batch) - Residents - Report

S.No.	Parameters	Very Good	Good	Average	Poor	Very Poor	Positivity
1	Amenity Stores	111	229	210	67	72	2.0
2	Attention to Problems	95	182	216	86	110	1.0
3	Behavior of Hostel Staff	138	246	182	55	68	3.0
4	Bus & Transport	103	239	219	63	65	3.0
5	Campus maintenance	310	253	94	9	23	18.0
6	Campus security	203	249	123	42	72	4.0
7	Campus wifi	91	162	218	125	93	1.0
8	Canteen facilities	81	172	198	106	132	1.0
9	Clinic & Pharmacy	109	224	209	83	64	2.0
10	Computerized Gate pass Management System	115	242	172	55	105	2.0
11	Cultural Events and Activities	121	242	186	64	76	3.0
12	Dining Hall Facilities	103	224	208	68	86	2.0
13	Dining Hall Hygiene	139	265	175	58	52	4.0
14	Drinking Water	144	299	176	35	35	6.0
15	Facilities for parents/ guests	105	236	204	73	71	2.0
16	Food Handling and Serving	98	227	213	70	81	2.0
17	Hostel Room/Corridor Hygiene and upkeep	181	290	150	32	36	7.0
18	Hostel surroundings (Garden, Landscaping)	221	273	136	22	37	8.0
19	Laundry Facility including laundromate	114	240	218	50	67	3.0
20	Naturals and saloon	134	288	194	35	38	6.0
21	Power supply and backup	249	280	111	17	32	11.0
22	Quality of Food	87	119	180	124	179	1.0
23	Reading Room Facilities (News Papers, Magazines etc.)	119	251	201	59	59	3.0
24	Recreational Facilities	101	220	227	72	69	2.0
25	Role of hostel committees	81	150	202	115	141	1.0
26	Role of mess committee	76	130	173	140	170	1.0
27	Role of the CFW(Chief Faculty Warden)	101	196	221	66	105	2.0
28	Room Furniture Adequacy	112	277	209	31	60	4.0

S.No.	Parameters	Very Good	Good	Average	Poor	Very Poor	Positivity
29	Sports Facilities (Gym, Outdoor, Indoor etc.)	119	289	184	42	55	4.0
30	Students welfare and support	97	206	227	59	100	2.0
31	Toilet hygiene and sanitation	147	267	174	51	50	4.0
32	Waste Management System	169	310	149	25	36	8.0

Action taken:

1. Dosa points were introduced in night canteens functioning near hostels.
2. E- wallet system introduced in night canteens for cashless transactions.
3. Rain water harvesting systems are enhanced.
4. Waste management system revamped with recycling of plastic waste.
5. Five new buses were added to the fleet of buses for commuting day scholars from city.
6. Power laundry facility enhanced with delivery in 24 hours.
7. Dining hall capacities enhanced.
8. A complete set of percussion instruments along with audio/video gadgets added to the Ragasudha and media club of the institute.
9. Ramps were added to all academic blocks and hostels to enable smooth movement of physically challenged.
10. Unisex toilets built for physically challenged in academic blocks and hostels.
11. Toilet Facility in the Convention Centre enhanced.
12. New E-Learning halls added into Academic Blocks 1 and 2.
13. 6 new Flip class rooms /Smart class rooms added.
14. New Gymnasium established near the Main Play Ground.
15. Grass cutting machine added for maintaining the Green track in the Main Ground.
16. Cricket pitches added.
17. Hot water facility using solar power enhanced in all Hostels.

9.4 Self-Learning (5)

Total Marks 5.00

Institute Marks : 5.00

The curriculum offers courses like seminars/minor projects that promote self learning - based on currently trending technical topics and major projects - where topics are selected based on the common areas of interest between the student and the guide. The university houses a well-equipped Central Library which aids in promoting a culture of self-learning among students. In addition, online educational video lectures like NPTEL and the in-house digital library like Amrita Vidhya, aids in supporting self-learning. The Association of Mechanical Engineering (ACME) along with technical clubs like SAEINDIA, IWS, etc., organizes technical workshops, paper & poster presentations, talks and seminars which exposes students to the professional world, thereby helping them develop organizational and leadership qualities as well. The students are also encouraged to participate in technical events/workshops conducted by other institutions/organizations which further enhance their knowledge. Industrial visits are also arranged to benefit the students to improve their practical exposure.

Facilities to support Self-learning

- Computing Facility: The intranet site- intranet.amrita.edu hosts links to various IT enables services like Digital Library, Central Library book search, etc. The campus is also part of the National Knowledge Network (NKN) of National Mission on Education through Information and Communication Technology (NMEICT) – a project of Ministry of HRD.
- WiFi at Amrita: All hostels and academic blocks are covered by WiFi.
- Cisco Networking Academy: Established as one of Regional Academies by CISCO in India in 1998. It is a comprehensive e-learning program. The Academy is currently an Instructor Training Centre (ITC) and Academy Support Center (ASC). The Academy offers certificates like CCNA, CCNP and ITE.
- ACME –Association of Mechanical Engineering, the departmental professional association organizes seminars, workshops, and other technical events for the benefit of students to enhance their professional, organizational, and leadership skills. Students are also encouraged to attend/participate in technical events conducted in other premium institutions and industries in the country and abroad.
- Clubs such as SAEINDIA, Anantam, Shrishti, and the respective department technical events like SUPRA, BAJA, REEV, etc., contribute and complement the self-learning process.
- Visits are organized to select industries to provide exposure to students.
- Students are encouraged to take MOOC courses from platforms such as Coursera and NPTEL.
- Students are encouraged to take up competitive examinations like GATE and CAT.

Academic Processes promoting Self Learning

- Students belonging to the senior semesters are encouraged to give term paper presentations and seminars as a part of their course work, in order to enhance their ability for self-learning and to inculcate the skill of delivering technical lectures.
- The curriculum offers project options in select courses like Design Thinking, Live-in-Labs, etc., which provides ample opportunities to students for independent thinking and self learning.
- Research is given prime priority to the students belonging to the senior semesters. Students possessing a CGPA of above 8.0, and aspiring for a Distinction grade, are encouraged to have a publication of their research work in a Scopus-Indexed journal.
- In the 2019 academic curriculum, an option is provided to the students to register for a MOOC course and submit the certificate for evaluation, in lieu of an elective.

9.5 Career Guidance, Training, Placement (10)

Total Marks 10.00

Institute Marks : 10.00

Corporate and Industry Relations

In recognition of the inevitable need to establish a close rapport with the industries and business establishments, for fulfilling the needs of in-plant training, final placements, research & consultancy, continuing education program, etc., a dedicated Center for Corporate and Industrial Relations (CIR) is established.

CIR's mission

"To facilitate holistic career development of students through comprehensive and systematic training on Life Skills and build competence in core areas through innovative practical applications**"**

CIR's functions are organized under eight units namely; Career Counselling, Career Competency Development, Higher Learning Initiatives, Entrepreneurship Development, Corporate Relations, Placement, Marketing & Communication, and Corporate Training. Each of these units work in tandem along with the various departments of the university. Each of these units has its team in all the campuses of Amrita Vishwa Vidyapeetham with the heads located in the Coimbatore campus.

CIR is well equipped with faculty and staff with a total strength of 92 with a maximum of 47 in Coimbatore campus. CIR has its own infrastructure facility that includes auditoriums, conference halls, interview rooms and classrooms with a total floor area of 55,541 sq.ft.

Career Counselling

The career aspirations of students are addressed from an early stage of their academic life. Each student is provided with a Career Planning workbook, in the third semester of their undergraduate programme in order to systematically plan and execute their short-term and long-term goals. It starts with identifying their personal career aspirations and culminates with goal setting and job acquisition. Each student is assigned to a mentor to guide him/her towards achieving this endeavor.

Career counselling basically consists of four elements:

1. Self-awareness

This involves discussion with the students on their aspirations, interests, values, and skills in order to match with suitable jobs.

2. Job market information

The Placement unit of CIR has details like job profiles, recruitment process, remuneration, etc., of various companies and prospective employers based on the recruitment processes carried out during previous years. Students get information on job market from CIR classroom sessions. They also attend presentations and talks by companies which are good sources for job market information.

3. Decision-making/ setting goals

For effective decision making on the kind of jobs, the CIR mentors discuss with the students for setting goals based on their job aspirations through one-to-one interactive sessions.

4. Preparations for placements

CIR assists with preparations for placements such as writing a résumé and cover letter, mastering presentations, group discussions and interview skills.

Table 9.2 provides the number of students who have undergone career counselling in the last four academic years.

Table 9.2: Number of students who have undergone career counseling

Academic Year	Description of counseling Activities	Number of students benefited	Remarks
2015 - 16	One to one counseling	1141	Personal File for each student
2016 - 17	Counseling for poor performers	151	Special training for weak students.
2017 - 18	Career Planning Guide and counseling	1101	Career Planning Guide for each student
2018-19	Career Planning Guide and counseling	1224	Career Planning Guide for each student

Career Competency Development

The Career Competency Development facilitates students to understand the emerging trends in the industry and arranges training by experts. It conducts training in foreign languages, organizes coaching classes for competitive examinations like GRE, CAT, GATE etc. within the campus premises. It also conducts mock interviews for the pre-final year students during their sixth semester. In addition, it conducts pre-placement training before the commencement of the placement season.

Life Skills

Life skills education aims to provide students with strategies for an effective interpersonal & professional life. Life skills are grouped under three broad categories, namely; Soft Skill, Verbal Skill, and Aptitude Skill. These skills enable the students in achieving a smooth campus-to-corporate transition.

Course Structure

CIR conducts life skill courses for the undergraduate(UG) program as a part of the academic curriculum of the university and are offered over a period of four semesters. The courses are structured in such a way that all these credit-based courses are completed by the end of the pre-final year before the commencement of the campus placement process. Table9.3 provides the number of students who have undergone career counseling in the last four academic years.

Table 9.3 Number of students undergone career competency development

Academic Year	Course Name	Course code	Number of students Benefited	Remarks
2015 - 16	Life Skills	SSK111	981	B Tech 3rd, 4th, 5th and 6th semesters
		SSK112	1140	
		SSK113	1141	
2016 - 17	Life Skills	15SSK221	995	B Tech 3rd, 4th, 5th and 6th semesters
		SSK112	988	
		SSK113	982	
2017 - 18	Life Skills	15SSK221	1101	B Tech 3rd, 4th, 5th and 6thsemesters
		15SSK321	992	
		15SSK331	994	
2018 -19	Life Skills	15SSK221	1224	B Tech 3rd, 4th, 5th and 6th semesters
		15SSK321	1088	
		15SSK331	1088	

Core Competency

For developing a better understanding of the industry and career options, the following activities are adopted:

- Guest Lectures
- Certification Programs
- Technical Sessions
- Industry Internships
- Industry Electives

Tables - 9.4(a), 9.4(b), 9.4(c), and 9.4(d) summarize the above activities organized during the last four academic years.

Table 9.4(a) Guest lectures organized

Academic Year	No. of Guest Lectures conducted								
	AEE	CHE	CIE	CSE	ECE	EEE	EIE	MEE	Total
2015 - 16	4	4	5	4	4	4	3	7	35
2016 - 17	2	3	5	7	5	6	3	9	40
2017 - 18	2	4	2	4	4	4	4	2	26
2018 - 19	2	4	1	2	1	4	1	2	17

Table 9.4(b) Certification programs conducted

Academic Year	Industry Elective executed	Number of students completed the course									
		AEE	CHE	CIE	CSE	ECE	EEE	EIE	MEE	PG	TOTAL
2015 - 16	BEC-Registered					2			2		4
	BEC-Certified					2			2		4
2016-17	BEC-Registered									17	17
	BEC-Certified									15	15
	CLAD-Registered					25		11		3	39
	CLAD-Certified					19		1			20
2017-18	BEC-Registered		3		1	1			1	2	8

Academic Year	Industry Elective executed	Number of students completed the course									
		AEE	CHE	CIE	CSE	ECE	EEE	EIE	MEE	PG	TOTAL
	BEC-Certified		3		1	1			1	2	8
	CLAD-Registered					14	6	1		6	27
	CLAD-Certified					6	4	1			11
	Autodesk – Revit Training			49							49
2018-19	BEC-Registered				18	4	4		24		50
	BEC-Certified				18	4	4		23		49
	CLAD-Registered					47	13	15	4	8	87
	CLAD-Certified					19		1		3	23
	CCDSAP-Registered				139	38	2	1		1	181
	CCDSAP-Certified				5	1					6
	CP-Registered				165	9	2	1			177
	CP-Cleared				48		2				50
	CSA-Appeared				2						2
	CSA-Cleared				1						1
	Autodesk – Revit Training			39							39

Table 9.4(c)Technical sessions conducted

Academic Year	Number of Technical Sessions conducted for sixth semester students							
	AEE	CHE	CIE	CSE	ECE	EEE	EIE	MEE
2015 - 16	13	12	11	13	12	13	14	12
2016 - 17	11	11	13	11	11	12	12	12
2017 - 18	9	10	11	11	12	11	9	14
2018 - 19	11	12	11	13	13	12	13	12

Table 9.4(d) Number of Mechanical Engineering students who received internships

Academic Year	No. of Interns
2016 - 2017	07
2017 - 2018	21
2018 - 2019	19

Foreign Languages

CIR provides foreign language learning opportunities to students in German and Spanish languages.Table 9.5 provides a summary of the classes conducted during the last four academic years.

Table 9.5 German and Spanish classes conducted

Academic Year	Foreign Language	No.of students Attended
2015 - 2016	German	43

Academic Year	Foreign Language	No.of students Attended
	Spanish	52
2016 - 2017	German	70
	Spanish	25
2017 - 2018	German	66
2018-2019	German	80

Higher Learning Initiatives

CIR supports the higher learning aspirations of students in the country or abroad. Training for GATE, GRE, TOEFL, and IELTS examinations are also provided at the campus for those students who plan to pursue their Engineering Masters programmes. Students who have plans to pursue management education in premier institutes require a good score (percentile) in the qualification examinations like CAT, GMAT etc. CIR identifies external institutes who conduct such training programs and select the best from the lot through a process of evaluation, discussions and negotiations. Table 9.6provides a summary of the competitive examination training sessions organized during the last four academic years.

Table 9.6 Competitive examination training sessions organized

Academic Year	Competitive Exam training	Number of students attended
2015 – 16	GRE	36
	CAT	57
	GATE	59
2016 – 17	GRE	47
	CAT	41
	GATE	53
2017 – 18	GRE	53
	CAT	51
	GATE	41
2018 – 19	GRE	87
	CAT	29
	GATE	54

Placement Specific Interviews and Training

Mock Interviews

Mock interviews are conducted for the pre-final year undergraduate students during their 6th semester. They are conducted by a panel consisting of an industry expert and CIR faculty members. Table 9.7 gives a summary of the mock interviews conducted during the last 4 academic years.

Table 9.7 Mock interviews conducted

Academic Year	Students who attended Mock Interviews – Branch wise							
	AEE	CHE	CIE	CSE	ECE	EEE	EIE	MEE
2015 - 16	69	60	67	351	199	129	61	207
2016 - 17	56	65	55	291	173	106	59	177
2017 - 18	48	60	63	284	182	108	64	185
2018 - 19	55	43	65	375	195	123	51	190

Pre-Placement Training

CIR conducts pre-placement training for students belonging to all branches of engineering during the summer vacation, soon after the completion of the prefinal year. These classes are handled by the faculty members from concerned engineering departments and industry experts. In addition to the pre-placement training, company specific awareness programmes are also conducted.Table 9.7(a) provides a summary of the pre-placement training sessions conducted during the last four academic years.

Table9.7(a) Pre-placement training sessions – Average number of sessions

Academic Year	Average number of sessions taken for Preplacement training
2015 - 16	33
2016 - 17	34
2017 - 18	47
2018 - 19	42

Special Training for Slow Learners

CIR conducts special sessions for students who find themselves unable to secure a job in the course of the recruitment process. Such students are identified and are given supportive training in areas that they are found to make slow progress. Generally, such training sessions have been provided in aptitude skill, verbal skill, and technical subjects. There are also cases where students are given additional coaching, on a one-to-one basis, to face technical and HR interviews.

Corporate Relations

Corporate Relations unit is the primary nodal point for facilitating industry collaborations with Amrita Vishwa Vidyapeetham. For this objective, it engages with the industries across the country as well as abroad. It is instrumental in signing Memorandum of Understanding with industries and premium universities for the benefit of acquiring funded research projects, setting up labs, conducting workshops in emerging technologies, guest lectures, internships, in-plant trainings, and faculty development programs. It is also instrumental in bringing in industry experts as part of the Board of Studies for curriculum development.

MOUs with Industries

Table 9.8(a)provides a summary of the list of MoUs signed/renewed during the last five academic years.

Table 9.8(a) Number of MOUs Signed/Renewed

Academic Year	No. of MOUs Signed / Renewed
2015 - 16	9
2016 - 17	6
2017 - 18	14
2018 - 19	11

CIR's involvement in academic curriculum – Industry Electives

CIR facilitates in bringing in current-in-demand industry topics, especially in the area of emerging technologies, to the university curriculum. This is taken care under the setting of the Memorandum of Understanding signed between the industry and the university. When a new course is suggested by the industry, CIR gets the curricula reviewed by the department and works with the department in completing all the internal formalities required to introduce the course into the curriculum. Subsequently, the industry trains the concerned faculty through multiple training sessions. Tables9.8(b) and 9.8(c), respectively, provide a list of industry electives that were introduced into the curriculum and the number of students who have completed the courses during the last four academic years.

Table 9.8(b) Industry electives introduced into the curriculum

Academic Year	Industry Elective executed	Course Code	Department which offered the Electives
2015 - 16	IT Essentials	CSE 380	CSE
	Big Data Analytics	CSE459	CSE
2016 - 17	IT Essentials	CSE 380	CSE
	Big Data Analytics	CSE459	CSE
2017 - 18	Foundations of IT	15CSE377	CSE
	Big Data Analytics	CSE459	CSE
2018 - 19	Foundations of IT	15CSE377	CSE
	Big Data Analytics	CSE459	CSE

Table 9.8(c) Number of students who completed the elective courses

Academic Year	Industry Elective executed	Number of students who completed the course								
		AEE	CHE	CIE	CSE	ECE	EEE	EIE	MEE	TOTAL
2015-16	IT Essentials	12	25	-	-	44	17	29	96	223
	Big Data Analytics	-	-	-	250	-	-	-	-	250
2016-17	IT Essentials	25	24	16	-	100	51	24	86	326
	Big Data Analytics	-	-	-	107	-	-	-	-	107
2017-18	Foundations of IT	15	16	5	-	60	23	24	41	184
	Big Data Analytics	-	-	-	286	-	-	-	-	286
2018-19	Foundations of IT	12	12	2	-	83	65	37	50	261
	Big Data Analytics	-	-	-		-	-	-	-	

Placement

The Placement unit has a major role in ensuring that all eligible students are placed, and continuously strive to raise the bar on the acquired salary, year by year. Along with the Corporate Relations unit, it connects with the industries across the country & abroad and arranges for placements. It is the earnest endeavor of CIR to ensure that the students are placed in jobs based on their career aspirations. At the end of each placement process, feedback is collected from the officials of the recruiting companies, which turns out to be a valuable input to bring in improvements in the future career competency development programs.

The stages involved in the placement process is depicted in the flow chart in Figure 9.3. Table 9.9 shows asummary of the placement statistics during the previous three academic years in the order of the admitted batches.

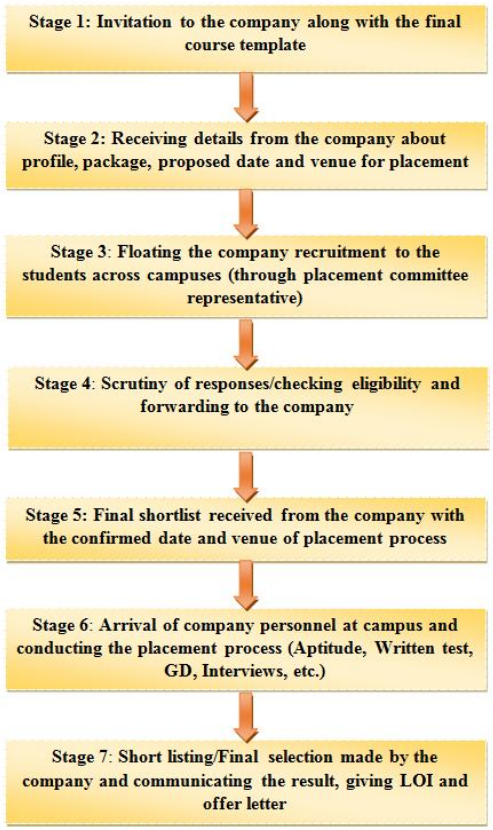


Figure 9.3 Flowchart of placement process

Table 9.9 Summary of the placement statistics during the previous three academic years

	2019 Batch			2018 Batch			2017 Batch		
B.Tech.	**Regd. Eligible**	**Placed**	**%**	**Regd. Eligible**	**Placed**	**%**	**Regd. Eligible**	**Placed**	**%**
CSE	218	214	98.17	223	222	99.55	279	276	98.92
ECE	119	118	99.16	126	123	97.62	159	157	98.74
EEE	69	66	95.65	58	56	96.55	83	78	93.98
EIE	53	53	100.00	41	41	100.00	43	40	93.02
Mech.	78	73	93.59	82	80	97.56	137	136	99.27
Chem	21	20	95.24	28	19	67.86	38	29	76.32
AE	17	16	94.12	23	20	86.96	37	32	86.49
Civil	21	19	90.48	16	9	56.25	37	34	91.89
Total	596	579	97.15	597	570	95.48	813	782	96.19
%	97.15			95.48			96.19		
Average Salary	5.3			4.8			4.5		
No. of companies visited	115			109			98		

9.6 Entrepreneurship Cell Total Marks 5.00

Institute Marks : 5.00

Amrita Centre for Entrepreneurship (ACE)

Amrita Centre for Entrepreneurship was established in June, 2011 with the objective of mentoring students towards career options and to nurture startup ideas. ACE facility includes a mentoring desk, library, laboratory, and workshop. On successful graduation, students are guided towards three options for their career advancements – Placements, Higher Studies, and Entrepreneurship. One of the options for students passing out of Amrita who have the urge to serve the society is to become an entrepreneur. ACE helps to nurture the entrepreneurial spirit among youngsters who have the skills and urge to innovate and initiate.

The ACE library has an own collection of books and other entrepreneurship-related materials. An electronic laboratory is part of the ACE facility to benefit students interested in building innovative circuits. A workshop with machinery like lathe, drilling& welding equipments, etc., is also available.

MANAGEMENT OF ACE:

The activities of ACE focus on creating a culture and an ecosystem for infusing entrepreneurial spirit among students. The objectives include the following:

- Design, develop, and execute high impact entrepreneurship programmes and create opportunities for Amrita students at local and national levels. The programmes would include talks, games and exercises, short courses, events, mentoring, incubation and networking.
- Form student clubs in each campus to promote entrepreneurship.
- Create a powerful 'ACE Community' by bringing in institutional members, hiring/seeking support from faculty, mentors and experts, besides identifying student leaders to form Entrepreneurship Clubs.
- Develop the capacity of ACE to run a mature set of entrepreneurship development programmes within a period of 5 years. The capacity building services cover consulting, faculty development, leadership development, creation of a pool of volunteers to participate in ACE programmes, and setting up E-Clubs.

The ACE roadmap for entrepreneurship development involves five stages:

The first stage involves sensitization and promotion of entrepreneurship. This includes entrepreneurship awareness campaigns using posters, membership drives through induction programmes, seminars, workshops & interactive sessions, idea generation & business plan competitions, and invitation to alumni entrepreneurs to ACE.

The second stage involves creation and fosteringof entrepreneurship. This is undertaken through the following tasks:

- Hands-on work on innovative project ideas
- Mentorship (by ACE, alumni, other entrepreneurs & CODISSIA)
- Entrepreneurship Awareness Camps (EAC) with Entrepreneurship Development Institutes (EDI), through DST-NIMAT funding
- EDP with EDI, through DST-NIMAT funding (for alumni in industry)
- FDP with EDI, through DST-NIMAT funding (for alumni in academia)

The third stage involves nurturing of entrepreneurship. This is done by providing business incubation facility (like TBI, STEP) and arranging funds (linking corporate funding, investors, angel network, VCs).

The fourth stage is to recognize and celebrate entrepreneurship. This is done by rewarding entrepreneurs (alumni award) and obtaining sponsorship.

The fifth stage involves institutionalizing the movement. This is undertaken through the introduction of courses in entrepreneurship, publication of case studies, provision for incubating, VC funding, etc.

Based on the roadmap, ACE has been progressing in the following manner:

- Conducting programmes with funding from Department of Science & Technology (DST)'s NSTEDB, routed by Entrepreneurship Development Institute of India (EDII), Ahmedabad. On an average, at least one programme per year has been organized of the following three types:
  - 3-day Entrepreneurship Awareness Camps (EACs)
  - 2-week Faculty Development Programme (FDP) on Entrepreneurship
  - 1-month Entrepreneurship Development Programme (EDP)
- Mentoring inputs with alumni & associations: CODISSIA, TiE, ICTACT, etc.
- Arranging certificate courses with the help of external experts
- Conducting competitions - Business Plans, Business Quizes, Best Technical Idea
- Expanding membership base and issuing E-Club membership cards
- Providing library, laboratory and workshop facilities for ACE members
- Organising talks, seminars, workshops etc. regularly during Tech-fests like Anokha
- Conducting club induction programmes for interested freshmen
- Identifying opportunities and working collaboratively with incubators for mature ideas requiring fund support

Effectiveness of ACE in Enhancing Entrepreneurship

ACE has achieved the following results so far:

- Obtained funding of over Rs. 19 lakhs for promoting entrepreneurship
- Acquired a membership base of over 1000 students and alumni
- Successfully conducted 7 Entrepreneurship Awareness Camps (EACs)
- Effectively organized 4 Faculty Development Programmes (FDPs) on Entrepreneurship
- Smoothly executed 3 Entrepreneurship Development Programmes (EDPs)
- Has been regularly providing mentoring to budding entrepreneurs

- Constantly provided exposure and motivation to ACE members to follow their passion

Success Stories of EDP participants – Names & Ventures

- K. Vasantha Kokilam, Candlefire Development Academy, 168, DPF Street, Lakshmi Mills, Coimbatore
- Subi Prabhakaran, Cake Dew, Puthuvalil House, Chathannoor, Kollam 691572 Kerala
- M. S. Sooraj Subramanian, Earlang Dreams, 97, ChokalingamPillai Street, Nataraja Nagar, Madurai
- Hariharan S., Nuthukku Muttai, Sri Krishna College, Palakkad Main Rd. Kuniamuthur, Coimbatore
- R. Kumaresu, The Shake Studio, Sri Krishna College, Palakkad Main Rd., Kuniamuthur, Coimbatore
- P. Amuthan, Amuthan Trading, 29A,Durai Samy Layout, Peelamedu, Coimbatore
- Alagappan Manickam, ALST & Co.,RangaKonar St, Anupperpalayam, Ram Nagar Coimbatore
- Anil Subahar, Shape recruiters, No.19, Malaya St., Vasantham Nagar, KovaipudurPirivu, Coimbatore
- Mr. Prasanna Balaji, Coral Textiles, 293/1A, Mullai Nagar, Iduvampalayam road, Periyandipalayam, Tirupur
- Mr. Sushil Sivanesh E., Impresso Gifts as a new venture under Impresso 3D, MIG B 190, Brindhavan Nagar 3rd Cross, SITRA, Coimbatore, Poonga Nagar, Civil Aerodrome Post, Peelamedu, Coimbatore
- Mr. Surya Narayanan.P, Sportico 40 Sakthi Green Land, Thiruvalluvar Street, VellakinarPirivu, GN Mills (PO), Coimbatore
- Mr. SathishKumar.P, SKV Paper Product, LalithaammalThottam, Vellamadai PO, Kalipalayam, Coimbatore
- Mr. Rajan R, Chellam Canteen, 126,ponnaiya Raja puram 4th street, Coimbatore
- Mr. K.S. Mohan Kumar, Latlon Technologies Pvt. Ltd, Kathir IT Park, Neelambur, Coimbatore
- Mr. M. Thirunavukarasu, Agri fly, Iswaraya Apartment, Veeranam Road, Kelampakkam, Chennai
- Dr. Indumathy R., RGPAL GLOBAL, 65, ThaneerthottiVeedi, Mugasimangalam, Alandurai Post, Coimbatore
- Mr. Amarnath B., SPETIX ENTERPRISES AND SERVICE PVT LTD, Kadavanthra, Kochi
- Mr. Siva Kumar M., Cyber Star Exports and Imports, VJ Nagar 2nd Street, Kottaipalayam, Coimbatore
- Mr. Vignesh M.. Sri Vignesh Enterprises, 3/160,Kaveri Tank Street, Theethipalayam, Coimbatore
- Mr. Menon Vishnu Janardhan, Garpenter, Avinashi, Coimbatore
- Mr. Satheeshkumar S., Satheesh Industrials, 14/18b-1, P.N. Lay Out, Vedapatti, Coimbatore
- Mr. C. M. Sathyaprakash, Yakshini Eco Garments, 302, D Block,TulipsApartment,Nava India Signal, Coimbatore
- Mr. Vignesh Prasanna, The Rapidgo Logistics, 1/447 H.5, Near Neelambur Tollgate, Chinniampalayam, Coimbatore
- Mr. Harsha Mukund Soundararajan, Microskin India Pvt Ltd, K.K. Pudur, Coimbatore

9.7 Co-curricular and Extra-curricular Activities Total Marks 10.00

Institute Marks : 10.00

Students are engaged in co-curricular and extra-curricular activities and field trips through student chapters and forums, which provide opportunities for students to explore new fields of interest, cultivate leadership skills, and learn teamwork. While the co-curricular activities are held under the aegis of the respective departments, the extra-curricular activities and sports are organized by the Office of Students Welfare and Department of Sports respectively. Every department has its own association through which various department symposia, workshops and other technical and non-technical events are conducted. Students are encouraged to compete in state and national level sports and cultural competitions. Several festivals and events are organized drawing inspiration from our rich Indian culture. A Talent Search Program is organized for the freshmen (Ref. B 9.15a). An annual cultural festival Amritotsavam is organized to showcase the talents of students (Ref. B 9.15b). Several music and dance programs are organized by inviting renowned artists through SPIC MACAY. Student representatives are elected for conduct of the cultural and sports activities. All the students of ASE are divided into four Housesin order to promote healthy competitions in Sports and Cultural events. Student Secretaries/Jt. Secretaries and Captains/Vice Captains (for cultural events and sports respectively) are elected for each House every year through a democratic process (Ref. B 9.15 c and 9.15d).

9.7.1 College Techfest (ANOKHA)

ANOKHA is a national-level engineering techfest organized by Amrita School of Engineering, Coimbatore India. Having successfully completed eight editions, ANOKHA has had an average annual participation of over 10,000 students from top-ranking engineering institutions in India like IITs, BITS, NITs and IIITs. It has also witnessed participation as well as partneringfrom universities abroad, in USA and Europe, like University of New Mexico, EVRY France and Uppsala University-Sweden. It has a prize-money of Rs. 15 lakhs with 100+ plus highly competitive contests in all disciplines of engineering, sciences, robotics, gaming, business incubation, social media & entrepreneurship, cubing and short-film making. Taking up themes of global importance and societal relevance like innovation, sustainable development, green trends, Technopolis - smart city and national security, it witnesses 30+ workshops in various cutting-edge areas. Anokha also houses TEDx-like distinguished talk series called “Lumiere”(Ref. B 9.15e, 9.15f and 9.15g).

The workshops have been offered by leading companies such as Amazon, Microsoft, Mathworks, Cisco, Intel, National Instruments and Robert Bosch. Other highlights of the techfest include fascinating exhibitions &Autoshows, Meet the CEO programme, school outreach and product design, development & demonstration, etc. Anokha provides the students an invaluable chance to discover, develop and demonstrate their talent, to excel and and to succeed. This student-driven techfest showcases and celebrates the innovation, ingenuity, teamwork and talent of engineering students of AMRITA.Some of the world renowned artists who have been part of the entertainment spectacle include Percussionist, Sivamani, and playback singers like Vijay Prakash, Karthik, Benny Dayal, Haricharan, Rahul Nambiar, AlaapRaju, ShaktisreeGopalan, SunithaSarathy, Ranjani-Gayatri, and Nikita Gandhi.

Conduct of a techfest of this magnitude and proportions, for the students and by the students, develops organizational and leadership skills, enlarges their vision, exposes them to new technologies and innovation, facilitates and offers a platform for interaction with leading tech companies, and lastly, this association among peer groups from across the length and breadth of the country promotes a sense of national integration.

9.7.2 Extra-Curricular Activities – Sports

Amrita School of Engineering encourages the students to be healthy in body and mind. Sports provide an excellent opportunity for students to interact with each other, develop true sportsman spirit and team spirit, as well as to stay healthy. The students of Amrita School of Engineering are divided into four teams, viz., Amritamayi, Anandamayi, Chinmayi, andJyothirmayi. The Students participate in clean and fair voting to select their Captains and Vice Captains. The Intramural Events are conducted during the Annual Sports Meet of the university. Staff tournaments are also conducted every year in certain games/events. Our students regularly participate in South Zone/All India Inter University Competitions and National-Level Inter-Collegiate Tournaments.

Infrastructure(Ref. B 16a)**:**

- Outdoor Games:

1) Basketball (M & W)	2) Ball Badminton (M&W)
3)Cricket (M)	4) Football (M)
5) Kabaddi (M)	6) Tennis (M & W)
7) Volleyball (M & W)	8) Tenni-Koit (W)
9) Swimming (M & W)	10) Hockey (M)
11) Handball (M)	12) Throw ball (W)
13) Athletics (M & W)	14) Frisbee (MW)

- Indoor Games:

1) Carrom (M&W)	2) Chess (M&W)
3) Shuttle Badminton (M&W)	4) Table Tennis (M&W)
5) Weight Lifting (M)	6) Power Lifting (M)

Gymnasium: The Campus houses three gymnasiums with the following equipments:

- Cardio Equipment:

1. Up-Ride Bicycle (Viva fitness)
2. Elliptical Cross Trainer (Motus&Viva Fitness)
3. Imported Motorized Treadmill (Motus 900)

- Strength Equipment:6 in 1 Multi Gym, 12 in 1 Multi Gym, 8 Station Multi Gym, 10-in-1 Personal Gym, Twister, Cable Cross Over, Hacks Squat, Smith Machine, Calf Rise, Inner & Outer Thigh, Nelco Weight Lifting Set, Benches (Incline, Decline, Flat and Multi-Purpose), T-Bar Rower, Preach Curl Stand, Dumbbells (with Rubber rings and with groove), Barbell Plates, Barbell Rods Set (4 different sizes), and Rod Racks.

Student Activities- Sports: Every year, the students participate in various tournaments such as

(Ref. B 9.16b):

- Coimbatore district-level Association Tournaments
- National/International Tournaments organized by other universities
- Inter-Collegiate Tournaments conducted by some other colleges
- Inter-Campus Tournaments of our own five campuses

- Inter-University Tournaments- All India/South Zone Level

Programmes Conducted:

- Talent Search for Freshers,
- Intramural Competitions for all students
- Annual sports day for every academic year
- Inter-Campus Tournament in Selected Disciplines
- Summer and Winter Coaching Camps in Swimming.
- Friendly Matches in Intra and Inter Departmental Level
- Amrita Super League (ASL)-Staff & Students Combined Sevens Football Tournament. (viii). Amrita Premier League (APL) - Intra Campus Level T20 Tournament.
- Organizing South Zone Inter University Tournaments in selected Games.

State of the Art Facilities:

Swimming Pool: Amrita Swimming Pool is of Olympic Standard with 50m X 25m in Size and contains 2.4 million litres of water. A Toddlers Pool is also incorporated to accommodate babies and for the professionals to have warm-ups. The in-house state-of-art machinery purifies 2.4 million liters of water within six hours. It is one of the few international standard swimming pools wherein the State, National and International Swimming Competitions can be conducted.

- **Synthetic Tennis Courts:**
- **ArogyaSadanam (New Gym):**Housesa multi-purpose indoor Gymnasium with a size of 8200 sq feet consisting of 4 Shuttle Synthetic Badminton Courts, 2500 Sq Feet of Gym Centre, and playing provision for Table Tennis, CaromBoards, and Chess
  - **Work In Progress:** A Standard Basketball Court near VasishtaBhavanam, and Specialized 3 Concrete type & 2 Muddy Cricket Pitches
  - **Aagneya Sports Club:**Sports Club Aagneya plays a vital role in conducting various Sports Events such as Intra Campus Level Open Tournaments: Campus Marathon, Amrita Badminton League, Amrita Basketball League, Amrita Volleyball League, Amrita Table Tennis League, etc. These are organized by the student office bearers. It gives a platform to bring out the sporting talent from a larger group.

Students winning laurels in South Zone/National level sports are awarded grace marks in the university exams(Ref. B 9.16 c)

9.7.3 Extra-Curricular Activities –Student Clubs

16 student-managed clubs are active in the campus (Table 9.10).The dedicated Student Counsellors encourage students in participating in the variousextra-curricularactivities.Students are encouraged to join at least one of the following Student Forums to fine tune their innate raw talents to ultimately compete in various competitions held at National and South East Asian Levels. It is ensured that the quality and content of the programs organized by these forums are in tune with the Norms of the Association of Indian Universities.

S.No.	Name of the Club
1	Amrita Talkies
2	Asthra - Science Club
3	Kalakriti- Arts Club
4	Naadam
5	Nature Club
6	Natyasudha –Dance Club
7	NSS
8	Photography Club
9	Team Media
10	Ragasudha
11	Sahaya Club
12	Srishti Club MUN. Toast Masters
13	Aagneya - Sports Club
14	Vision – Eye Donation Motivation Forum
15	Wellness Club
16	SPIC MACAY

Table 9.10 Cultural Forums and Social Clubs

- **Events Conducted by student Clubs**– Given at Ref.B 9.17 b
- **Participation in Association of Indian Universities (AIU)** –Ref.B 9.17 c

- **NSS Activities 2017-2019**: The summary of NSS activities carried out by the students of Amrita is given below:

Year	Activity
11 Mar 2017	Lake Cleaning Drive- SelvaChinithamaniKulam Lake

- **Conduct of Festivals& Cultural Events**

  Various Festivals and events are organized in the campus to promote harmony and awareness on the Indian Culture. Celebrations are organized on the occasion ofGurupoornima, Navarathri, Ugadi, Pongal, Onam, Ganesh Chaturthi, Gokulashtami, National Nutrition Week, International Yoga Day, and Amma's Birthday.

- Talent Search: It is a vibrant and extensive program, spanning over several weeks, organized to identify the freshmen having raw talents in dramatics, skits, quiz, dance, music, debate, literature, sports and games etc. The freshmen participate enthusiastically in large numbers and exhibit their talents.
- Amritotsavam: It is the mega annual cultural festival, spreading over a couple of weeks, with a large participation of students and staff. Cultural events, quiz, debates, songs, dances, essay competitions etc are organized completely by the students who invariably enrich their leadership qualities and team spirit.
- Gokulashtami: The birthday celebrations of Sri Krishna are conducted with a lot of pomp and splendor. The campus takes on a festive look and the students, faculty and non-teaching staff show extraordinary zeal and commitment in organizing various vibrant cultural programs. A grand procession with floats depicting various significant episodes in the life of Sri Krishna is a major attraction. Students are exposed to fabrication work, group performances and organizing skills.
- Amma's Birthday: Our Chancellor's Birthday is celebrated on 27th of September every year at Amritapuri. A large number of dignitaries along with thousands of devotees from all walks of life belonging to various countries gather to get the blessings of Amma. Our students and faculty members render voluntary services. Students develop project management and leadership skills while actively participating in organizing such a mammoth event.

10 GOVERNANCE, INSTITUTIONAL SUPPORT AND FINANCIAL RESOURCES (120) Total Marks 120.00

10.1 Organization, Governance and Transparency (55) Total Marks 55.00

10.1.1 State the Vision and Mission of the Institute (5) Institute Marks : 5.00

Vision:

To be a global leader in the delivery of engineering education, transforming individuals to become creative, innovative, and socially responsible contributors in their professions.

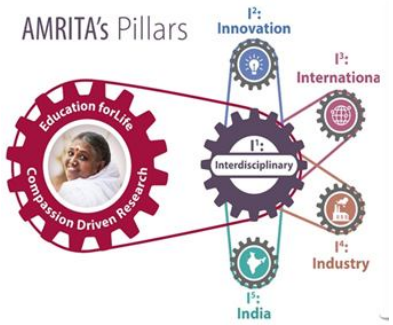
Mission:

- To provide best-in-class infrastructure and resources to achieve excellence in technical education,
- To promote knowledge development in thematic research areas that have a positive impact on society, both nationally and globally,
- To design and maintain the highest quality education through active engagement with all stakeholders – students, faculty, industry alumni and reputed academic institutions
- To contribute to the quality enhancement of the local and global education ecosystem
- To promote a culture of collaboration that allows creativity, innovation, and entrepreneurship to flourish
- To practice and promote high standards of professional ethics, transparency, and accountability

10.1.2 Availability of the Institutional Strategic Plan and its Effective Implementation and Monitoring (25) Institute Marks : 25.00

Quality and commitment have been the corner stones for the success of Amrita. Being a multi-campus, multi-disciplinary university, decentralized administration was essential to maintain agility and quality. The concept of process and process owners facilitated decentralization of activities and delegation of authority, while maintaining accountability. After being awarded the “Deemed to be University” status in 2003, Amrita’s recognition can be attributed to the key five strategic pillars:

- Inter-disciplinary
- Innovation
- International
- Industry
- India



Building on these strategic pillars is absolutely critical for Amrita to be recognized as a world class university

a. **Inter-disciplinary:**

Offer degree programs that are inter-disciplinary/intra-disciplinary in nature. The degree programs are designed to fit with the thematic research areas of the school.

Initiate and secure funds for inter-disciplinary projects from Govt agencies and industry.

Four new programs that are intra/inter-disciplinary in nature will be introduced from AY 2019-20. Five more programs involving automation & rural technology, cyber physical system security and forensics, data analytics and medical systems, vision based systems for smart transportation and bioinformatics will be introduced between calendar year 2021-2026.

b. **Innovation:**

Innovative teaching-learning process: Strengthening the curriculum and introducing pedagogical changes that would trigger better knowledge gain. Introduction of modular mathematics courses was implemented in 2015. It is planned to further modularize the mathematics courses during the 2019 curriculum revision.

Introduce flexible curriculum with open electives across all engineering departments. The 2019 curriculum aims at being flexible and learner centric.

Carry out innovative research that can result in patents and entrepreneurship. A 20% increase in patent filing was observed from 2015-19 relative to 2010-15. The goal is to be able to file at least three patents a year from the School of Engineering.

c. **International:**

Currently, more than 140 MoUs have been signed with foreign universities which allow student exchange programs, dual degree programs, internships and projects. The strategic plan calls for at least an additional 100 MoUs with universities ranked in the top 500 of the world ranking.

Goal is to increase the number of collaborations with reputed foreign universities by 50% in the next 5 years.

d. **Industry:**

Amrita’s engagement with industry is critical to ensure that (a) the curriculum and pedagogy matches with the needs of the industry; (b) to ensure that the research problems chosen are industry relevant problems and (c) industry gets a chance to assess the calibre and quality of Amrita. Goal is to increase the industry consultancy amount by 50% relative to 2018 funding amount.

e. **India:**

The founding trust of Amrita has adopted 103 villages across India. Experiential learning (named as Live-in-Labs), introduced in 2015, is part of the curriculum. Primary goal is to ensure that the society benefits from all the research work done at Amrita.

Monitoring the execution of the strategic plan is handled by the Board of Management, which is the Apex body of Amrita.

10.1.3 Governing body, administrative setup, functions of various bodies, service rules, procedures, recruitment and promotional policies (10) Institute Marks : 10.00

Other academic and research progress are handled by various committees comprising of administrators, chairpersons, professors and faculty members of the departments. The following committees are in place to provide directions, make decisions, implement and monitor progress of various functions.

1. The Board of Management consists of the following members:
    - Swami AmritaswarupanandaPuri President
    - Swami RamakrishnanadaPuri Member
    - Br. Abhayamrita Chaitanya, Pro-Chancellor Member
    - Dr. P. Venkat Rangan, Vice Chancellor Member
    - Dr. Prem Nair, Dean – Faculty of Medicine Member
    - Dr. Bipin Nair, Dean – Faculty of Sciences Member
    - Dr. Shanti Nair, Dean, Research Member
    - Dr. U. Krishnakumar, Dean - Faculty of Arts, Media & Commerce Member
    - Dr. K. Sankaran, Registrar Member Secretary

Board of Management (BoM) consists of nine members and conforms to guidelines set by regulatory bodies, and includes; three humanitarian leaders who are also authors of several scholarly books, one institutional leader, four eminent scientists, one eminent doctor.

BoM meets at least twice a year to both review past progress and approve future plans. BoM handles the following important aspects:

1. To establish campuses, schools, centers and departments with adequate investment in infrastructure and quality of faculty
2. To maintain a highly professional ambience and environment for faculty, students and staff to succeed and to redress grievances
3. To confer, grant or award Degrees, Diplomas, Certificates and other academic titles and distinctions
4. To maintain proper accounts and other relevant records
5. To ratify all appointments of Faculty and Staff

Academic Council

1. List of Members:

- Br. Abhayamrita Chaitanya (Pro Chancellor)
- Dr. P Venkat Rangan (Vice Chancellor)
- Dr. K Sankaran (Registrar)
- Dr. Prem Nair (Director, Health Sciences, Kochi Campus)
- Prof. C Parameswaran (Director -Corporate Relations)
- Dr. Bipin Nair (Dean – School of Biotechnology)
- Dr. Shanti V. Nair (Dean- Research)
- Dr. Sasangan Ramanathan (Dean – Engineering)
- Dr. V S Somanath (Dean, School of Business)
- Dr. Krishnashree Achuthan (Dean, PG Programmes)
- Dr. Maneesha Sudheer (Dean, International Programmes)
- Dr. Balakrishnan Shankar (Associate Dean, Amritapuri)
- Dr. R Dhandapani (Controller of Examinations)
- Br. (Dr.) Sankara Chaitanya (Director, School of Ayurveda)
- Br. Sudeep (School of Engineering, Amritapuri)
- Br. Dhanraj (School of Engineering, Bangalore)
- Dr. U Krishnakumar (School of Arts & Sciences, Kochi)
- Br. Sunil Dharmapal (Mysore Campus)
- Dr. Jyothi S N (Principal – School of Engineering, Amritapuri)
- Prof. S G Rakesh (Asso. Dean – School of Engineering, Bangalore)
- Dr. Vishal Marwaha (Principal, School of Medicine)
- Dr. Balagopal Varma R (Principal - School of Dentistry)
- Prof. K T Moly (Principal - College of Nursing)
- Dr. M Sabita (Principal - School of Pharmacy)
- Dr. Rekha Bhatt (Principal i/c, ASAS Mysore)
- Dr. M Savitha Pande (Principal - School of Education, Mysore)
- Dr. Nandakumaran V M (Principal – School of Arts & Sciences, Amritapuri)
- Dr. Kishore Pillai (Associate Dean – Management),
- Dr. Raghu Raman (Chairperson, ASB)
- Prof. Sunanda Muralidharan (Chairperson, Dept. of Management, Kochi)
- Prof. Manoj P (Chairperson, Dept. of Management, Bangalore)
- Shri. I B Manikantan, Campus Director, Chennai
- Dr. P Shankar, Principal, School of Engineering, Chennai
- Dr. Rajiv Nair, Chairperson (Management, Amritapuri)
- Dr. A V Shyam, Chairperson, School of Business, Coimbatore
- Dr. P Sureshkumar, Principal, School of Agriculture Sciences

The Academic Council meets at least twice a year to deliberate on the following functions:

- To prescribe and ratify courses of study leading to degrees and diplomas
- To take periodical review of the activities of the Schools/Departments/Centres and to take appropriate action with a view to maintaining standards of instruction
- To devise measures for improvement of standards of teaching, research and training
- To frame policies with regard to admissions
- To ensure fair conduct of examinations
- To award fellowships and studentships, free-ships, concessions, travel fellowships, scholarships, medals, prizes etc.
- To put in place guidelines for attendance and discipline

2. Executive Committee

List of Members:

- Dr. S Mahadevan (Dy. Dean) – Chairman
- Mr. N Ravindran (GM Purchasing)
- Br. Harikumar (Manager, Finance)

Frequency of Meeting: Once a week

3.Research Committees also called Thrust Area Groups (TAG)

- The quality of research is handled at the department level by thrust area groups.
- Chairperson oversees the progress of research.
- Dept Research Promotion Group (RPG)

4. Internal Quality Assurance Cell (IQAC)

The IQAC is the quality monitoring cell with members from all departments, centers and administrative offices. There a total of 60 members. IQAC aims to develop a system for conscious, consistent and catalytic action to improve the academic and administrative performance of the institution. IQAC evolves mechanisms and procedures for ensuring timely, efficient and progressive performance of academic, administrative and financial tasks, optimization and integration of modern methods of teaching, learning and evaluation and ensuring the adequacy, maintenance and functioning of the support structure. Some of the functions of the IQAC are:

- Development and application of quality benchmarks/parameters for the various academic and administrative activities of the institution.
- Dissemination of information on the various quality parameters of higher education.
- Organisation of workshops, seminars on quality related themes and promotion of quality circles.
- Documentation of the various programmes/activities leading to quality improvement.
- Preparation of the Annual Quality Assurance Report (AQAR) to be submitted to NAAC based on the quality parameters.Frequency of meeting is at least twice a year.

5. Library Committee

- Dr S.Thirumalini, Chairperson, Dept. of Mech. Engineering - (Chairman)
- Dr K. I. Ramachandran, Professor, CEN (Member)
- Dr B.Rajathilagam, Associate Professor, Dept. of CSE (Member)
- MrSabarish Narayanan, Assistant Professor, Dept. of ECE (Member)
- Ms Ambika P, Assistant Professor, Dept. of English (Member)
- Dr R.Jaybarathi, EEE (Guest)
- MrJeyothi Prakash, Deputy Librarian (Convener)

Frequency of Meeting: At least twice a year

6.Council of Wardens

- Dr K. Bagavinar – Chairman
- Mr. S Adarsh (Dept of ECE) – Vice Chairman & faculty warden
- Dr. Saravanan (Dept of Mech Engg)
- Mr. P. Gopakumar (Manager, ICTS)
- Mr. C Arunkumar (Dept. of Computer Science & Engg)
- Dr. P. Balasubramanian (Amrita School of Business)
- Mr. Vijay Narayanan (Office of Dean Engg)
- Ms. R. Aarthi (Dept. of Computer Science & Engg)
- Dr. P. R. Janci Rani (Asst. Prof, Office of Student Welfare

Frequency of Meeting: Once a month

7. Tech Fest Committee

A total of 20 faculty mentors from various departments

Total of 150 students

Frequency of meeting: As and when needed

8. Sports Committee

Dr. O J Kumaresan – Chairman

Members are inducted from various departments depending on the nature of event being conducted

Frequency: As and when required

9. Cultural Committee

Dr. Shailendra K (Prof. Office of Student Welfare) – Chairman

Members are inducted from various departments depending on the nature of event being conducted

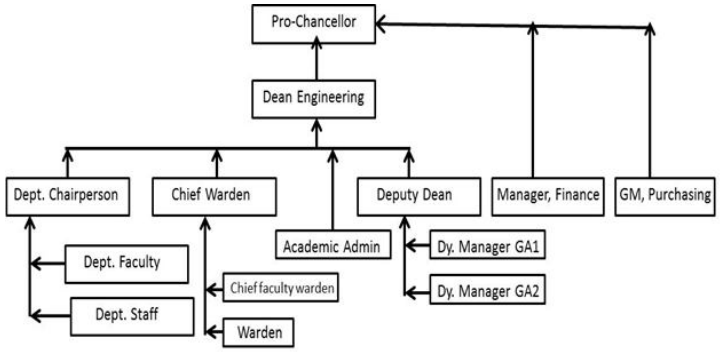
Frequency: As and when required

10. Purchase Committee

Each department has its own purchase committee. Purchase committee can consist of anywhere between 3-5 faculty members.

Frequency of meeting: On an as needed basis

Organization Structure (key functions shown) of the School of Engineering, Coimbatore



Recruitment Policy

Procedure for non-tenure appointments

All non-tenure Faculty appointments (Assistant Professors) as well as non-teaching appointments are done at School level by a committee consisting of Head of School, HR Head, Chairperson of the Department/Center and Senior faculty. In this aspect, there is a significant decentralization and empowerment of heads of schools in selection.

Faculty Recruiting & Promotions Committee

All tenure appointments i.e. associate professor and professor are evaluated and ratified by the faculty recruiting & promotions committees that include Deans of Faculties, Director, Human Resources, Chairperson of the department and senior professors. These appointments are based on peer review, presentation by faculty and interview. There is a conscious effort made by this committee to recruit talent from top institutes in India and abroad leveraging on the linkages facilitated by Amrita Centre for International Programs (ACIP).

Service rules

Service rules are framed by Board of Management of Amrita Vishwa Vidyapeetham so as to be in conformity with UGC regulations as well as best practices followed in internationally well reputed Universities. These rules broadly fall under the following aspects:

- Teaching and instructional duties: Direct teaching to students includes scheduled classroom teaching of theory, laboratory sessions, and regularly scheduled project group meetings at bachelors and masters levels. Indirect teaching includes mentoring sessions, research guidance to students, seminars, journal clubs, Ph.D. advising, etc. Mandatory minimum teaching (based on UGC rules) for all Amrita Faculty are set as 16 hours of direct teaching (classroom and laboratory, UG and PG) to students. In addition, there are indirect teaching hours, teaching preparation work hours, research work hours, all of which together should add up to a full working week. Any reduction from the above required hours of direct teaching can only be in lieu of following university approved duties:
- Departmental duties (2 hours per week only at the associate professor and professor levels)
- Sponsored Research Project responsibilities (up to 4 hours per week)
- Industrial consulting and management development programs (up to 4 hours per week)
- Clinical services (for clinical faculty)
- Senior administrative roles as assigned/appointed by the University

All faculty must attempt to use latest teaching methodologies, including ICT based methods, and provide access to such ICT rich learning material to students.

- **Research duties:** Research duties include publishing of research papers, patent filing, consultancy, securing funded extramural grants and organizing of international conferences. The mandatory research paper requirements are as follows:

Each department is mandated to organize one international conference every two years. While organizing such Conferences University will give infrastructure support but the organizing faculty in the department is responsible to apply and secure adequate extra mural funding to cover travel and lodging of international delegates.

- **Administrative duties:** Faculty are expected to serve on departmental, school-level, campus-level and university-wide committees such as admissions, sports, cultural, techfest, discipline, anti-ragging cell, hostel etc.

- **Societal and Community engagement:** In alignment with the university's ethos and vision of the Chancellor AMMA, faculty are expected to actively contribute in various societal and community engagement initiatives such as Live-in-Labs, Swachh Bharat (AmalaBharatham), Village adoption, Green friends etc
- **Appointment and Probation:** An employee will be on Probation for a period of two years from the date of appointment which is liable to be extended at the discretion of the committee for further periods not exceeding one year. An employee will be confirmed in the permanent position only on satisfactory completion of probation. Until the employee is informed in writing, an employee shall be deemed to be a probationer.
- **Salary structure, perks and allowances:** As per the prevailing norms, an employee appointed shall be paid monthly salary as mentioned in the appointment letter with effect from the of joining Amrita Vishwa Vidyapeetham
- **Promotions:** Any faculty member in order to qualify for continuing increments and/or promotion must demonstrate significant accomplishments in both teaching and research as prescribed from time to time by the University. The committee evaluates and ratifies all tenure promotions from assistant professor to associate professor, as well as, associate professor to professor. These promotions are based on peer review, presentation by faculty and interview by the committee. All multiple increments (other than routine annual cost of living increase increments) and promotions from assistant professor to associate professor, as well as, associate professor to professor, must be approved by faculty recruitment & promotions committee
- **Superannuation:** Superannuation age for employees of the Amrita Vishwa Vidyapeetham shall be 58 years, and shall superannuate on the last date of the month in which the employee attains the superannuating age.
- **Termination of Appointment:** An employee on Probation is liable to be terminated from service with either side serving one month notice period or salary in lieu of the notice period. A permanent employee in the Academic Departments shall serve three months' notice period or salary in lieu of the notice period which shall invariably be in a manner that shall not affect the academic responsibilities entrusted to a faculty and with due diligence. A permanent employee in the Non-Teaching Departments shall serve one month's notice period or salary in lieu of the notice period.
- **Leave:** An employee may avail leave as per the rules and regulation of Amrita Vishwa Vidyapeetham as will be in vogue at any given time.

Conduct

An employee shall adhere to the Conduct Rules of Amrita Vishwa Vidyapeetham, while in service failing which they are liable for punitive action for violation of such Rules and in the extreme case termination services without notice and/or compensation thereof. They shall be laid down as an Annexure to the appointment letter and each appointee shall be required to sign an acknowledge as having read and accepted the same. The conduct rules are as follows:

(a) Every employee shall at all times maintain absolute integrity and devotion to duty and also be honest and impartial in official dealings

(b) An employee shall at all times be courteous with other members of the staff, students, and members of the public

(c) Unless otherwise stated specifically in the terms of appointment, every employee is a whole time employee of Amrita Vishwa Vidyapeetham and may be called upon to perform such duties, as may be assigned by competent authority, beyond scheduled working hours and on Closed Holidays and Sundays. These duties shall inter-alia include attendance at meetings of Committees to which an employee may be appointed by Amrita Vishwa Vidyapeetham

(d) An employee shall be required to observed the scheduled hours of work, during which the employee must be present at the designated place of duty

(e) Except for valid reasons and/or unforeseen contingencies, no employee shall be absent from duty without prior permission

(f) An Employee should perform all the duties that are entrusted to the post designated to the employee and also any work that may be assigned by Dean/Chairperson/Competent Authority including attending to exam work assigned either by the Department or Amrita Vishwa Vidyapeetham during any time of the year. An employee shall work diligently and safeguard the interest and objectives of Amrita Vishwa Vidyapeetham at all times

(g) An employee will be responsible for the well being of students and their welfare while maintaining their discipline.

(h) Complete discipline and decorum shall be maintained in the campus and an employee shall not act in a manner that shall tarnish or be detrimental to the reputation of Amrita Vishwa Vidyapeetham

(i) No employee shall leave their duty station without the prior permission of the Competent Authority/Dean/Chairperson or Head of Department, during leave/vacation or otherwise. When leaving their duty station, they shall clearly inform in writing their contact details during the period of such absence.

10.1.4 Decentralization in working and grievance redressal mechanism (5) Institute Marks : 5.00

There is an exclusive department to address student grievances headed by a Prof. and assisted by a team of faculty. Members of the committee include:

- Dr. (Col) P N Kumar (Head, Student Affairs)
- Dr. Shailendra K (Prof. Students Welfare)
- Dr. Janci Rani P R (Student Counsellor)
- Dr. Sowndaram (Professional Counsellor)
- Ms. Rajalakshmi (Professional Counsellor)
- Dr. Tharani Devi (Faculty, Student Welfare)

The above members are assisted by the department student counsellors and advisors.

The following committees are also constituted for addressing faculty and student grievances involving sexual harassment and SC/ST grievance cell.

Anti-Ragging Committee

Dr.Sasangan Ramanathan	Chairperson	Dr. M.Saimurugan	Member
Dr. (Col). PN Kumar	Member	Ms. P Ambika	Member
CCWH	Member	Dr. B Rajathilagam	Member
Dr. BalajeeRamakrishnanda	Member	Dr. R Ramanathan	Member
Dr. R Gowtham	Member	Dr. S.Selva Kumar	Member

Disciplinary Committee

Dr. (Col). PN Kumar	Chairperson	Mr. D Unnikrishnan	Member
Dr. K.Bagavinar	Member	Dr. N.Harini	Member
Dr. P V Suneesh	Member	Dr. P Prakash	Member
Mr. N.Praveen Kumar	Member	Dr. A.Balasubramanian	Member
Dr. Udaya Bhaskar Reddy	Member	Mr. M.Ganesan	Member
Mr .T R Senthil Kumar	Member	Mr. N.Mohankumar	Member
Mr. A S Prakash	Member	Dr. K R M Vijaya Chandrakala	Member
Dr. B. Soundharajan	Member	Mr. M Pushparajan	Member

Women's Complaints &Redressal

Dr. K M.Mini	Chairperson	Ms K Shobana	Member
Dr. P. Supriya	Member	Dr. Sasangan Ramanathan	Member

Emergency Response Team Members

Dr. R Saravanan	Dr. K Bagavinar
Mr. S Adarsh	Dr. P.R.Janci Rani
Mr. C Arunkumar	Mr. V.V.SajithVariyer
Mr. Gopakumar	Ms. R.Arthi
Mr. Vijay Narayanan	Mr. M Ritwik
Mr. P Sivaraj	Mr. Kalidas

SC/ST Complaints & Redressal Cell.

Dr. S Mahadevan	Chairman
Dr. T Palanisamy	Member
Dr.S.Padmavathi	Member
Dr. Anju S Pillai	Member
Mr.K.Bakiaraj	Member

10.1.5 Delegation of financial powers (5) Institute Marks : 5.00

a. Department chairperson verifies the accuracy and validity of request for financial commitment from the department faculty. There is no ceiling for the first line of approval by the department chairperson.
b. All financial approvals/commitments, regardless of the amount are routed through the office of Dean Engineering (campus Head).
c. If the requested amount is greater than Rs. 1 Lakh, a detailed discussion is held between the Dean and the chairperson before approval.
d. >99% of the expense request has been approved in the past 5 years, up to a maximum of Rs. 50 Lakhs.

10.1.6 Transparency and availability of correct/unambiguous information in public domain (5) Institute Marks : 5.00

Yes. The following steps are taken to ensure accurate information dissemination to all the stake holders.

a. At the beginning of every semester, the academic calendar, time table for all classes, faculty time table and lab schedule are made available to all stake holders. This information is available to everyone from within the campus as well as from outside the campus through virtual private network.
b. Policy information, list of members of committees, upcoming events, and student grades are available in the campus intranet (link: https://intranet.cb.amrita.edu (https://intranet.cb.amrita.edu))
c. Access to library digital content is also available via the campus intranet.

10.2 Budget Allocation, Utilization, and Public Accounting at Institute level (15) Total Marks 15.00

:

Total Income at Institute level: For CFY,CFYm1,CFYm2 & CFYm3
CFY : (Current Financial Year),
CFYm1 : (Current Financial Year minus 1),
CFYm2 : (Current Financial Year minus 2) and
CFYm3 : (Current Financial Year minus 3)

Table 1 - CFY 2018-2019

Total Income 1878509606				Actual expenditure(till...): 996697620			Total No. Of Students 5021
Fee	Govt.	Grants	Other sources(specify) Interest+Van fe	Recurring including salaries	Non Recurring	Special Projects/Anyother, specify	Expenditure per student
1851943877	0	0	26565729	735467520	261230100		198505.80

Table 2 - CFYm1 2017-2018

Total Income 1439202987				Actual expenditure(till...): 1221086281			Total No. Of Students 5013
Fee	Govt.	Grants	Other sources(specify) Interest+Van fe	Recurring including salaries	Non Recurring	Special Projects/Anyother, specify	Expenditure per student
1337700296	0	69946699	31555992	992089872	228996409		243583.94

Table 3 - CFYm2 2016-2017

Total Income 1169025805				Actual expenditure(till...): 992674085			Total No. Of Students 5124
Fee	Govt.	Grants	Other sources(specify) Interest+Van fe	Recurring including salaries	Non Recurring	Special Projects/Anyother, specify	Expenditure per student
1144503056	0	0	24522749	813012795	179661290		193730.31

Table 4 - CFYm3 2015-2016

Total Income 1052373840				Actual expenditure(till...): 936583197			Total No. Of Students 5014
Fee	Govt.	Grants	Other sources(specify) Interest+Van fe	Recurring including salaries	Non Recurring	Special Projects/Anyother, specify	Expenditure per student
1028375112	0	0	23998728	767486113	169097084		186793.62

Items	Budgeted in 2018-2019	Actual Expenses in 2018-2019 till	Budgeted in 2017-2018	Actual Expenses in 2017-2018 till	Budgeted in 2016-2017	Actual Expenses in 2016-2017 till	Budgeted in 2015-2016	Actual Expenses in 2015-2016 till
Infrastructure Built-Up	2400000	201919(	147500(	1474121	130750(	130687(	1174300	1173968
Library	4500000	365399[	556000(	5559522	683000(	6717117	172900(	1723593
Laboratory equipment	2400000	227710(	260000(	2598901	423000(	4225657	345300(	3446433
Laboratory consumables	4200000	3556742	408000(	4078747	412000(	4034704	252000(	2387119
Teaching and non-teaching stal	5800000	3771591	534405(	534404[	522540(	522427[	494400(	494306(
Maintenance and spares	5350000	4394574	448000(	4485107	355600(	354878[	494600(	493898(
R&D	6000000	170682[	822350(	8223867	133000(	1315116	133000(	132456(
Training and Travel	1200000	573054(	1180000	1079783	1201100	122450[	123400(	1228074
Miscellaneous Expenses	1650000	137033[	153000(	1513232	137230(	134174(	1112800	1074483
Others	2000000	166334(	164000(	1643957	886000(	9149262	846300(	8842841
Total	**1383700000**	**996697620**	**1223420000**	**1221086280**	**993241000**	**992674085**	**937180000**	**936583197**

10.2.1 Adequacy of budget allocation (5) Institute Marks : 5.00

The yearly budget is prepared based on the academic and research requirements of the departments. Budget discussion is held at the department level headed by the chairperson. A formal budget is submitted to the Dean for review. Dean will consolidate the campus level budget and submit to management for approval and sanction. Predominantly, the management approves the final budget submitted by the Dean. For the past 4 years (including the current financial year), the allocated budget and utilization have been adequate.

10.2.2 Utilization of allocated funds (5) Institute Marks : 5.00

Individual department chairpersons are notified regarding the sanctioned budget. Expenses for infra-structure, maintenance and house-keeping are maintained at the University/campus level, while the departments are responsible for expenses related to lab equipment, consumables, travel and training expense etc. Library expense is approved and maintained by the Dean/Principal. The sanctioned budget was effectively utilized for the past 4 years.

10.2.3 Availability of the audited statements on the institute's website (5) Institute Marks : 5.00

Yes

10.3 Program Specific Budget Allocation, Utilization (30) Total Marks 30.00

:

Total Income at Institute level: For CFY,CFYm1,CFYm2 & CFYm3
CFY: (Current Financial Year),
CFYm1 : (Current Financial Year minus 1),
CFYm2 : (Current Financial Year minus 2) and
CFYm3 : (Current Financial Year minus 3)

Table 1 :: CFY 2018-2019

Total Budget 174000000		Actual expenditure (till…): 167536081		Total No. Of Students 811
Non Recurring	Recurring	Non Recurring	Recurring	Expenditure per student
47000000	127000000	42621911	124914170	206579.63

Table 2 :: CFYm1 2017-2018

Total Budget 177500000		Actual expenditure (till…): 175043789		Total No. Of Students 835
Non Recurring	Recurring	Non Recurring	Recurring	Expenditure per student
40000000	137500000	38705689	136338100	209633.28

Table 3 :: CFYm2 2016-2017

Total Budget 135000000		Actual expenditure (till…): 132832349		Total No. Of Students 812
Non Recurring	Recurring	Non Recurring	Recurring	Expenditure per student
25000000	110000000	23502804	109329545	163586.64

Table 4 :: CFYm3 2015-2016

Total Budget 130000000		Actual expenditure (till…): 124613773		Total No. Of Students 773
Non Recurring	Recurring	Non Recurring	Recurring	Expenditure per student
25000000	105000000	23057236	101556537	161207.99

Items	Budgeted in 2018-2019	Actual Expenses in 2018-2019 till	Budgeted in 2017-2018	Actual Expenses in 2017-2018 till	Budgeted in 2016-2017	Actual Expenses in 2016-2017 till	Budgeted in 2015-2016	Actual Expenses in 2015-2016 till
Laboratory equipment	300000	247045	220000	2112844	150000	1155112	800000	753007
Software	500000	427605	700000	562461	650000	573174	160000	154812
Laboratory consumable	120000	1012277	800000	732419	500000	429123	500000	257962
Maintenance and spares	900000	722221	600000	594219	600000	582399	400000	44152
R & D	750000	993068	175000	174157	150000	1183006	180000	178500
Training and Travel	300000	110024	150000	99391	150000	81368	200000	178456
Miscellaneous	250000	2213392	252000	251094	220000	2111255	170000	164301
Total	**38400000**	**27869574**	**47150000**	**46626546**	**26900000**	**25116733**	**22300000**	**20996831**

10.3.1 Adequacy of budget allocation (10) Institute Marks : 10.00

The allocated budget was used to meet the requirements of purchase of new equipment, additional infrastructure needs, replacement and upgrade of old equipment, consumables for smooth operation of labs, and travel for conferences, workshops and faculty development programs. Spending of sanctioned amount is closely monitored by the department chairperson, Dean and accounts department. Tables B.10.3a and 10.3b show the budget allocation by management was adequate for the smooth functioning of the department in the past 4 years (including the financial year ending March 2020).

10.3.2 Utilization of allocated funds (20) Institute Marks : 20.00

The department chairperson is informed about the sanctioned budget prior to the beginning of the next financial year. Expenses related to the purchase of new equipment, software, laboratory consumables, repair/maintenance of lab equipment and travel are the responsibility of the department chairperson. Expense related requests are considered on a case by case basis and approved by Dean. Sanctioned budget was adequately managed over the last 4 years as seen in Tables B.10.3a and 10.3b.

10.4 Library and Internet (20) Total Marks 20.00

10.4.1 Quality of learning resources (hard/soft) (10)

Institute Marks : 10.00

1. Relevance of available learning resources including e- resources.

E-Resources	
e-Books	16434
e-Journals	14739
Databases	14
DVD/CD	5307
Dissertations	3797
Print Resources	
Books	67235
Periodicals	265

List of Databases

S. No	Database
1	ACM
2	ASCE
3	ASME
4	Access Engineering
5	ASTM
6	EBSCO: CMMC
7	IEEE Xplore
8	J-Gate (JET)
9	JSTOR
10	Science Direct
11	Scopus
12	Web of Science
13	Springer eJournals
14	Springer eBooks

2. Accessibility to students

- Fully Automated Library with LAN and Wi-Fi connection for accessing e-Resources and Internet
- Library is arranging orientation and Hands-on-training to all students.
- Working hours - 8 am to 10 pm
- All e-resources accessible across the campus through WiFi
- Digital Library with Ethernet, UPS connectivity, seating capacity of 170
- WEB OPAC
- Institutional Repository (Soft copy of Ph.D Theses, Dissertation, Project reports, Examination papers)
- New Arrival Bulletin

3.Support to students for self learning activities

1. NPTEL
2. National Digital Library
3. Swayam Prabha,
4. e-PG Pathsala, Swayam,
5. South Asian Archive
6. EDX
7. UGC MOOCs
8. National Academy Repository

9. VIDYA Digital Library
10. World eBook Library

10.4.2 Internet (10) Institute Marks : 10.00

Name of the Internet bandwith with provider

- 1 Gbps NKN Link – BSNL
- 100 Mbps – BSNL
- 80 Mbps - Blu Ultraband

Wi-Fi availability: WiFi is available at all Academic Areas, Library and Hostels. All students can access the WiFi using their own username and password.

Internet access in labs, classrooms, library and offices of all Departments: Internet can be accessed from all labs, library, offices, departments etc. Network connectivity is also provided in all classrooms with internet. This connectivity is through LAN cables over and above the WiFi connectivity provided. All the buildings are interlinked through high speed fibre cable with High Bandwidth connectivity.

Security arrangements: Network security is provided using a perimeter security device and also at all end points. At the perimeter a dual firewalling solution with Basic Firewalling features, Content/Application Filtering, Bandwidth Management, Global VPN, Gateway Antivirus, Botnet Filter, Intrusion Prevention, Anti-Spyware, Geo IP Filtering and Failover Load Balancing take care of all traffic that comes into the campus and going out of the campus. At all end points, desktops are installed.

Annexure I
(A) PROGRAM OUTCOME (POs)

Engineering Graduates will be able to:

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

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

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

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

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: 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. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

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

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

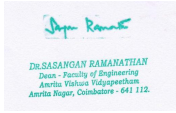
(B) PROGRAM SPECIFIC OUTCOME (PSOs)
Program should specify 2-4 program specific outcomes.

PSO1	Apply knowledge acquired in the field of Design, Manufacturing, Thermal, and Fluid sciences to solve real-world engineering problems using emerging technologies
PSO2	Extend and implement innovative thinking on product design and development with the aid of modern tools
PSO3	Apply the Science and Engineering knowledge for materials design, and processing for development and improvement of products and processes

Declaration

The head of the institution needs to make a declaration as per the format given -

Head of the Institute
Name : Dr.Sasangan Ramanathan
Designation : Dean - Engineering
Signature :



Seal of The Institution :

Place : Coimbatore
Date : 14-01-2020 16:25:05